The Heavy Hand of the Green Imaginary:

The reconfiguration of hydrosocial territories in Uzbekistan

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LIST OF ABBREVIATIONS

ADB	Asian Development Bank
BISA	Irrigation Basin Management Authorities
BVO	Basin Water Management Organisation
CAREC	Central Asia Regional Economic Cooperation
CDA	Critical Discourse Analysis
CR	Critical Realism
CPS	Country Partner Strategy
DAC	Development Assistance Committee
EBRD	European Bank for Reconstruction and Development
EU	European Union
FAO	Food and Agriculture Organisation
GAP	Good Agricultural Practices
GEFF	Green Economy Financing Facility
GGGI	Global Green Growth Institute
GIZ	German Society for International Cooperation
GoU	Government of Uzbekistan
GWP	Global Water Partnership
HACCP	Hazard Analysis and Critical Control Points
HDP	Horticulture Development Project
HSP	Horticulture Support Project
HVCDP	Horticulture Value Chain Development Project
ICWC	Interstate Coordination Water Commission
IFI	International Financial Institutions
IFAD	International Fund for Agriculture and Development
ILO	International Labour Organisation
IMF	International Monetary Fund
ISA	Irrigation System Authorities
IWRM	Integrated Water Resources Management
JICA	Japan International Cooperation Agency
MAWR	Ministry of Water Resources and Agriculture
MDG	Millennium Development Goals
NGO	Non-Governmental Organisation
NIE	New Institutional Economics
ODA	Official Development Assistance

OECD	Organisation for Economic Cooperation and Development
ODI	Overseas Development Institute
OMOP	One Mahalla One Product
OVOP	One Village One Product
PPP	Public–Private Partnership
RESP	Rural Enterprise Support Project
RRA	Rural Restructuring Agency
SAP	Structural Adjustment Policies
SRA	Strategic–Relational Approach
SME	Small and Medium Enterprises
TA	Agriculture Technical Assistance
UNDP	United Nations Development Programme
UNECE	United Nations Economic Commission for Europe
UNEP	United Nations Environment Programme
UNESCAP	United Nations Economic and Social Commission for Asia and the Pacific
USAID	United States Agency for International Development
WB	World Bank
WCA	Water Consumer Association
WEF	World Economic Forum
WIS	Welfare Improvement Strategy
WUA	Water User Association

ABSTRACT

The Heavy Hand of the Green Imaginary: the reconfiguration of hydrosocial territories in Uzbekistan by M. Gazieva

This thesis is about how water flows are being reconfigured under Uzbekistan's ongoing agricultural modernisation, and how this impacts smallholder farmers. I draw on document analysis, semi-structured interviews, and two case studies in the Samarkand region's district of Jomboy to argue that agricultural modernisation, whose adoption emerged as a result of strategic-relational processes at the national and global scales, results in hydrosocial *re*territorialisation. I trace the emergence of intensive gardening and agricultural clusters to the Uzbek government's gradually increasing engagement with international financial institutions and development aid. I argue that the new agri-model is folded into the Green Economy development strategy that Uzbekistan adopted to render its activities 'legible' by synchronising them with global norms. In agriculture, the Green Economy gives rise to what I call a 'New Agrarian Imaginary' – an ideal vision, a mental map for how Uzbekistan's agriculture *should* look. Hydrosocial reterritorialisation, in turn, is a spatial and material expression of the contradiction between the New Agrarian Imaginary and its encounter with Uzbekistan's continuously transforming structural context.

Hydrosocial reterritorialisation is characterised by the dis-embedding of hydrosocial relations previously configured around Uzbekistan's cotton production for the state order. This change, as I argue, marginalises smallholders by disrupting socially mediated water contestation, characteristic of rural resource relations for most of Uzbekistan's Soviet and independent history. For smallholders, hydrosocial reterritorialisation translates into individualisation of water use, or the reliance on groundwater resources, which I call *verticalisation,* a 'slow-violent' process. I conclude that new hydrosocial territorialities are associated with rural fragmentation and precarity and are perceived ambiguously by rural dwellers, especially women.

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INTRODUCTION

آب از سرچشمه گل آلود است

The water is muddy at the source.

(Persian proverb)

In November 2025, Tehran faced the risk of evacuation because its dams were running dry. Ten million people in the 39th largest city in the world feared displacement because of water scarcity (Al Jazeera, 2025). At the time, Iran's leadership recognised that this was a solution of last resort, but increasingly, measures on this scale are stretching our sense of what is possible. Yet, Iran's dire state of water affairs rings a bell. The last time readers came across such dramatic news was during Cape Town's 2017 water crisis, when the government announced an apocalyptic 'day zero – a moment when dam levels would be so low that they would turn off the taps in Cape Town and send people to communal water collection points'. To meet their 450 million litres/day target, Capetonians feverishly resorted to 'standing over buckets to catch and re-use that water', flushing once a day and recycling washing machine water (The Guardian, 2018).

Amidst the drum roll of flash news building suspense toward an impending climate collapse, there are subtler pieces, on the sidelines of front pages, with titles such as 'It's plunder': Mexico desperate for water while drinks companies use billions of litres' (The Guardian, 2022) or 'It's not drought - it's looting': the Spanish villages where people are forced to buy back their own drinking water' (The Guardian, 2024) or 'Martinique's water woes drive anger at French rule' (Reuters, 2025). These are peripheral stories from peripheral places, gathering a maximum of 220 likes on Twitter (X), surfacing occasionally, scattered across the media, reshared on social media by an equally scattered group of people. These articles tell stories of extractivisms and water concessions to private companies, and the resulting dispossession of communities residing near Coca-Cola, Nestlé, or Danone factories, who struggle to access water and grow food. In these articles, the causes of water shortage are very clear; they do not engage in some abstract discussion about 'poor governance', 'failing institutions' or the most obscuring of all – 'climate change'.

This thesis is about the policies and mechanisms that produce this sort of water inequality in Uzbekistan. Uzbekistan is 'water stressed' (UNECE, 2025); however, this stress is experienced unevenly, and, as this research finds, the modalities of this experience have also changed. I trace the evolution of this transformation by looking at how Uzbekistan and international development institutions' efforts to diversify the country's agricultural sector away from the production of cotton (and wheat) for the state order have shaped agricultural modernisation under the current, hegemonic project, the Green Economy. I look at how water governance policies have accompanied this shift, transformed how

smallholders access water, and left their imprint on rural livelihoods. Like Lyla Mehta in 2007, I ask 'whose scarcity?' (Mehta, 2007). If Uzbekistan is water stressed, who is experiencing this stress, and how is this inequality produced and reproduced?

1.1 Background

In 2019, Uzbekistan made headlines for receiving the Economist's 'country of the year' award, under the new president, Shavkat Mirziyoyev. Since his inauguration in September 2016, he spearheaded the transformation of Uzbekistan's economy and politics from an isolationist, hard-dictatorial, command system of the former president Islam Karimov, towards (partial) privatisation and liberalisation, marking the onset of an 'Uzbek Spring' (Lillis, 2017). His government liberalised the strictly regulated currency, overhauled the bureaucracy and security organisations, and, through a joy-inducing, unprecedented spree of back-to-back visits, normalised relations with Central Asian neighbours (Lemon, 2019). Most importantly, under his leadership, Uzbekistan eradicated child labour and slavery in its cotton fields, where an estimated two million children were ordered to toil every year (International Labour Organisation, 2022). Lemon (2019) describes Uzbekistan's transformation as 'authoritarian modernisation', characterised by elite reshuffling, a technocratic reorientation of the state apparatus, looser regulation of societal freedoms, and the strengthening of external ties, with models for development now including China, Singapore, and Kazakhstan.

For a country whose history was shaped by its extractive cotton economy, symbolised by the ecological devastation of the Aral Sea, cotton sector reforms mark a pivotal turn in the trajectory of Uzbekistan (Peterson, 2019). This is especially impressive considering that, as governor of Jizzakh province, Mirziyoyev was nicknamed 'Tyson' for his aggressive, heavy-handed methods of enforcing state cotton production quotas on farms. As a former Prime Minister of Uzbekistan and co-orchestrator of its notoriously repressive agricultural system, he is no outsider to the hard dictatorial tactics of Karimov himself (Lemon, 2019).

One of the reasons for modernising the agricultural sector is Uzbekistan's vulnerability to climate change. For decades, Uzbekistan has been considered a 'hot spot for severe water stress due to increasing temperatures' (Mitchell et al., 2017, p. 698), which would entrench its aridity. Rising temperatures are altering the seasonality of snowmelt discharge into transboundary rivers originating in upstream countries, namely Kyrgyzstan and Tajikistan, leading to excessive spring flows and parched summer months (Ibid.). At the transboundary level, water is acutely politicised as upstream countries have been pursuing energy self-sufficiency policies by building hydroelectric dams. The most recent threat comes from the Taliban government of Afghanistan's plan to construct the 285 km Qosh Tepa canal, which is expected to divert water from the Amu Darya to irrigate 55,000 hectares. This is predicted to lead to 'a notable decline in [Uzbekistan's] average water intake capacity along the middle and lower reaches of the [Amu Darya] – dropping from 80% to 65%' (Adylbekova, 2023).

Furthermore, Uzbekistan's irrigation infrastructure is in disrepair. The President acknowledged that 36% of the 39 billion cubic metres of water withdrawn from the Syr Darya and Amu Darya for agriculture are lost through unlined canals. Of these irrigation canals, 77% need rehabilitation. Out of 1,687 registered pumping stations, 94% 'have already completed their standard terms of service, necessitating modernisation and replacement'. Furrow irrigation is argued to be a driving cause of water waste, 'resulting in the inefficient use of more than 50%, or almost 20 billion cubic metres of water' (Ilkhamov, 2023, p. 3). 53% of irrigated lands exhibit secondary soil salinity, while 10.8% of pastures experience soil degradation (Koriyev et al., 2025, p. 5). This is a non-exhaustive list, but it indicates the magnitude of ecological and infrastructural damage that needs to be addressed.

Under Mirziyoyev's Uzbekistan, the 'Green Economy', encompassing agricultural diversification, agribusiness promotion, conversion of cotton and horticultural lands to agroclusters, now managed by foreign and local businesses, and subsidisation of 'water saving technologies', has been heralded as the solution to addressing these challenges (Presidential Decree No. UP-5853, 2019). The country committed to expanding lands under water-efficient technologies from '175 thousand hectares in 2020 to 1 million hectares by 2025, and up to 2 million by 2030', out of a total of 4.4 million ha of irrigated land (Ilkhamov, 2023, p. 8). The Green Economy, in turn, is the contemporary global paradigm in sustainable development, premised on the idea that economic expansion 'is compatible with our planet's ecology, as technological change and substitution will allow us to absolutely decouple GDP growth from resource use and carbon emissions' (Hickel and Kallis, 2020, p. 469). Uzbekistan has fully embraced this promise, adopting the Green Economy as the key pillar for the 'New Uzbekistan' (Yangi O'zbekiston) strategy, where 'green technologies' are to be implemented in all sectors of the economy (Presidential Decree No. 60, 2022). The Green Economy has become Uzbekistan's 'hegemonic project' (Jessop, 2014c) through which it can shed its past resource excesses and reinvent itself as a modern, clean, and green nation.

At the same time, Uzbekistan's efforts to transform the agricultural sector by reining in 'inefficiencies', reignites the question of the fate of its rural dwellers, whose strategies of resource access were shaped by a state order system for cotton that defined Uzbekistan's agrarian relations for nearly a century: under the Soviet Union, and for over 30 years after its independence. Specific to water, the sweeping reforms overtaking Uzbekistan are bound to transform distributional dynamics, particularly for the rural poor. Examples from across the world demonstrate that large-scale agricultural change encompasses variegated reconfigurations of relations between humans and their environment (Swyngedouw, 2015) often left invisible amidst the thicket of narratives, planning, and economic and political imaginaries (Liao and Schmidt, 2023; Mehta et al., 2012). Rendering these reconfigurations visible is the aim of this thesis.

1.2 Rationale, research questions, and argument

My initial motivation for this research was to immerse myself in, and theorise the relationship between formal and informal practices between small and large farmers within Uzbekistan's Water User Associations (WUAs). WUAs are local-level, participatory water governance structures established along hydrographic boundaries to institutionalise equitable water-sharing. They were endorsed within the Integrated Water Resources Management (IWRM) framework, globally proselytised by Western institutions under the 'good governance' development paradigm (Kim and Hornidge, 2016). Having reviewed a vast body of literature on the topic in Uzbekistan (Abdullaev and Mollinga, 2010; Eichholz et al., 2013; Moss and Hamidov, 2016; Mukhamedova and Wegerich, 2014; Oberkircher, 2011, non-exhaustive) I was inspired to build on this literature and develop an up-to-date typology of water-use practices to contribute to scholarship on *informality.*

However, a year into my research, during my very first interview with an employee of a water-related international organisation, I was caught off guard upon learning that Uzbekistan's WUAs had been dissolved. During the interview, my interlocutor was gravely concerned about the implications of WUAs' dissolution for small farmers, as there is currently no institutional basis to meet their water needs. However ineffective Uzbekistan's WUAs had been, as my interlocutor confided, it was better than nothing. Red and foggy from the exposure of my rookie status, I realised mid-conversation that amidst all this literature reviewing and preparation for fieldwork, I had failed to track this vital change in Uzbekistan. Keen to recover my scholarly dignity, I ventured into the causes of WUA dissolution under Uzbekistan's agricultural modernisation, which became the entry point into the messy contemporary history of Uzbekistan's water policy. If Uzbekistan is liberalising and modernising, and opening up, and becoming the country of the year, why would it dissolve the very thing that epitomises this openness in agriculture, a sector whose reform became the emblem of Uzbekistan's celebrated transformation?

My research questions, therefore, are:

1) Why were WUAs dismantled?
2) How does Uzbekistan's agricultural modernisation reconfigure water access relations?
3) Impact on smallholders: How is the reconfiguration of water access relations affecting small farmers in Uzbekistan? How are these new relations experienced? How does this affect the continuity of smallholding in Uzbekistan?

My foray into the rich and interdisciplinary realm of Uzbekistan's hydro-agrarian change led me to a three-tiered, iteratively developed theoretical framework that holds this thesis together. It consists of: 1) Bob Jessop's strategic-relational approach (SRA) as the (meta)-theoretical scaffolding that runs through the three tiers, combined with 2) the political ecology concept 'hydrosocial territories' as well as 3) social reproduction and critical agrarian studies, elaborated in detail in Chapter 3.

In short, SRA is a Marxist-inspired (capitalist) state theory that views the state as a social relation and a strategic terrain where the balance of (class) forces competes over their respective (capital) accumulation strategies within an institutionally structured context. The state form is an expression of this balance of forces, which seeks to maintain order through 'hegemonic projects'. Institutions, in turn, have strategic biases (selectivities) that lead them to privilege certain strategies, interests, and actors over others. Political outcomes, therefore, arise from a dialectical interaction between strategic agency and structurally selective contexts, producing historically contingent and patterned forms of state action (Jessop, 2007). 'Hydrosocial territories', in turn, conceives of human-water relations as a territorially bound expression of contested political and economic imaginaries, where dominant ideas tend to prevail, but are nonetheless contested at multiple scales (Boelens et al., 2016). Social reproduction, lastly, foregrounds processes that create and sustain the conditions of the labour force within the contradictions of capitalism (Katz, 2001). In this thesis, these three tiers help me account for how and why the state adopts certain policy actions (WUAs, the Green Economy), how these actions transform water resource use, and the implications of these transformations for society's ability to reproduce itself.

This thesis unfolds in layers. First, I argue that WUAs were dismantled because they no longer served Uzbekistan's agricultural accumulation strategy after agricultural modernisation. Using the SRA, I foreground a key argument in existing scholarship on water and agriculture in Uzbekistan that WUAs filled an institutional void in water governance created by agricultural decollectivisation after the fall of the Soviet Union. WUAs, interacting with Uzbekistan's strategic context, served to uphold, rather than challenge, water-access relations around cotton production for the state order. Cotton production for the state order, in turn, hinged upon a bimodal agricultural structure, within which smallholders, particularly women, were the primary producers of food. I argue that water relations, within this bimodal, cotton-oriented system, constituted a 'modality of hydrosocial territorialisation'. This modality was defined by reliance on surface-level water resources, mediated by territorially bound social interdependencies, or patron-client relations, between local state actors, the WUA, private farmers and smallholders.

Second, I trace the roots of Uzbekistan's new accumulation strategy under contemporary agricultural modernisation, to show that they are a process of strategic-relational contingency of development institutions' failed attempts to reform the cotton sector during the rule of the former President Islam Karimov. Within Uzbekistan's strategic context, these evolved into interventions in agricultural diversification that supported the rise of horticultural agribusiness and a techno-managerial approach to the wide-scale dissemination of water-efficient technologies. This formed the basis of the agricultural modernisation strategy under the Green Economy, which, within the horticultural sector, is geared towards agribusiness-led export growth, set to replace smallholders' share in food production, rendering their economic role gradually irrelevant. I argue that these changes are backed by a 'New Agrarian Imaginary', an ideal vision of agricultural landscapes that government actors, international development

institutions, and the newly emerging agribusiness class are working to realise. With the advent of new agricultural players, water governance was, as a result, recentralised by dissolving WUAs, and streamlined to now service much larger, capitalised farms.

Third, under the Green Economy, agricultural modernisation engenders new forms of water dispossession by dis-embedding surface water interdependencies between various producer types. This dis-embedding of dependencies is again a process of strategic-relational dynamics, such as the interaction of the continued centralisation of agricultural production and water allocation policies, with the new mandate to prioritise agribusiness, particularly those who install 'water-saving technologies'. I argue that these policies gradually strip smallholders of their historic practices of water contestation around negotiation with commercial farmers, leading to hydrosocial *re*territorialisation. The production of new hydrosocial territoriality, as I demonstrate, is materially expressed in increasing hydrosocial *verticalisation*: reliance on groundwater resources through hand pumps and artesian wells. This individualises water use and creates new localised spatialities at the level of the village.

Finally, among smallholders, hydrosocial *re*territorialisation engenders new forms of precarity around water access and produces ambivalent effects among rural dwellers, particularly women, who bear the brunt of new water scarcities due to their historic, social reproductive role of maintaining smallholding plots. Ambivalence stems from the contradictory process of increasing difficulty in maintaining plot production due to water-access challenges, alongside new opportunities to work in horticultural agribusiness under exploitative terms that are not unwelcome. I conclude that the cumulative result of agricultural transformation has stratifying effects that unfold along gendered lines.

1.3 Thesis structure

Chapter 2 provides a critical overview of the evolution of mainstream development paradigms, from modernisation theory and the Green Revolution, through to the IWRM informed by the 'good governance agenda', and up to the contemporary 'Green Economy'. It draws on within-discipline and critical perspectives to identify changes and continuities in schools of thought and policy interventions inherent in these paradigms. This chapter provides essential global context for understanding development interventions in Uzbekistan.

In Chapter 3, I present a synthetic theoretical framework based on Ioris' (2012) trialectics of the state, nature and society. Because my primary concern is understanding the transformation of nature-society relations, I ground this thesis in the discipline of political ecology of water. At the same time, because I identify the state as the key mediator of hydrosocial transformation, I rely on Bob Jessop's Strategic-Relational Approach (SRA) to provide the theoretical scaffolding of this thesis, while combining it with the concept of 'hydrosocial territories' and social reproduction. These three lenses constitute the three-tiered theoretical approach, corresponding to three levels of analysis.

The ontological and epistemological position of this research is addressed in Chapter 4. It is rooted in Roy Bhaskar's Critical Realism (CR), a philosophical and analytical lens that inspired Jessop's SRA. In this chapter, I discuss CR's layered ontology and how it translates into methodology and theoretical argumentation rooted in 'retroduction'. I also discuss the range of data used in this research, namely document analysis, 56 semi-structured interviews, two case studies, informal conversations, group discussions, and an instance of participant observation.

Chapter 5 serves two functions. First, it provides a historical background on Uzbekistan's agricultural structure and the water relations surrounding it, covering the period from the Russian Empire to the presidency of Islam Karimov. The second purpose of the chapter is to draw on and reinterpret the large body of scholarship on Uzbekistan's water and agriculture after decollectivisation, to make the theoretical argument that water access relations around the state order for cotton constituted a modality of hydrosocial territorialisation.

Chapters 6-8 constitute the empirical core of this thesis. In Chapter 6, I draw on document analysis of development reports and legislation, and to a lesser extent, elite interviews, to trace the strategic-relational dynamics that shaped agricultural modernisation under the Green Economy. Chapter 7, in turn, looks at mid- and local-level interactions to 1) explain the mechanisms that produce new forms of water scarcity in Uzbekistan, and 2) how these mechanisms are expressed on the ground, and particularly, their implications for the experience of water access among smallholders. Chapter 8 goes beyond the production of water scarcities to look at how new hydro-territorial spatialities are implicated in smallholders' everyday labour, especially women, both on the plot and beyond the plot.

Chapter 9 concludes by summarising the thesis's main arguments and suggesting new avenues for research.

2. A CRITICAL OVERVIEW OF RELEVANT DEVELOPMENT PARADIGMS

Introduction

To contextualise Uzbekistan's experience within global trends, this chapter historicises two pivotal developmental paradigms, Integrated Water Resources Management (IWRM) and the Green Economy, by tracing the evolution of hegemonic development thinking. I identify key moments of rupture and continuity in development aid's attitudes to agricultural modernisation, irrigation and small farmers. This chapter is split into three sections: 1) the Green Revolution, 2) IWRM and the hegemonic assumptions on which it is based, namely: crisis narratives, marketisation and participation, and 3) the Green Economy. The Green Revolution serves as the starting point because it is the origin of developmental policies under neoinstitutionalism and the Green Economy, whose implementation in Uzbekistan I scrutinise in later chapters. In this chapter, I draw on academic and, to a lesser extent, grey literature on these development frameworks from both classical and critical perspectives, omitting most critical agrarian and water studies that feature in the theoretical framework.

In summary, I trace how development has moved on from IWRM's participatory paradigm. Furthermore, despite what on the surface looks like substantial progress across historical time periods, the common thread that cuts through mainstream development discourse, whose mark on the world has so far prevailed, is the endorsement of depoliticised growth based on capital accumulation, and techno-managerialism with uneven distributional outcomes. I dedicate considerable attention to key assumptions embedded in IWRM and the ideological 'moment' it represents. This is for two reasons. The first is that IWRM's unfolding in Uzbekistan represents a key problematic in this thesis and is foundational to my treatment of the state of Uzbekistan's rural water relations prior to recent agricultural modernisation and the Green Economy. The second is that IWRM and the Green Economy have substantial overlap: both are fuelled by the ethos of marketisation and legitimised by ecological crisis narratives. The key difference, however, is the Green Economy's de-prioritisation of participation in resource governance in favour of a re-entrenchment of techno-optimism highly characteristic of the Green Revolution some 60 years prior. Ultimately, mainstream development thinking has changed in form while exhibiting important consistencies in substance – and even participatory governance, which appears to interrupt this pattern, was fundamentally depoliticising as the principles embedded within it have not prevented its appropriation by local and national political economies.

2.1 Modernisation theory and the Green Revolution

In US agricultural development policy, the principles of modernisation theory formed the basis for the Green Revolution in Latin America, the Middle East and South and Southeast Asia, operationalised by the Rockefeller Foundation, Ford Foundation and eventually the World Bank and other agencies such as USAID, during the Cold War (Holt-Giménez and Kerssen, 2015; Mueller, 2013; Parayil, 2003). The Green Revolution was nominally known to have lasted from 1943 until the 1970s (Patel, 2013), as, famously, the agricultural lever for the realisation of modernisation's promises. It was based on a global, modern, high-yielding seed diffusion programme that entailed massive transfers of capital and technology from developed economies, led by the US, to newly independent states after the breakup of the colonies. It sought to create the conditions for technology spillovers by setting up research centres and disbursing loans to countries to encourage agricultural and irrigation modernisation and state support for fertilisers (Baranski, 2022; Feder, 1976). Some key characteristics of high-yielding varieties were their responsiveness to chemical fertilisers, the quality of being stiff-stemmed, with faster maturation time, with an average of 110 days instead of 180, allowing the possibility of two to three harvests a year (Moseley, 2015). Because the Green Revolution served geopolitical interests, the methods of its spread were not entirely benign; for example in the case of India, during an ecological and political crisis in the mid-1960s, food aid was leveraged to obtain concessions for fertiliser imports, land policy reforms, and minimum support price for wheat, as well as to transform the Indian agricultural research system (Baranski, 2022).

Proponents of modernisation theory advocate for a phasing out of subsistence production towards full commercialisation, yet recognise that the path towards this is rugged (Fafchamps, 1992; Kennedy and Von Braun, 1986; Von Braun and Kennedy, 1994). Commercialisation is defined as the 'degree of participation in the (output) market, with the focus very much on cash incomes', for profit maximisation, using traded inputs with a highly specialised product mix (Leavy and Poulton, 2007, p. 4). Food for subsistence, in turn, is typically grown on 1-2 ha plots, based on the global average (Poulton, 2017), to feed the household, using non-traded inputs and growing a wide range of products. Proponents of modernisation expected that industry and manufacturing would slowly drive the surplus labour out of subsistence and semi-subsistence agriculture into urban areas, which in turn would allow for the consolidation of landholdings and rise in agricultural incomes. In reality, outcomes depend on government policy; for example, whether there is public investment in smallholder agriculture in combination with labour-intensive industrialisation, or a shift towards capital-intensive industrialisation with low support for smallholders, which risks exacerbating inequality (Poulton, 2017). This sort of structural transformation is expected to be accompanied by a shift from traditional wholesale markets towards supermarkets, a phasing out of small shops, and generally, 'the inclusion of the rural economy into the national economy, and of the national economy into the global economy' (Frödin, 2013).

Initially, the Green Revolution was met with generous praise for its achievements in ending world hunger, and encouraging 'food security' (Moseley, 2015). Very soon, however, public opinion turned sour as reports of ecological harms – water-logging, salinisation, disease resistance and pesticide pollution – began to emerge (Moseley, 2015; Paddock, 1970). A part of the explanation is material: high-yielding varieties required particular agronomic conditions with reliance on large amounts of fertilisers and well-managed irrigation (Baranski, 2022), as 'on non-irrigated land, new varieties [fared] no better than the standard ones' (Paddock, 1970). Expansion of irrigated land was thus a prerequisite for the adoption of new seeds, and as noted by Paddock (1970): 'virtually all the new wheats in Mexico, India, Pakistan, and Turkey – the areas where they have made an impact – are grown under artificial irrigation' (p. 898).

The most notable criticism of the Green Revolution was that it empowered large farmers at the cost of smallholders and entrenched rural inequality (Baranski, 2022; Feder, 1976). To this day, the claim remains the subject of ongoing debate. Proponents of the Green Revolution, for example, argue that it has 'benefitted producers who control optimal production environments or who have access to such environments, irrespective of farm size' (Pinstrup-Andersen and Hazell, 1985, p. 9). As the argument goes, soil quality and access to irrigation play a greater role in determining technology adoption patterns than farm size, and those without access to these will miss out on the benefits of the Green Revolution. Responsibility for poor outcomes is devolved by the contention that national institutions and policymakers themselves carry a share of the responsibility for the exclusion of small farms by conceiving of large farms as more desirable (Pinstrup-Andersen and Hazell, 1985, p. 10).

Critical scholarship, in turn, largely drawing on the experience of India, focuses on the uneven distribution of technology during the Green Revolution engendered by the development programme's funding and dissemination structure, and the seeds themselves (Griffin, 1979; Shiva, 2016). Ultimately, it comes down to power. As put succinctly by Griffin (1979):

> The growth in inequality in rural areas stems in large part from the fact that small, poor peasants who have restricted access to credit, technical knowledge and the material means of production are unable to innovate as easily or as quickly as those who are landed, liquid and literate (p. 216).

This is because the scientific strategy behind the Green Revolution was 'landlord-biased' as the seeds it produced were usable by those who had access to capital, for example to purchase nitrogen fertiliser for higher yields, as well as irrigation facilities (Boyce, 2011, p. 10). Through specific, capital-intensive resource requirements, they homogenised agriculture by replacing the diverse and locally-oriented indigenous plant forms in favour of monocultures (Shiva, 2016), leading to land dispossession (grabs) and proletarianisation, where 'millions of peasant farmers were forced off the land to make way for larger, more capital-efficient farms' (Holt-Giménez and Patel, 2009, p. 27).

Furthermore, uneven technology adoption was associated with increased water inequality. In her incisive critique of the Green Revolution in Punjab, Shiva (1989) explains:

> The Green Revolution increased the need for irrigation water at two levels. Firstly, the shift from water prudent crops such as millets and oilseeds to monocultures and multi-cropping such as wheat and rice increased the demand for water inputs throughout the year. Secondly, the replacement of old varieties of wheat with new varieties of wheat and rice also increased the intensity of irrigation, which went up from 20 - 30% to 200 - 300% (p. 16-17)

Intensive irrigation, in turn, engendered the need for water storage systems and thus dams, leading to water centralisation, the production of scarcities through water diversions, contested across national and international borders, with the potential to spur conflict. The entrenchment of farm inequality caused by uneven access to technology was thus reproduced at the scale of water access. These intensifications are direct consequences of scarcity and surplus created by capital-intensive agriculture, as two sides of the same coin that create social, political, and economic crises, disproportionately affecting small farmers (Shiva, 2016).

By the early 1970s, US development institutions expressed their awareness that the gains from the Green Revolution had been unevenly distributed (Feder, 1976). The staunch belief in the 'trickle down' theory of distribution had begun to wane (Dorner, 1975). In his famous 1973 speech in Nairobi, World Bank President Robert McNamara announced a pivot in the organisation's strategy to address poverty and poor productivity of small farmers, admitting that:

> The data suggest that the decade of rapid growth has been accompanied by greater maldistribution of income in many developing countries, and that the problem is most severe in the countryside […]. One can conclude that policies aimed primarily at accelerating economic growth, in most developing countries, have benefitted mainly the upper 40% of the population and the allocation of public services and investment funds has tended to strengthen rather than to offset this trend (McNamara, 1973, p. 11).

Yet, the pivot was short-lived, as the Green Revolution was replaced by the notorious structural adjustment programmes (SAP) under the Washington Consensus of the 1980s, thus launching 'the great neoliberal push' by IFIs, (Harrison, 2004, p. 158). Until that point, 'development' was conceived of as state intervention in the economy, through planning and development programmes, an assumption that was swiftly challenged by SAPs' distortion-eliminating loan conditionalities (Ahmed and Lipton, 1997; Harrison, 2004). While SAPs' effects on small producers across the world were found to be mixed (Ahmed and Lipton, 1997; Boussard, 1992), their financial endorsement of liberalisation and expenditure cuts on government support for infrastructure, education, research, and social services engendered an anti-poor bias, disproportionately affecting smallholders (Heidhues and Obare, 2011).

Going back to the Green Revolution as the first global agricultural paradigm and precursor to subsequent overarching frameworks, such as the Green Economy (Patel, 2013), the key point on which criticisms of the Green Revolution (and modernisation) converge is that the movement offered techno-managerial solutions to inherently social and political problems (Baranski, 2022; Griffin, 1979; Harwood, 2009; Shiva, 2016). According to Harwood, the Green Revolution sidelined small peasants was partly due to the 'pressure from the Foundation for 'quick results as well as its nervousness about making any recommendations which might be seen as 'political'' (Harwood, 2009, p. 24). Similarly, Shiva, echoing Ferguson's thesis that development aid is an 'antipolitics machine' (Ferguson, 1990), concludes that 'Green Revolution politics was primarily a politics of depoliticisation' (Shiva, 2016, p. 42). In the tense and urgent context of the Cold War, 'mobilising science and technology in the service of counter-revolution' became a prerogative, one intentionally conceived by the Green Revolution's planners as distinct from questions of social equity and opportunity (H. Cleaver cited in Shiva, 2016, p. 42). The Green Revolution highlighted the potency of the relationships between international institutions, technology, resources, power, and agricultural development, an oft-undervalued dynamic that cuts through development initiatives to this day.

2.2 Integrated Water Resources Management

Integrated Water Resources Management (IWRM) is an offshoot of the 'good governance agenda', which, in turn, emerged out of the post-SAP malaise of economic decline and reduced state capacity. IWRM is a systems-based and policy-oriented conceptual framework formally introduced in the nineties, and used for analysing and addressing competing water uses (such as agriculture, energy, environment) at the river basin level, at both national intersectoral and transboundary cooperation (Biswas, 2008; Molle, 2008; Wichelns, 2017). It stems from the good-governance-affiliated New Institutional Economics and, more specifically, the work of Elinor Ostrom, a 2009 Nobel Prize winner in Economic Sciences for her analysis of the governance of the commons. Ostrom famously posited that users of common-pool resources (CPR) can establish rules and devise solutions to achieve equitable, fair and sustainable distribution. In this sense, she was sceptical of government intervention, arguing that 'the individual is more likely to shirk responsibility or freeride if governments intervene and disrupt the pattern of common pool management arrangements' (Wink, 2011, p. 23). Drawing on earlier research, she found that resource management can be enhanced through a cooperative, polycentric decision-making system that mirrors the market economy, where efficiency is improved by multiple players competing in the same market. This arrangement, as the thinking goes, diffuses the problem of resource misallocation and generates self-regulating tendencies. As a result, Ostrom challenged top-down impositions of resource management in favour of a community-based approach, which forms the basis of her design principles that have inspired the self-governance approach to water management, exemplified by the call for the establishment of Water User Associations (WUA) under IWRM, globally (Wink, 2011).

IWRM is the precursor to the 'Nexus' perspective (Wichelns, 2017), which later evolved to highlight the intersectoral management of water, evidenced by food-energy-water nexus approaches in later literature, discussed in the final section of this review. For a couple of decades, IWRM was the 'orthodoxy of water management' (Jeffrey and Gearey, 2006) and a lever for channelling large volumes of aid money to countries of the Global South, including countries of the former Soviet Union, and reshaping their national water governance institutions. Understanding the policies and literature IWRM produced helps situate Uzbekistan's own national water trajectory over the last twenty years.

The Global Water Partnership (GWP), an international network founded by the World Bank, United Nations Development Programme and the Swedish International Development Cooperation Agency (SIDA) to foster IWRM, defines it as:

> a process which promotes the co-ordinated development and management of water, land and related resources, in order to maximize the resultant economic and social welfare in an equitable manner without compromising the sustainability of vital ecosystems (GWP, 2011).

IWRM, as a global and unifying direction for water management gained momentum after the World Summit in Rio de Janeiro in 1992, which brought the leaders of 179 countries and culminated in the call for the adoption of the Dublin Principles, developed by a number of water experts in Dublin the same year (Borchardt et al., 2016). The Rio summit was also where the concept of 'sustainable development' was adopted, defined 'as development that meets the needs of the present without compromising the ability of future generations to meet their own needs' (Loiseau et al., 2016, p. 361).

The Dublin Principles were eventually synthesised into three main ideas comprising:

> (i) the integration of different sectors and different uses and users of water, (ii) the balancing of three pillars – economic, social and environmental sustainability and (iii) the participation of stakeholders in decision-making and the strengthening of the role of women'(Borchardt et al., 2016; 7).

These ideas were subsequently adopted by the GWP, itself created in Stockholm in December 1995, at a meeting that included governments, international organisations, multilateral banks, experts and the private sector. GWP's mission was to 'support improved water resources management and development at the local, national, regional and/or river basin level', cementing a new global paradigm for water governance (Rana and Kelly, 2004; viii). Since the establishment of the GWP, international development aid organisations such as the World Bank, USAID, the Asian Development Bank, among others, made the implementation of IWRM principles the guiding framework for investments in the water sector (Wink, 2011).

By 2002, after a series of intermediate international water conferences, the World Summit on Sustainable Development in Johannesburg required all countries to implement IWRM and water-

efficiency plans to be funded with millions of dollars in aid (Asthana, 2010; Borchardt et al., 2016). It led to substantial changes in the makeup of national water institutions, as governments, in response to the promise of finance, embarked on IWRM mainstreaming processes (Kim and Hornidge, 2016). The key pillars of IWRM include the transition of water management from administrative to hydrological water boundaries, a shift from a sectoral to cross-sectoral management which takes into consideration ground water, surface water, irrigation and hydro-power demands, bottom-up governance which involves water users in decision-making processes surrounding allocation, and a move from supply water management to demand management, which promotes the economic value of water (Zinzani, 2015).

While IWRM principles guide water governance across all levels of the water hierarchy, Water User Associations (WUA) serve as the 'final instance' along the chain, whose establishment was encouraged in all participating countries, including Uzbekistan, to ensure the equitable distribution of irrigation at the village level, through the mechanism of participatory water management (Dukhovnyĭ and Schutter, 2011a; Kim and Hornidge, 2016). By definition, WUAs are democratic, self-governing bodies responsible for managing the whole or parts of the irrigation system. They are designed to maximise water-use-efficiency and sustainability by requiring users (farmers, households etc.) to pay for water fees for the delivery and quantity of water (configurations vary by country). This is expected to encourage users to make their own management decisions regarding their water needs (Chuan, 2010; Zinzani, 2015).

2.2.1 Hegemonic debates around water: scarcity, marketisation and participation

As a sanctioned and globally agreed-upon concept, IWRM has been recognised to provide a common ground for water professionals to discuss ideas and learn from each other, motivate national processes of self-reflection surrounding water management, and empower NGOs and interest groups to campaign for their own issues (Molle, 2008). IWRM aims to change institutional structures by promoting an open dialogue and discursive style of governance through the involvement of all the relevant actors to foster consensus among stakeholders to reach a common good (Saravanan et al., 2009).

Yet as early as 1992, scholars began highlighting that governments are struggling to implement truly integrated water management (Jeffrey and Gearey, 2006). Others have complained that overall, IWRM has been lagging behind and 'has not induced major transformations in the management of freshwater resources' (Borchardt et al., 2016; 7). In a frequently cited study, Biswas argues that the IWRM framework is too amorphous and lacks the capacity to handle the complex and interconnected water problems, and that the gap between its theory and practice is too wide (Biswas, 2008; Kim and Hornidge, 2016).

Labelled by François Molle as a 'nirvana concept' (Molle, 2008), a prescriptive theory with 'substantive intuitive influence' (Jeffrey and Gearey, 2006), IWRM was promoted by the epistemic community

comprising the above-mentioned development agencies such as USAID, UN and most prominently the World Bank, whose enthusiastic endorsement of the framework created a world-wide snowballing effect, turning IWRM into a hegemonic concept (Molle, 2008). IWRM's insistence that water is an economic good fits comfortably within the neoliberal turn in development, evidenced by the promotion of limited state involvement in governance and infrastructure, and marketisation of water (Harvey and Reed, 2007, p. 366).

Similarly, the scholars of the published volume 'Contemporary Water Governance in the Global South' identified three (sub)hegemonic, interrelated themes that have become entrenched in water governance debates, amidst the snowball effect of IWRM's growing popularity: 1) crisis and scarcity, 2) marketisation and 3) participation (Goldin et al., 2013). Recognising that basic water needs for household uses, sanitation, and agriculture of millions are still not addressed, while aquatic ecosystems are still being destroyed, the authors in the book argue that the main causes of the (unacceptable) state of affairs are neither technical nor natural, but of a social and political nature. These hegemonic concepts couch the causes and solutions of poor access exclusively within technical, institutional, or natural domains, rendering them inherently apolitical (Sneddon, 2013). Through policy papers, international conferences, and educational forums, they have acquired an air of 'unassailable objectivity', and are used to 'further the interests of political and economic elites within a given society, often at the expense of disenfranchised and marginalized social actors' (Sneddon, 2013, p. 17).

The subsequent sections follow the (hegemonic) themes of the aforementioned book and expand on them by drawing on additional academic literature, to offer a fuller characterisation of IWRM as a global water paradigm.

2.2.2 Crisis and scarcity

Hegemonic narratives of water scarcity revolve around indices, measurements, and improvements of water resource provision without truly questioning the structural and systemic causes of scarcity. These include Malin Falkenmark's water scarcity index that demarcates levels of water scarcity along three thresholds: ' (1) water stress – 1,000 m3 to 1,700 m3 of freshwater per capita, (2) water scarcity – 500 m3 to 1,000 m3 of freshwater per capita and (3) severe water scarcity – less than 500 m3 of freshwater per capita' (Mahayni, 2013a, p. 37). UN's minimum recommendation, in turn, designates 40-50 litres a day for cooking, sanitation, and drinking. Another example is the Social Water Scarcity Index (SWSI), which is intended to reflect the social and institutional capacity of a society to respond to water stress. Additional focus has been placed on the quality of drinking water, particularly given the implications of water contamination for public health. Allan distinguishes between 'big' and 'small' water scarcity. 'Big' water scarcity refers to situations where limited water supply threatens agricultural production, while 'small' water scarcity refers to drinking and subsistence shortages faced by society and industry, which primarily affect the poor. Approaches such as diversification away from water-intensive activities

through imports, and channelling water to vulnerable communities are seen as key to making the most effective use of scarce water resources. However, as Mahayni notes, the 'challenge remains … that water scarcity, whether 'big' or 'small', is conditioned by a host of other factors that transcend simplistic governance choices or technical interventions' (Allan, 2004; Mahayni, 2013a).

The starting point for the criticism of 'scarcity' narratives is that droughts and water stress are not the results of generalised shortages, but of failure to allocate resources to the poor. Focusing on biophysical characteristics of scarcity normalises humanity's failures to redistribute resources (Mehta, 2010; Rayner, 2010). Castro critically examines the ubiquitous claim that the 'water crisis' is a crisis of 'governance'. Within the mainstream discourse, governance refers to an 'administrative toolkit' for achieving certain ends, such as specific water codes and policies and stakeholder engagement. However, alternative notions of governance entail alternative visions of societal development, such as substantive democratic participation rather than government-managed provision. Others originate in irreconcilable political-economic positions, such as the view that water is a common good and that water delivery is a public good, versus the assertion that water services should be based on market principles. Castro criticises the mainstream vision that good 'water governance' is a system of shared responsibility involving partnerships between stakeholders such as civil society and public and private actors, arguing that this expectation is highly idealised and does not address the 'existence of fundamental social divisions underpinning water insecurity, injustice, and inequality, which are major drivers of water conflict' (Castro, 2007, p. 113).

Based on her case study in Kutch in Gujarat, Mehta differentiates between 'real' and 'manufactured' scarcity. By analysing the social, historical and environmental conditions of Kutch, she reveals that scarcity in the village is anthropogenic: devegetation, diminishing groundwater aquifers and soil salinity are products of human mismanagement with real, biophysical consequences of water shortages in the area. 'Manufactured' scarcity, borrowed from Herman and Chomsky's 'Manufacturing Consent' is a discursive construct, where scarcity is normalised and made permanent. This benefits elites by deflecting from the anthropogenic causes of the scarcity, legitimising controversial development schemes and unequal access to land and water (Mehta, 2003). Instead, she calls for a non-economically oriented, locally based vision of scarcity that truly reflects the experience of local people rather than oversimplifying problems to provide solutions rooted in neoliberal ideas (Mehta, 2017).

Empirical and historically grounded literature from around the world demonstrates how Mehta's lens can be applied. For example, Mahayni traces how state agricultural policies and the removal of fuel subsidies in the context of liberalisation in Syria in the 1980s, 1990s, and early 2000s had knock-on effects on farmers' ability to irrigate their crops, which led to high levels of urbanisation and eventual rural water scarcity in large areas of the country as farmers were no longer able to afford their activities. These chain effects were overshadowed by the country's popular water scarcity narratives that blamed the crisis on over-extraction and disrespect for water resources by farmers (Mahayni, 2013b). Building

on the growth of small hydropower plants in Turkey, Erensu argues that their value as a low-carbon energy alternative generates new notions and visions of scarcity in water and energy. A fear of scarcity triggered by the fear that Turkey lacks sufficient energy to meet its development goals, created a sense of 'future abundance' provided by the potential of dam construction, shaping current perceptions of 'underutilized nature as wasteful and, thus, legitimizes political projects such as liberalisation/privatisation in the energy sector in the name of efficiency' (Erensu, 2013, p. 71). Like Mehta, Musemwa investigates how 'water scarcity' became a hegemonic concept in Zimbabwe during a drought in the 1960s by situating it within a historical and ecological context. By tracing how a diverse community of water users experienced water scarcity and fought for their water rights against the British colonial state, Musemwa demonstrates how periods of drought can give rise to a popular hegemonic notion of 'scarcity' that the state can blunt. The state's ability to downplay real, and collectively experienced scarcity highlights the role of power in determining the effectiveness and legitimacy of hegemonic concepts (Musemwa, 2013).

2.2.3 Marketisation

Hegemonic debates on the marketisation of water largely revolve around three specific but interrelated concepts. The first refers to privatisation, or the involvement of private companies in water provision and management, which means transferring assets, ownership, and/or full operation of water delivery to the private sector. Full privatisation is rare, and a more common framework is to facilitate hybrid models involving public-private partnerships (PPPs), or short-term contracts, akin to outsourcing models. The second concept is commodification, which entails the conversion of water from being subjected to non-market social rules to market rules through pricing mechanisms (Harris, 2015a). Finally, marketisation relates to the creation of markets, for example, for trading and selling water rights, which requires corresponding institutions, such as a clear legal framework and property rights, social and environmental impact assessments, the relevant logistical and infrastructural services for transporting water, and regulation to avoid monopolies (Harris, 2015a). In a detailed analysis of their operationalisation, Harris explains that due to the Dublin Principles' emphasis on the 'economic good' of water, these approaches have often been bundled together and taken as indivisible, equating the notion of 'economic' with privatisation, which undermines effective policy-making (Harris, 2015a).

Among the earlier instances of neoliberal policy in the water sector in a non-Western country was that of Pinochet's Chile, famous for its 1981 Water Code. The Water Code recognised property rights in water and opened up one of the first 'water markets' which allowed the trading of water to balance out shortages (Molle, 2008). Despite its disputed success (Bauer, 1997; Molle, 2008), the Chilean model, emblematic of the anti-state, neoliberal beginnings of the 1980s and 1990s spearheaded by the structural adjustment by the World Bank and IMF, was heralded as the best practice approach for replication among recipients of loans from the Global South (Goldman, 2007; Molle, 2008). Molle qualifies the 'Chilean water markets' as one of the 'models' fundamental to the IWRM 'nirvana concept'. The

'model' in this case is a development intervention that is uncritically regarded as a 'success story', sanctioned by experts and powerful institutions, whose adoption minimises risk (Molle, 2008).

In his incisive history of the World Bank's role in water privatisation in the last several decades, Goldman writes:

> as recently as 1990, fewer than 51 million people received their water from private water companies, and most water customers were in Europe and the United States. Just 10 years later, more than 460 million people were dependent upon a few global water firms for their water supplies, and the high growth areas were Africa, Asia, and Latin America (Goldman, 2007, p. 791)

In the early 2000s, around 70% of the private water markets were controlled by the French companies Suez and Veolia Water (Goldman, 2007). Board chairmen of companies like Suez, and oil and hydropower companies, are joined with European water firms, the UNDP, and World Bank at bodies such as the World Commission on Water or the World Water Council, forming transnational policy networks that promote water privatisation schemes around the world (Goldman, 2007). Building on this, Harris outlines how the conditionalities set by IFIs interact with histories and geographies of colonialism, authoritarianism, and cycles of indebtedness in countries of the Global South, and become central for understanding the varied dynamics of privatisation and marketisation of water or distribution of certain water infrastructures across regions of the South (Harris, 2015b).

Evidence from interactions between IFIs and countries of the Global North and the Global South indicates that the neoliberal prerogative of marketisation overrides genuine concern for policy effectiveness and relevance to local conditions. Furthermore, with the Rio Declaration and Dublin Principles of the early 1990s endorsed by IFIs, the narrative that served to justify cost-recovery and private companies' interests (Goldman, 2007) was that of 'scarcity' and 'conservation', where the efficiency of private companies was the best way to address the impending water crises and wars (Goldman, 2007; Harris, 2015b; Molle and Berkoff, 2007). This is where public-private partnerships (PPPs) have been considered a viable option. PPPs are defined as:

> cooperation of some sort of durability between public and private actors in which they jointly develop products and services and share risks, costs, and resources which are connected with these products (Van Ham and Koppenjan cited in Poulton and Macartney, 2012, p. 96),

The role of PPPs is to align public and private sector interests, such as in the provision of public goods or services to poor segments (Poulton and Macartney, 2012). Yet presenting PPPs as a pragmatic alignment of public and private interests obscures the recurring critique that they privilege private actors over the public interest, offer limited transparency and accountability, and that a one-size-fits-all approach does not work (Brinkerhoff and Brinkerhoff, 2011).

The gradual introduction of water charges has been met by a host of technical and legal challenges, a failure to demarcate domestic and irrigation uses, and severe conflicts in some regions as people resisted the commodification of water, which they viewed as a human right (Molle and Berkoff, 2007; Poulton and Macartney, 2012). Water is very hard to value (D'Odorico et al., 2020; Molle and Berkoff, 2007), and non-Western governments were reluctant to increase costs for their farmers by charging for water due to protectionist agricultural policies similar to those in the West. Recovery rates are often low in many countries due to low willingness-to-pay or ability-to-pay, and have been found to be higher in authoritarian countries when supply is cut off for non-payment or fees are low. Farmers are often required to pay a supplementary general tax to the government and, in water-scarce areas, spend additional money on informal/extra-legal payments as bribes to local officials. Very often, studies find that even when farmers meet charges, pricing mechanisms do not increase efficiency, largely because, in non-Western countries, charges are not followed by corresponding improvements in water delivery (Molle and Berkoff, 2007). In effect, in countries where water charges led to better service, farmers and smallholders were keen to increase their water expenditure (Kidane et al., 2019). Scholars find that when users are knowledgeable about the economic value of water, particularly in water-scarce areas, their willingness to pay for water services increases (Kidane et al., 2019).

2.2.4 Participation – Water User Associations

Social participation in natural resource governance has been heavily criticised by numerous scholars. The literature recognises that farmer involvement is necessary for watershed management due to the competing interests between upstream and downstream users, causing farmers to be trapped in relations of interdependencies that require significant cooperation over water usage (Asthana, 2010; Chuan, 2010; Kumar, 2005). However, a large body of practice-led and critical-academic literature on institutional impacts of the adoption of WUAs argues that at the core of participation are asymmetrical relations of power, particularly in non-democratic contexts, with unfavourable outcomes (Mollard and Berry, 2010; Mollinga et al., 2007). In this vein, some studies emphasize the difficulty of achieving state-society cooperation, especially in the context of incomplete decentralisation and an unsuitable institutional environment, and warn against prioritising solely technical-managerial aspects of water governance (Chowns, 2015; Chuan, 2010; Hamilton et al., 2020; Mollinga et al., 2007; Shah et al., 2001; Whaley and Cleaver, 2017).

For example, a study on WUAs in China showed that their establishment reduced water conflicts by facilitating negotiations over timing and irrigation access among downstream, midstream, and upstream farmers, a key concern for proponents of WUAs. However, the authors argue that the top-down establishment of WUAs, their capture by rural elites, and the exclusion of member households from irrigation canal planning lead to daily acts of resistance on the part of some farmers, in the form of withholding payment for irrigation service fees or digging holes in the canals (Chuan, 2010). Similarly, in a study on river basin management in Mexico, Mollard and colleagues develop a politically-focused,

analytical model to demonstrate that democracy is a *pre-condition* for effective participation. They show how Mexico's members of the federal administration coalesce with local mayors and influential groups of farmers to stall participatory processes and maintain a monopoly on power, for the former, and government programmes for the latter groups. This power capture of water and environmental agendas by the authorities hampers the rights of farmers to water and limits effective action, in this case, obliging the 'civil society to innovate outside' (Mollard et al., 2010, p. 129). In other cases, community-based management of water supply did not deliver desirable improvements in financial and technical performance and instead became a way for the government and donors to 'offload' responsibility for public service provision (Chowns, 2015; Whaley and Cleaver, 2017).

Shah and colleagues, in turn, label the adoption of participatory governance in developing countries as 'institutional leapfrogging', arguing that their hydrological and climatic, socio-economic, and institutional characteristics are too different from those of Western countries. The authors argue that the large number of smallholder users in developing countries who gain access to water through informal means, makes WUA implementation unlikely to succeed unless large-scale interventions specifically target smallholder water-use practices. The urgency for leaders in these countries to satisfy national interests to ensure food security and crop exports means that smallholder access to water is not on the priority list (Shah et al., 2001).

Critical institutionalists such as Mehta, Cleaver, and Sehring emphasise 'the non-comparability of various 'messy' contexts, the inter-relating of global and local factors, and the impact of social and economic changes over time' (Cleaver, 2012, p. 14). Using ethnographic methods, Cleaver and Sehring propose examining the adoption of WUAs through the lens of 'institutional bricolage', a concept borrowed from and extended by Levi-Strauss and Douglas. 'Institutional bricolage' recognises the agential power of actors as pragmatically improvising, mobilising pre-existing stock of social formulae such as ways of behaving, relationships with authority, accepted social norms, whether formal and informal to create dynamic, hybrid institutions combining elements of the modern, traditional, formal and informal. This inevitably leads to fuzzy, variegated, and uneven outcomes across the world, with a diverse set of overlapping, meaningful practices (Cleaver, 2012).

Some studies highlight that participation is hijacked along class lines. For example in a three-year study of local water politics among various communities in Bolivia, Zambia and Vietnam, the authors draw a combination of post-structuralist and social theories of Bourdieu and Giddens to highlight how the most marginalised households internalise structural inequities of water allocation, but also engage in agential survival strategies of risk-aversion, discretely cooperating or siding with the more influential farmers and local organisations, by using less-desirable water sources or leveraging their limited social networks. Their study emphasises the need to take the everyday politics of water allocation seriously and take into consideration how community-based management can reproduce unequal relations (Funder et al., 2012). In a comparable study in Bangladesh, the authors find that when access to water

is partially or fully limited, institutional factors and social dynamics play a key role in identifying whether the most disadvantaged benefit from water projects. While community-based water institutions provided an outlet for marginalised farmers to voice their concerns, elite members and local governments hampered transparency or created dependencies, which silenced the voices of a number of participants (Hamilton et al., 2020).

Other scholars in Nepal, Peru, Egypt, India, and elsewhere note that participation does not address women's subordinate status in villages. Women may struggle to express themselves when included in WUA meetings, or may be outright excluded (Ahlers and Zwarteveen, 2009; Barnes, 2015; Harris, 2009; Sakketa, 2018). Women-led households are usually poorer due to women's triple societal role: productive, reproductive, and as active community members, which limits their ability to purchase farming equipment, lowering their profitability. Furthermore, in cases where water retrieval schedules are at night, particularly in times of scarcity, women prefer to stay at home for safety concerns (Sakketa, 2018). In other cases, participation mandates and blind assumptions about women's true struggles lead NGO workers to adopt projects that are simply irrelevant to women's needs. For example, in a case study in Egypt, Barnes analysed how the assumed issue of poor drinking and sanitation water among women led NGO workers to develop a training that failed to address the true concern of the community – namely, irrigation water. Failure to recognise the varied nature of women's activities pigeonholed them according to their stereotypical roles, and undermined the legitimacy of the development programme, silencing women's voices even further (Barnes, 2015).

2.3 Overriding participation in the 'Green Economy'

More recently, the 'good governance' agenda has been replaced by the 'Green Economy' as the hegemonic development paradigm whose techno-optimism echoes the underlying logic of the Green Revolution, albeit metamorphosed and infused with jargon around sustainability and clean energy. The Green Economy additionally merges elements of the Green Revolution's antecedents, such as the SAP, and the 'good governance' agenda's emphasis on the role of market mechanisms in spearheading growth, yet this time, with the intent to overcome the limits posed by the environment by incorporating the climate crisis into an opportunity for growth. As 'participation' and 'institutions' slowly recede into the background (without completely fading), to pave the way for policy packages that foster a 'clean and green' vision, the afore-discussed hegemonic debates around crisis narratives and marketisation have nonetheless preserved their relevance because within the Green Economy, they remain as the discursive and ideological foundations for policy action.

Like the 'good governance' agenda, the Green Economy has been accused of being an 'umbrella' concept that is subject to contradiction and confusion (Loiseau et al., 2016). The term 'Green Economy' was officially proposed in 2008 as a new developmental direction following the fallout from the financial crisis. It was launched at the Rio +20 conference in 2012, twenty years after the 1992 Rio

Summit (host to the IWRM and sustainable development agenda), as the new direction on the path to sustainability for international organisations such as the World Bank and the United Nations Environment Programme (UNEP). First introduced in academia in 1989 and rooted in environmental economics and ecological modernisation, which posit that 'environmental issues are due to the inefficient use of natural resources and the undervaluation of natural capital' (Loiseau et al., 2016, p. 364), the Green Economy has been defined by UNEP as one that fosters 'well-being and social equity, while significantly reducing environmental risks and ecological scarcities' (UNEP cited in Loiseau et al., 2016, p. 362). It was conceived as the solution to the 'double crisis' of the first decade of the 2000s, namely the financial and climate crises, which challenged conventional market-economy models. The Green Economy was thus conjured to sustainably address repair and growth, while eliminating extreme poverty and achieving human development (Bina and La Camera, 2011). The uptake of the Green Economy has accelerated over the last decade and has acquired a truly global currency, with its principles incorporated into national development strategies in 147 countries worldwide, including in Central Asia, whether in the form of low-carbon emissions frameworks or explicit Green Economy agendas (GGGI, 2020).

Green Economy's vast agenda risks being reduced to a mechanism for promoting markets and technology diffusion, or the 'cleantech investment sector' (Caprotti and Bailey, 2014, p. 197). For example, the OECD highlights the 'diffusion of clean technologies' for international cooperation, 'and the development of an international market for environmental goods and services', as well as market mechanisms such as 'getting the prices right' and achieving resource efficiency (OECD cited in Bina and La Camera, 2011, p. 2309). This is echoed by organisations such as UNEP and the United Nations Economic and Social Commission for Asia and the Pacific (UNESCAP), who, despite offering a more balanced treatment of socio-economic and environmental challenges, nonetheless resort to a policy model around 'efficient, cleaner and more thoughtful use of scarce natural wealth for the well-being of all' (UNESCAP, 2008, p. 56) through 'investments in […] policy and technology approaches […] to reverse entrenched consumption patterns' by 'greening' businesses and providing 'green' jobs and offering sustainable choices to consumers (p. 58). As a result, depoliticised narratives around marketisation and scarcity characteristic of the 'good governance' agenda remain at the forefront of the new hegemonic Green Economy paradigm, where techno-centrism, by creating growth through innovation *while* overcoming natural limits, serves as a silver bullet for the collectively envisioned future growth.

In recent years, as the Green Economy paradigm reached maturation, within agriculture and irrigation, 'participation' and 'institutions' gave way to a revitalised techno-centrism. This is evidenced by the gradual usurpation of IWRM by the Water-Energy-Food (WEF) Nexus approach (Brears, 2022; Muller, 2015). Initially, upon the launch of the Green Economy, IWRM, which precedes the latter by twenty years, was embedded into the new paradigm as fundamental to the achievement of 'both growth and

sustainable development' (GWP, 2012, p. 10). To mediate the alignment of IWRM with the growth imperatives of the Green Economy, GWP proposed a 'Basis-Boost-Balance' approach, where smallholders were to be integrated into global value chains through access to input and output markets, and subsequently, embedded into the formal land and water allocation cycle via a balanced approach that takes into account economic growth while maintaining the natural resource base (GWP, 2012). WEF Nexus, in turn, was introduced at the 2008 World Economic Forum, which hosted calls to re-examine water's role in economic growth, culminating in the WEF Nexus 2011 report. This was followed by the 2011 Bonn Nexus conference, after which the Nexus gained traction and was eventually endorsed by the EU and GWP and integrated into the UN Sustainable Development Goals (SDGs) (Benson et al., 2015). The Nexus approach was shaped by business stakeholders such as the food and beverage industry's 2030 Water Resources Group, who were early contributors to WEF discussions and supported by consultants from McKinsey, 'who believed that water might be 'the next big thing' after climate and carbon' (Muller, 2015, p. 684).

Recently, WEF has been more consistently referred to as essential to achieving the Green Economy, possibly due to its closer alignment with the latter's ethos (Ali and Acquaye, 2024; Brears, 2022; A. Ghosh and Nelson, 2025; Molajou et al., 2023). This is because the newfound source of IWRM's flaws is its ignorance of 'relationships with other resources', which exacerbates the adverse effects of resource competition (Molajou et al., 2023). Furthermore, IWRM's participatory requirements pose obstacles to large irrigation projects such as dams. Large dams, whose construction is still expanding in less developed countries, are argued to 'embody the nexus and challenge Dublin IWRM, [by] offering multi-purpose resource management opportunities, including reliable water supplies, flood protection and hydropower but often with potential social and environmental impacts' (Muller, 2015, p. 683). By necessitating the lengthy process of consent acquisition, the World Bank concluded, IWRM undermines 'the fundamental right of the state to make decisions in the best interests of the community as a whole' (World Bank cited in Muller, 2015, p. 683). This is echoed by Ringler and colleagues, who admit that 'IWRM requires cooperative behaviour among actors, whereas the nexus approach focuses on increasing resource use efficiency' (Ringler et al., 2013, p. 619), achieved through technological innovation and private and public financial support (Brears, 2015). Unlike WEF and the Green Economy's holistic and rational ethos, IWRM's water-centred approach, participation, and inclusive governance are now framed as existential obstacles to addressing the more pressing needs of the resource-scarcity crisis, food security, and growth.

In the irrigation sector, technological solutions such as smart metering, solar power expansion, remote sensing, and drip irrigation, most of which predate WEF, have been identified as embodying Nexus thinking by limiting energy costs for agriculture, guaranteeing resource efficiency while maximising agricultural production (IWMI, 2024; Jobbins et al., 2015). In 2006, the World Bank made the following case for drip irrigation:

> Drip irrigation uses 30-50 percent less water than surface irrigation, reduces salinisation and waterlogging, and achieves up to 95 percent irrigation efficiency. It can be technically demanding – for example, it requires clean water to prevent clogging… Scope for expansion is enormous: sprinkler and drip are used on 90 percent of the irrigated area in France, but just 3 percent in China (World Bank, 2006, p. 163)

In practice, the mechanisms used to expand drip irrigation consist of loans and subsidy programmes that benefit large and medium farmers due to high investment costs or compliance requirements. These vary by country but may include factors such as 'no electricity debts, land titles, installed flow meters, and the means, know-how and time to apply' (Hoogesteger, 2017, p. 159). Especially in countries of the Global South, small-scale farmers continue to struggle to access sub-loan programmes due to a range of structural and political challenges, such as poor access to information on such programmes, gendered exclusion, and low productivity, among others (Siankwilimba et al., 2025). Furthermore, due to the 'rebound effect', or Jevons paradox of technology use, higher *efficiency* does not necessarily translate into savings, as farmers may use more water by expanding the irrigated area or growing more water-intensive crops. Outcomes depend on contextual, institutional, and political factors, such as geography – e.g., water with less sediment, regulation, and enforcement (Berbel et al., 2018). Alternatively, countries' attempts to encourage rapid water-efficient technology adoption to meet loan requirements can be 'underwritten by energy subsidies, which have in turn contributed to depletion of aquifers and placed strains on energy supply' (Jobbins et al., 2015, p. 394). Finally, although not exhaustively, water saved at the plot level says nothing about water savings at the basin level – decisions around how the saved water is used are again political and made at scales beyond the farm (Van der Kooij et al., 2013)

Ultimately, the Green Economy exhibits continuities with the unfair distributional outcomes characteristic of agricultural modernisation programmes of the 20th century. Akin to the Green Revolution's facilitation of land grabbing (Holt-Giménez and Patel, 2009) and the Dublin Principles' endorsement of water's commercialisation and privatisation (Ahlers, 2010), the Green Economy has introduced a new concrete form of 'green grabbing', or 'the appropriation of land and resources for environmental ends' (Fairhead et al., 2012). The majority of these 'green deals' are 'aimed at the establishment of agricultural production' driven by the corporate 'agro-export industry, channelled in complex global supply chains' (Baglioni and Gibbon, 2013, p. 1559). As argued by Baglioni and Gibbon (2013), land deals are still informed by modernisation theory narratives, such as that large-scale farms are technologically superior and are better equipped at addressing the food crisis.

Conclusion

Shortly after emerging from the collapse of the Soviet Union, Uzbekistan joined the currents of development finance as a recipient of ideologically backed aid. This chapter serves as a reminder of the

aspirations and flaws of development aid thinking in its evolving approaches to (in)equitable irrigation – the main concern of this research. As the empirical chapters show, Uzbekistan selectively appropriated development paradigms, leveraging their flaws and contradictions to meet national political and economic ends.

Officially, mainstream and critical development scholarship draws a clear distinction between the pre- and post-1980s, with SAPs marking the emergence of neoliberalism. Whereas, famously, the early decades of US-led intervention in post-colonial countries were driven by a belief in the state's responsibility for national development planning, the pivot towards SAPs and later neoinstitutionalism represented a significant shift in hegemonic attitudes towards the role of the state not as the steerer of development, but as the facilitator of the right context and conditions to allow markets to 'do their job' in realising economic growth (Harrison, 2004; Hosseini and Gills, 2018). From an aerial view of development's evolution across these historical tides, if conceived of as a progressive march towards the entrenchment of neoliberalism and globalisation characteristic of the Green Economy today, then (participatory) IWRM's faith in the value of community involvement and its democratic ethos looks like a malfunction in this ostensible teleology, however fickle. As Harrison (2004) summarises Thirkell-White's analysis of the 'governance' era's commitment to inclusivity:

> IMF's foundations as a technocratic institution, in which 'politics' is by-and-large an encumbrance to the realisation of market clearance, equilibria and Pareto efficiency, sits very awkwardly with the recent engagement with 'civil society'…(Harrison, 2004, p. 160)

Yet despite its alleged awkwardness, the participatory approach to irrigation has remained remarkably sticky. It has endured for nearly three decades and persists institutionally in many countries, despite the advent of the Green Economy as the new hegemonic developmental vision. In effect, in countries where robust 'civil society' already exists, IWRM is not a direct affront to its WEF/Green Economy successors, as 'green' technology and institutions do not *necessarily* antagonise each other. Rather, it is the interaction between paradigm-based funding cycles and national and local governance mechanisms in Global South countries that creates the effect of constantly shifting goalposts and, hence, interruptions to development priorities. In countries where Western-centric notions of 'civil society', as envisioned by approaches such as IWRM, are ill-suited to the local context, international development 'paradigm leaping' risks reproducing similar cycles of displacement and abrupt institutional change at the local level.

Unfortunately, despite its ideological ambition, participation in water was subject to the same outcomes as techno-managerial solutions such as seed distributions in the Green Revolution: the entrenchment of local power asymmetries, depoliticisation, and the exclusion of the most vulnerable. This is consistent across countries of the Global South. Ostrom's isolation of principles for community-based resource-sharing and the top-down, sweeping endorsement by international donors undermined the very reason

such arrangements work in the first place. Successful common pool resource governance arrangements are products of long-term, socially embedded negotiations rooted in reciprocal relations among community members who share a similar cultural and institutional context. Our knowledge of these arrangements stems from contexts little affected by global corporations and state-facilitated extraction (Stern, 2011). Indeed, this is what makes IWRM's apparent break with the teleology of neoliberalism only *apparent*: regardless of its democratic ethos, its depoliticising effects placed it in continuity with the paradigms that preceded and succeeded it. Its gradual de-prioritisation under the Green Economy, then, possibly marks a consolidation in where donors locate the crucible of growth – once again in technology and private investment, yet this time against the backdrop of the climate crisis. From this perspective, the Green Economy shares significant continuity with the Green Revolution in its techno-centrism and modernisation, albeit in a neoliberal form, legitimated by depoliticised and hollow ecological crisis and scarcity narratives.

3. THE STATE, NATURE AND SOCIAL REPRODUCTION

Introduction

In this chapter, I situate my research within the discipline of political ecology, and develop this thesis' theoretical framework. While I draw on a variety of concepts across fields such as critical agrarian studies, political economy of labour, and social reproduction, the (uneven) reconfiguration of nature-society relations as articulated by the political ecology discipline remains my driving concern. Furthermore, because I identify the reconfiguration of these relations as mediated and driven by the *state*, itself a mediator and imposer of (national) hegemony, the proposed theoretical framework rests on Bob Jessop's Strategic-Relational Approach (SRA) to the capitalist state. Jessop's SRA is a Marxist, meta-theoretical, scalar, and abstracted approach to analysing capitalist state action that rests on an elaborated understanding of the relationship between structure and agency.

Because of the state-orientation of SRA and its overly abstract treatment of meso and micro levels, I supplement it with specific concepts drawn from the aforementioned fields, such as hydrosocial territories and social reproduction, to develop an extended version of the trialectics of the state, nature and society as proposed by Ioris in his study of Brazilian urban water governance. SRA, therefore, steers the theoretical description, while political ecology and critical agrarian studies ground it, making it applicable to my research questions. The philosophical paradigm of critical realism on which SRA is based, and my corresponding methodology are covered in the next chapter.

3.1 Situating the study within political ecology of water and critical agrarian studies

This thesis maintains a political ecology lens, which views water distribution dynamics and access challenges among smallholder farmers as shaped by the structure of the political economy of agricultural production. Challenging mainstream approaches to development, as covered in the previous chapter, political ecology scholarship interrogates how techno-managerialism and depoliticisation are implicated in the production of resource scarcity and inequality (Castro, 2007; Ioris, 2012; Loftus, 2009; Molle, 2008; Sneddon, 2013). Fundamentally, asking why and how smallholder farmers access water in particular ways entails understanding how Uzbekistan's agrarian political economy privileges certain players over others and how smallholders respond to these changes in their respective localities. These localities, in turn, vary greatly in geography and socio-economic composition, which imprint on

outcomes of political-economic decisions made at multiple levels. In other words, water scarcity is a global problem with (micro)local manifestations. Therefore, the relevance of institutionalist literature's normative prescriptions for equitable water governance diminishes when one takes into account the body of literature on the agrarian question that problematises the very existence and survival of smallholders in the context of undeniable asymmetries engendered by the proliferation of multinational agribusiness land privatisations mediated by the state.

The original Agrarian Question, as explored by, among others, Kautsky, Lenin, and Chayanov at the turn of the 20th century, has been challenged significantly by globalisation. In its original formulation, scholars posited whether a full agrarian transformation, through the total enclosure of peasant subsistence farmers (smallholders) by surplus producers, is a precondition for the completion of capitalist industrialisation at the national scale (Akram-Lodhi and Kay, 2009). However, 100 years later, the survival and continued significance of the smallholder sector, which, according to the FAO produces 80% of the food in Sub-Saharan Africa and Asia (Gómez y Paloma et al., 2020) demonstrates that the initial premise of the Question is of weakened relevance. Bernstein argues that globalisation offers international and non-agricultural sources of investment and markets, which decouple agriculture from processes of national capital accumulation, ultimately challenging the teleology of modernisation theory, covered in the previous chapter. Furthermore, with countries joining global commodity chains, smallholders struggle to compete with imports and are increasingly obliged to rely on off-farm labour for their livelihoods (Watts, 2021). As a result, a number of scholars of critical agrarian studies have rechannelled their attention away from the original formulation of the Question, in favour of focusing on the specificities of globalisation-induced rural appropriation of labour and biological processes, which disproportionately affect countries of the Global South (Akram-Lodhi and Kay, 2009).

Neoliberal restructuring has been argued to entrench the coexistence of an export-oriented sector and a peasant-producer subsector within a 'bifurcated agrarian structure'. According to Akram-Lodhi, market-led agrarian reform 'is premised on assumptions that fail to recognise the *socially embedded character of land transfers'* (Akram-Lodhi, 2007, p. 1437). Over the decades, critical agrarian studies progressed from questioning the continued existence of smallholders, towards interrogating how the latter's social and productive lives are being transformed over time through appropriations of land and labour by larger actors. In this body of literature, appropriation of rural labour and biological production processes manifest in the form of 'land grabbing' –'the large-scale acquisition of land or land-related rights and resources by corporate entities', that dispossess inhabitants of common property resources such as land, water, forests, through their concentration in private hands, thus transforming agrarian labour regimes (White et al., 2012, p. 620). This tendency was famously identified by Harvey as 'accumulation by dispossession', where, through financialisation and privatisation, some actors are able to profit from public resources, state concessions, and benefit from discursive constructions of

'scarcities' which prioritise efficiency at the expense of the general population, eventually morphing into various forms of contemporary 'green grabbing' (White et al., 2012).

3.2 The trialectics of state, nature, and society

Fundamentally, understanding the links among the related phenomena outlined in the Introduction and Chapter 2 requires a framework that goes beyond merely critiquing one policy recommendation against another. How can we tie the sense of urgency that water stress poses for Uzbekistan, the emergence of the Green Economy and agricultural modernisation, the dissolution of Water User Associations, and the uncertain water-related effects this has on smallholders' livelihoods, into a coherent narrative? By deconstructing *how* choices are made in favour of certain water governance configurations, Ioris' (2012) framework for analysing the urban political ecology of water in Brazil offers an avenue. He attributes the oversimplification of water management problems to an 'undertheorisation of the politicised role of the state and its involvement in class struggles' (p. 125). Consequently, Ioris invokes Bob Jessop's Strategic-Relational-Approach (SRA) to propose a trialectic basis for water management, comprising the state, nature, and society: i.e., 'the exogenous commitments of the state, the rising social demands and the peculiar hydrological features' (p. 134). SRA is increasingly employed in themes related to ecological transformation because it transcends purely institutional, agential, or historically and contextually specific explanations for change in capitalist states, while accounting for counter-hegemonic tendencies and contradictory trajectories (Quastel, 2016; Silvester and Fisker, 2023). At the same time, Ioris' engagement with SRA is among the few examples (along with Walker, 2014) that comprehensively apply the framework to a political-ecological empirical case study. In my system-level account of the production of new rounds of water marginalisation in Uzbekistan, I therefore draw on Ioris' state-nature-society triad while also elaborating on its constitutive elements by incorporating concepts external to it.

3.3 State power in a globalised world

State theory has experienced a relative decline since the early 2000s, variously attributed to scholarly interest in civil society's emancipatory potential and to post-structuralist analytics of dispersed, microscopic modalities of power (Aronowitz and Bratsis, 2002; Barrow, 2005; Kalyvas, 2002). Concurrently, state sovereignty has been argued to be eroded by global financial markets, and the emergence of an international community comprising supranational institutions, multinational corporations, and digital media politics that contest the legitimacy of state narratives (Castells, 2023; Hammarlund, 2005). However, neo-Marxist scholars have been quick to contest this diagnosis: the state's role has been reconfigured rather than diminished, nation-states remain 'the principal agents of globalisation as well as the guarantors of the political and material conditions necessary for global capital accumulation' (Barrow, 2005, p. 2). Drawing on Aglietta, Barrow argues that the reproduction

of capitalism on a global scale presupposes states that adjust laws, deploy coercion and incentives, and delimit the regulatory boundaries within which transnational capital derives its competitive advantages.

In neo-Marxist state theory, the state takes 'the form of a mediator between the externally established policy priorities and the internal social forces to which it also still remains accountable' (Panitch, 1994, p. 70). These externally established policy priorities, in turn, find their source in the global intellectual hegemony (Gosovic, 2000) spearheaded by Bretton Woods Institutions and various other development banks (i.e., ADB, EBRD) that gained pre-eminence over the UN as norm-setters due to superior financial flows (Greve, 2015; Köhler, 1995). This is achieved by means of consensus-creation, which 'influences and shapes the direction, content, and structures of the current world order'(Gosovic, 2000, p. 449).

Countries of the Global South remain highly unequal in their capacities, political and military power to resist international development-mediated globalisation. However, as Panitch highlights:

> far from losing importance, the host state actually becomes responsible for taking charge of the complex relations of international capital to the domestic bourgeoisie, in the context of class struggles and political and ideological forms which remain distinctively national even as they express themselves within a world conjuncture (Panitch cited in Barrow, 2005, p. 15)

According to Jessop, the nation-state's mediation of capital relations thus unravels against the backdrop of global competing hegemonies where international development organisations steer international knowledge-production to define the boundaries and features of intervention, thereby shaping economic imaginaries (elaborated below), based on particular developmental visions. More pragmatically, international intervention internationalises domestic policy regimes by incorporating transnational agreements into legislation and building new, corresponding institutions, ultimately leading to a tendency for states to drift from the preoccupation with regulation and sovereignty (Aronowitz and Bratsis, 2002; Barrow, 2005). However, the absorption of global hegemonic norms leads to 'distinctively *national'* outcomes, and as explained in subsequent sections, takes place in a strategically selective terrain with unique power-configurations and path-dependencies. Akin to *bricolage* (Bhaskar, 1998) hegemonic forces transform and lose their original potency once they encounter local conditions and contestations.

3.4 The strategic-relational and dynamic workings of state power

Bob Jessop begins his analysis of the state from the premise that the value form in capitalism, or the social form that labour takes in capitalism, which operates through abstract, impersonal market relations, generates systemic contradictions, such as between production and realisation, capital and labour, short-term profitability and long-term social reproduction, that cannot be solved within the market itself. One of the (relatively autonomous) state's roles is to intervene and manage these

contradictions by securing extra-economic conditions, i.e., infrastructure, contracts, property rights, and a working legal system, to uphold the continuous reproduction and circulation of capital. According to Jessop, 'within the matrix established by the value form there is considerable scope for variation in the rhythm and course of capitalist development' (Jessop, 2014c), meaning that different accumulation strategies and hegemonic projects compete to shape how these contradictions are managed. Because of ever-expanding commodification set in motion by the capital relation, the conditions for capital's reproduction are constantly undermined; after all, its very existence depends on the maintenance of a functioning society. Thus, the capitalist state must continually intervene, adjust, and reorganise its modes of governance to manage the contradictions generated by the capital relation without undermining the very social and environmental conditions upon which accumulation depends (Jessop, 1991). This is where hegemonic projects and imaginaries come into play – they temporarily stabilise capitalism's contradictions by creating new sets of winners and losers.

Following this premise, SRA elaborates on the workings of the structure-agency dialectic of the constitutive elements of a non-monolithic, relational state, to account for how hegemonic projects, such as the Green Economy, emerge. To make explicit SRA's intellectual heritage: it is a Marxist account of the state, integrated with the work of Gramsci, Poulantzas, and Foucault. According to Jessop, the state is a social relation made up of an 'ensemble of institutions and organisations' whose socially accepted function is to define and enforce binding decisions on a given population in the name of their 'common interest' or 'general will'[1] (Jessop, 2007, p. 26). Despite the appearance of coherence that (capitalist) state practices produce, the state 'does not exist in isolation of the balance of political forces, but these forces are in effect responsible for shaping – at least in part – the structure and intervention of the state' (Ioris, 2012, p. 127). The notions of 'common interest' and 'general will' are relative, because any attempt to define them 'occurs in a strategically selective terrain', where the fluctuating mass of values and opinions, including those of state managers, create asymmetries which privilege some over others at particular historical junctures (Jessop, 2007, p. 6).

The relational, non-monolithic state, comprising actors, legacies, institutions, and myriad other social formations, is constantly in flux as it interacts with both endogenous and exogenous forces, producing hegemonic, sub-hegemonic, and counter-hegemonic formations. Internally, this occurs through a continuous, non-linear interaction among what Sum and Jessop refer to as four categories of selectivities: structural, discursive, technological, and agential. Selectivities are biases, active predispositions that constrain and enable particular actions, thus having the quality of being simultaneously path-shaping and path-dependent. Structural selectivities, perhaps the broadest of the four, refer to 'institutional orders, organisational forms, and interaction contexts' that constitute the *terrain* where the reproduction of social forms, such as the capital relation or patriarchy, is constantly

[1] This approach applies regardless of whether the state is democratic or authoritarian – the theory is concerned with the mobilisation of power within a modern *'capitalist'* state.

articulated *and* contested (Sum and Jessop, 2013, p. 218). In Uzbekistan's case, organisational/institutional forms include the requirement for Uzbek farmers to meet quotas on cotton and wheat, or the centralised land titling or irrigation distribution systems, Water User Associations, or the system of grant disbursal of international financial institutions, explored in Chapter 6. Discursive selectivities, in turn, delimit imaginaries and communicate horizons of action, and in this thesis, include the Presidents' speeches on water, smallholders, or the Green Economy. Agential selectivities refer to the asymmetric capacity of actors and agents to enact change within a structuring context at all levels – including those of individual farmers, smallholders, and the President himself. Finally, technological selectivities are analogous to Foucault's dispositives – they bundle knowledge systems, governmental rationalities, and technological materialities to produce and reinforce asymmetries. Water-efficient technologies, discursively endorsed by Green Economic ideals, as explored in the empirical sections, are prime examples of technological selectivities: they require capital investments and specific expectations regarding land tenure, credit, knowledge, and social capital, which the majority of independent farmers in Uzbekistan lack.

Because the four selectivities continuously co-facilitate each other across multiple levels, it would be reductive to bracket each one separately when accounting for systemic change, namely the political ecology of irrigation in Uzbekistan. For example, as empirical chapters show, the effects of Green Economic agriculture on water and territory in Uzbekistan are, in concert, a result of institutional legacies of cotton monoculture, social structures, discursive constructions, materialities of technologies interacting with ecology, and agency of actors who navigate this complex environment, use these technologies, and produce and reproduce discourses. However, what matters is that the competing balance of forces periodically congeals, ripening the terrain for the emergence of new accumulation strategies and hegemonic projects, rooted in particular imaginaries, that offer provisional solutions to capitalism's contradictions.

3.5 Accumulation strategies, hegemonic projects, and (sociotechnical) imaginaries

An accumulation strategy pertains to the *way* the circuit of capital is organised, and its success is predicated on its congruence with a hegemonic project. Examples of accumulation strategies include import substitution industrialisation, predominant under the President Islam Karimov and many socialist-leaning post-colonial states such as India and Egypt in the decades following their independence, or, alternatively, 'export promotion' models of Latin America (Galdini, 2021; Jessop, 1991). Furthermore, multiple accumulation strategies can coexist because the power of capitalist states 'is the institutionally mediated condensation of a changing balance of forces' (Sum and Jessop, 2013, p. 109). A relevant example of an accumulation strategy is 'clusterisation', characterised by vertical integration where domestic production of, for example, processed fruits and vegetables is mediated by large logistico-industrial entities with links to global markets and value chains (Sum and Jessop, 2013).

Based on the Harvard-Porterian model for increasing competitiveness, clusterisation is currently a popular accumulation strategy in Uzbekistan, spanning from cotton-textile clusters, horticultural processing, and silk production to Artificial Intelligence and technology parks. Yet for the given accumulation strategy to *stick*, it needs to be part of a hegemonic project, defined as the 'mobilisation of […] class-relevant forces […] through specific political, intellectual, and moral practices' (Jessop, 2014). As Jessop clarifies, accumulation strategies and hegemonic projects may overlap significantly; however, they are not the same:

> While accumulation strategies are directly concerned with economic expansion on a national or international scale, hegemonic projects can be concerned principally with various non-economic objectives (even if economically conditioned and economically relevant). The latter might include military success, social reform, political stability, or moral regeneration (Jessop, 2014).

With its concerns for social, political, and, as will be explained, moral and ecological regeneration, the Green Economy constitutes a hegemonic, 'national-popular' project (Jessop, 2014) that serves to validate an accumulation strategy such as 'clusterisation'. As shown in Chapter 6, the Green Economy renders Uzbekistan's agricultural modernisation policy – itself comprising a mixture of cluster-based, value-added, export-led accumulation strategies and enduring import substitution industrialisation through raw materials export – legible to the outside world. It is a popular mission that is institutionalised at the national level, exemplified in Uzbekistan by initiatives such as the sweeping 'Yashil Makon' (Green Nation, see Chapter 6) that aims to create 'green', low-pollution, high-vegetation spaces as a national solution for meeting Paris Agreement targets. However, whereas the *hegemonic project* constitutes institutional forms, policies, and practices that create new economic privileges and alter the balance of forces to legitimate and realise new accumulation, an *imaginary* is the shared semiotic framework on which the former is based. In other words, any hegemonic project and accumulation strategy requires an imaginary to back it up. An imaginary is an *idea* about how the world should look that is then communicated and realised through discursive and material practices in the form of hegemonic projects and accumulation strategies.

The Uzbek state's Green Economic hegemonic *project* is thus backed by a corresponding ecological and economic *imaginary* whose content is completed by the symbolic framework of the receiving group or individual. The Green Economy, as explained in the previous chapter, emerged in the early 1990s in response to the growing recognition of the climate crisis and evolved into the strongest contender 'as the basis for concerted action' following the global financial crisis (Jessop, 2015). Owing to its 'fuzziness', the Green Economy has become a 'floating signifier' narrated as capitalism's best hope – a 'magic bullet' (Ibid.). Jessop posits:

> [its] growing appeal as an economic/ecological imaginary might only be a temporary ideological reflection of the 'triple crisis' of finance, energy, and the environment rather than providing a long-term challenge to the economic logic that created the triple crisis (Ibid.).

An imaginary, following Jessop, serves as a 'mental map' that simplifies an otherwise unstructured, super complex reality. At the same time, its status as a 'floating signifier' – 'productive in building alliances and compromises' – points to its mutability (Jessop, 2015). Jessop's reservations about the Green Economy (or the Green New Deal) are that the concept's fuzziness renders it susceptible to subsumption by neoliberal forces that hollow out the counter-hegemonic ethos embedded in its ecological concern. This is the central position of this research, and moreover, consistent with the workings of the aforementioned *bricolage*, the imaginary transforms upon making contact with another. In other words, the imagery associated with the 'Green Economy' depends on the symbolic framework from which it is interpreted. So while the Green Economy is a global-hegemonic developmental framework, it can acquire wildly different articulations and meanings at the national, local, and relational levels.

By deconstructing constitutive elements of state power (selectivities, accumulation, hegemonic projects, imaginaries etc.) Jessop's SRA manages to cut through the fog of complexity while remaining comprehensive. However, its grand-theory ambition means the framework (rather deliberately) falls short of expounding some key concepts. Among these is the idea of the imaginary. Jessop dedicates considerable attention to *how* an imaginary becomes actualised – through discourse and strategic action that influence the balance of forces and generate consent – yet its definition is fragmented and scattered across his numerous texts. A clearer definition is provided by Jasanoff (2015), whose work on sociotechnical imaginaries is conceptually and pragmatically relevant to Jessop's. She defines sociotechnical imaginaries as:

> collectively held, institutionally stabilized, and publicly performed visions of desirable futures, animated by shared understandings of forms of social life and social order attainable through, and supportive of, advances in science and technology (Jasanoff, 2015, p. 4).

According to Jasanoff, the stress here is on *desirable* 'because efforts to build new sociotechnical futures are typically grounded in positive visions of social progress', achieved through innovations in science and technologies (Ibid.). Sociotechnical imaginaries are stabilised by combining 'future thinking' and its corresponding political performance and power, with legacies of social and material achievements, whether infrastructural or institutional. In this, Jasanoff's rendering, albeit in a less technical and more poetic manner, parallels Jessop's aim of treating the structure-agency dialectic at the level of the political collective with nuance. Technologies operate as 'performative scripts' that lend concreteness to social imaginaries, while performative signalling by state actors is implicated in the act of subjectivation, 'with

'its choices and exclusions' determining what can be seen and what passes unnoticed' (Jasanoff, 2015, p. 13).

In Uzbekistan's case, the 'Green Economy' import is an overarching ecological and economic imaginary that encompasses all sectors of the national economy and international relations. Within agriculture, however, it acquires a national-sectoral flavour, with its own set of symbols, socio-material legacies, and 'desirable futures' and *subjects* that are simultaneously global and local. As shown in Chapter 6, in addition to projecting a technologically modern, export-oriented, and water-efficient agricultural landscape, the Green Economic agricultural imaginary implies moral rectitude regarding past national agro-ecological faults – namely, the desiccation of the Aral Sea. In her ethnographic investigation of the moral economies of Darjeeling tea production in Northern India, Sarah Besky proposes the concept 'Third World Agrarian Imaginary'. Besky uses the term to expose how fair trade and Geographic Indication (GI) labels *redeem* and *reproduce* colonial plantation labour by re-articulating the relationship between women and tea-plucking as natural. By discursively and pictorially rebranding tea 'plantations' as 'tea gardens', fair trade labels romanticise hard, gendered work as 'natural agricultural heritage', to then recast its products as *moral*. In this marketing sleight of hand, local female labourers become 'ecologically noble' and aligned with globally circulating GI imaginaries (Besky, 2014, pp. 30-31).

The Green Economy performs a similar redemptive function in what Fairhead and colleagues (2012) term an 'economy of repair' that reproduces the capitalist relation even as it promises to transcend it. However, following Jessop, Jasanoff, and Besky, its manifestation is context-dependent. To articulate the specificity of the sociotechnical context, and drawing on Jasanoff, Chapter 6 proposes the term 'New Agrarian Imaginary' to underscore the distinctly Green Economic vision in Uzbekistan's agriculture. The New Agrarian Imaginary is global, and thus transferable, in that it draws on technical and symbolic *imports* that are activated through globally-inspired hegemonic projects and new accumulation strategies, and stabilised by local, socio-material legacies. In other words, the 'New Agrarian Imaginary' is not exclusively a product of the Uzbek state's future-building; instead, it is a national *interpretation* of a developmental framework that succeeded the 'good governance' agenda.

So far, this section has established that the capitalist state is a dynamic relation in which forces constantly interact, competing for their respective accumulation strategies, which are then unified by hegemonic projects, themselves based on specific sociotechnical imaginaries that serve as mental blueprints for how the world should work. These complicated acts of coordination, such as the Uzbek state's synchronisation of the globally circulating Green Economy with national objectives, are achieved via a mechanism that Jessop refers to as metagovernance, or the 'governance of governance' (Jessop, 2007, p. 25). Governance is defined as the 'co-ordination of interdependent activities' (Jessop, 1998, p. 29) such as market forces, hierarchical command by the state, or the direct interface for getting things done, where attention is drawn to processes that exclude the vertical orchestration by the state

(Jessop, 2002; Mayntz, 1998; Whitehead, 2003). As governance is prone to failure, metagovernance is proposed as a prescriptive approach to mitigate this failure by providing the 'rules for governance' through coordination and balancing mechanisms (Jessop, 1998, p. 43). More relevant to this research, Jessop observes that 'because many studies focus on specific problem fields or objects of governance, they tend to ignore questions of the relative (in)compatibility of different governance regimes and their implications for the overall unity of [statehood]'(Jessop, 2007, p. 69).

In other words, what happens if participatory governance is entirely incompatible with Uzbekistan's authoritarianism? Metagovernance, hence, offers a lens to investigate the ways in which 'articulations of state power become expressed in and through governance structures and the ways in which governance systems are in turn forged in the persistent 'shadow of hierarchical authority' (Whitehead, 2003, p. 8). In Uzbekistan's case, the concept of metagovernance sensitises us to the way in which governance structures, whether the former Water User Associations or the present Green Economy Programme together with the international organisations that endorsed them, transform to become operational. The Uzbek state collibrates incompatible *modes of governance* (participatory networks, market mechanisms, hierarchical command) *in the service of* its economic imaginary.

In Chapter 5, I employ metagovernance to explain how the Uzbek government synchronised its extractive cotton production with WUA's participatory goals – by incorporating them to meet its institutional gaps. In Chapter 6, metagovernance explains how international financial institutions' efforts to reform the cotton sector are steered by the Rural Restructuring Agency to service a national vision for agricultural diversification. Finally, in Chapter 7, I look at how the Green Economy ideals of the New Agrarian Imaginary are implemented in practice. Here, the drive for rapid, widespread adoption of water-efficient technologies collides with the path dependencies of hydro-authoritarian agrarian institutions, engendering new forms of 'green grabbing'.

3.6 Spatio-temporal fixes and nature

As premised in the trialectic framework, studying the state alone is insufficient for understanding resource access outcomes on the ground, and additionally warrants an understanding of the interconnections between state, nature, and society. Ioris starts by recognising that 'water management extends through the interconnections between state intervention, social interactions and socionatural hydrological systems' (Ioris, 2012, p. 128). Therefore, while rejecting geographical determinism, he adds a new materialist inflection to his analysis by asserting that the biophysical properties of water systems are not only influenced by, but themselves condition social relations and political contestations. The relationship is asymmetrical because, through technology, humans can continuously overcome the limits imposed by nature (Walker, 2014). Going back to SRA, nature, as a device of power distribution, is vulnerable to appropriation by hegemonic demands or interests of an elite class, which in turn may produce social distress, creating new cycles of demands for intervention. The state thus plays a central

role in both reinforcing 'the powers of society over nature and, in an attempt to secure social cohesion, regulat[ing] the rate of socioecological impacts' (Ioris, 2012, p. 130).

In more theoretical terms, when synthesised with SRA, accumulation strategies and hegemonic projects, inspired by imaginaries and coordinated through metagovernance, result in spatio-temporal fixes whose articulations are environmentally conditioned. Applied to Uzbekistan, the establishment of agricultural clusters to export value-added agricultural goods, produced on high-tech, 'clean' farms that conform to the ideals of the New Agrarian Imaginary, transform space by reallocating natural resources (land and water), and time by altering the cycles of production and distribution. This is because of the 'indeterminate and antagonistic nature of capital' that constantly commodifies 'fictitious' commodities such as nature, land, money, and labour-power (Jessop, 1991, p. 13). In his extension of David Harvey's 'accumulation by dispossession', Jessop explains the following:

> A spatio-temporal fix resolves, partially and provisionally at best, the contradictions and dilemmas inherent in capitalism by establishing spatial and temporal boundaries within which a relatively durable pattern of 'structured coherence' can be secured and by shifting certain costs of securing this coherence beyond these spatial and temporal boundaries. This sort of spatio-temporal fix displaces and defers contradictions both within a given economic space and/or political territory and beyond it (Jessop, 2004, p. 13).

Based on Arrighi's more straightforward rendering of Harvey, because of capital's tendency to accumulate beyond what could be reinvested productively, the temporal and geographical 'fix' defers this propensity onto new spaces by building new social and physical infrastructures and absorbing the surpluses of labour into these new 'productive combinations' (Arrighi, 2004, p. 528). Accumulation strategies and hegemonic projects create spatio-temporal fixes by establishing a 'general interest and institutionalised compromise', 'privileg[ing] some identities, interests, and spatio-temporal horizons and marginaliz[ing] or sanction[ing] others'. In doing so, they often displace their social and material costs beyond the intended territorial, social, and temporal boundaries, resulting in the 'super-exploitation of nature or inherited social resources, deferral of problems into an indefinite future, and, of course, the exploitation and/or oppression of specific classes or other social categories' (Jessop, 2014e, p. 12).

Spatialisation and hydrosocial territories

The 'hydrosocial cycle' and 'hydrosocial territories' from critical political ecology are instances of Harvey's and Jessop's spatio-temporal fix in water. According to Linton and Budds, the hydrosocial cycle is the 'socio-natural process by which water and society make and remake each other over space and time' (Linton and Budds, 2014, p. 179). They advocate for an examination of water and its circulation to uncover how water reflects and internalises power relations that might otherwise remain invisible. Unlike the hydrological cycle, however, the hydrosocial cycle is not exempt from

subsumption by capital and instead tends to follow the basic axiom, succinctly expressed by Swyngedouw, that 'water flows to money' (Linton and Budds, 2014, p. 173). Linton additionally traces the powerful role played by *ideas*, such as 'modern water' – described as the 'intellectual abstraction of water as a natural quantity', or an economic resource, which results in the exclusion of alternative meanings and relations with water, 'along with people for whom such meanings and relations are constitutive of life and livelihood' (Linton, 2010, p. 13). Moreover, while the metatheoretical dialectical relationship between water and society can be consistently applied across cases, according to Swyngedouw, it is nonetheless expressed as a 'historical-geographical process', emphasising the localised dimension (Swyngedouw, 1999).

Connecting back to SRA, when adapted to water, the spatio-temporal fix manifests in the transformation of hydrosocial relations and existing modalities of territorialisation of water-use. 'Hydrosocial territories' are hybrid, spatially bound networks, that are co-produced through unequal productive, cultural, administrative, symbolic, and infrastructural interactions. They differentially embody hegemonic and marginal imaginaries that frame the cycle of contentious production and reproduction of the environment. Hydrosocial territories reflect these contestations, whose outcome is shaped by dominant actors that draw on certain worldviews and naturalising discourses. Shifting epistemic belief systems and politico-economic visions around water and its use (such as the shift from 'participation' in water to the 'Green Economy') reconfigure hydrosocial territories, creating new terms and boundaries for inclusion and exclusion (Boelens et al., 2016; Flaminio et al., 2022). Hommes and colleagues' Foucauldian explanation of the transformation of hydrosocial territories connects directly to Jessop's technological selectivities, accumulation strategies, hegemonic projects, and economic imaginaries:

> the fact that creating hydrosocial territories entails reconfiguring physical, social, and symbolic features to realize a certain socio-territorial imaginary about what is and what ought-to-be, means that many hydraulic projects can be seen as governmentality projects. Through the norms, knowledge and government mentalities inscribed in hydraulic projects, these projects become means to create a reality according to dominant ideas (Hommes et al., 2018, p. 152)

'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, p. 1090) transposes this abstraction onto territory to render its definition concrete, demonstrating 'territory-effect

as the outcome of socio-technical practices' and connecting back to Jasanoff, practices that are rooted in sociotechnical imaginaries. 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, p. 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, p. 75).

How the 'New Agrarian Imaginary' produces new hydrosocial spaces in rural Uzbekistan is the subject of Chapter 7. Beyond Uzbekistan, globalisation entails the reconfiguration of administered space in a dialectic tension between *de*-territorialisation and *re*-territorialisation (Elden, 2005; Swyngedouw, 2004). As Chapter 7 argues, the Green Economy 'reconfigures physical, social, and symbolic features to realise a certain socio-territorial imaginary' – namely, the New Agrarian Imaginary (Hommes et al., 2018, p. 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).

In political contexts that qualify as hydro-authoritarian, such as Uzbekistan, this neoliberal reconfiguration of nature-society relations can acquire a particularly forceful quality (Spoor and Thiemann, 2025). Hydro-authoritarian projects are centrally financed, hierarchical and coercive; they are unfettered by the distractions and limitations posed by 'institutional and temporal limits on power' (Spoor and Thiemann, 2025, p. 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, p. 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 – or in Jessop's terms, the *political form* through which power is channelled.

Deploying 'hydrosocial territories' as a sub-category of spatio-temporality allows me to trace the relationship between the evolution of state policy and its translation into water access changes on the ground. For example, in Chapter 5, I argue that Uzbekistan's political economy of cotton production under the former President Karimov entailed a particular modality of hydrosocial territorialisation, that was subsequently *de*-linked, or de-territorialised under the New Agrarian Imaginary. The *mechanisms* that produce hydrosocial de-territorialisation and reterritorialisation are spread across Chapter 6 and

Chapter 7. Chapter 6 explains how Uzbekistan's historic relationship with international development institutions engendered the New Agrarian Imaginary, while Chapter 7 specifies how this imaginary interacts with mid-level and local hydro-authoritarian water governance to produce new, fragmented spatialities of water access, reflected in increasing *verticalisation*.

Finally, the production of these spatialities through the reconfiguration of hydrosocial territories entrenches environmental injustice, albeit in subtle ways. The characteristics of this subtlety – namely the slow, hard-to-notice temporality of the production of environmental inequality – are captured by Nixon's 'slow violence' : '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, p. 2). In contrast to the 'spectacular' nature of calamities plaguing the news cycle, 'slow violence' materialises through vertical power and within institutionally driven processes, mediated by the state (Ioris, 2012; Panez and Olea, 2023; Panitch, 1994). Most importantly, its effects are unevenly felt, initially by the most vulnerable, or those who do not have the means to escape it (Nixon, 2013). Because 'slow violence' happens over time and is constituted by interactions between the political, social and material, an examination of the local hydrosocial cycle and territorialisation needs to be embedded in a historical account of the transformations which produce it. Finally, this directly connects to the social-reproductive implications of the reconfiguration of hydrosocial relations, addressed in the subsequent part of this framework.

3.7 Society

Delineating 'society' in this study

Theoretically, as SRA is primarily a theory of the state, 'society' is implicitly conceived of in direct relation to it – as constituted by those whose 'will' the state administers. With regards to society's contours, Jessop argues that 'it should be no more interpreted as an empirical given as the state itself' (Jessop, 2007, p. 22). Attempts to delineate 'society', or even the 'nation' and 'nation-building' are further challenged by increasing internationalisation, which paradoxically reinforces the mediating role of the state (Jessop, 2007). Jessop and Ioris characterise society as shaped by class-based relations that have an uneven capacity to influence the choices of the state (Ioris, 2012; Jessop, 2007).

Considering the polymorphous and class-based nature of 'society', for the purpose of research, it is delineated and studied at particular junctures of its interactions and relations with the state or nature. In Ioris' trialectics of water management problems, social groups use and transform nature, or in this case water, 'according to demands and techniques which epitomise specific historico-geographical circumstances' (Ioris, 2012, p. 125). Because this research is concerned with smallholders' ability to access water, in this thesis, smallholders as a *class*-productive group, characterised by specific livelihoods and forms of cultivation, underpin the notion of society. This is also consistent with the *relational* approach of Critical Realism (CR), to which this thesis adheres, as expounded in the

subsequent chapter, where analysis should be rooted in *relations* rather than isolated objects. Admittedly, as consistently recognised in SRA, 'smallholders' are not monolithic as social forms are always asymmetric with 'regard to economic resources, state capacities, gender, ethnicity, nature, place', among others (Jessop, 2014a).

Social reproduction and resource dispossession

Consistent with SRA's notion of displacement of costs of accumulation strategies beyond the political-economic boundaries they represent, is the argument that the accumulation of water has implications not only for relations of production, but more importantly, those of social reproduction (Roberts, 2008). In Chapter 8, I zoom in on some of the effects of Uzbekistan's top-down hydro-agrarian transformation on patterns of rural labour, particularly among women, who bear the brunt of reproductive work. Social reproduction, based on Vogel's reliance on Evelyn Nakano Glenn's definition, is:

> the creation and recreation of people as cultural and social, as well as physical, beings. Thus it involves mental, emotional, and manual labour. This labour can be organised in myriad ways - in and out of the household, as paid or unpaid work, creating exchange value or only use value. . . . (For example, food production) (Vogel, 2000, p. 167)

Social reproduction is one terrain where the contradictions of capitalism manifest. As stated previously in reference to the necessity of extra-economic conditions for capitalism's survival, sustained accumulation depends on the reproduction of the labour force while simultaneously destabilising it (Bunce et al., 2024). According to Katz, social reproduction is historically and geographically contingent and shaped by processes embedded in the state, capital, society, and, as argued here, nature. It entails reproducing knowledge and skills within a particular habitus, thereby maintaining and replicating categories of difference (Katz, 2001). Drawing on Polanyi, Roberts argues that water's commodification poses a challenge to social reproduction. As a 'fictitious commodity', like land and labour, water is an input rather than something produced intentionally for sale, so subjecting it to market logic strains the very conditions on which reproduction depends (Roberts, 2008). This is an extension of Jessop's aforementioned premise – that the antagonistic nature of capital tends to commodify fictitious commodities – into the realm of social reproduction. Because land and water are vital to all forms of social reproduction, Polanyi, cited in Roberts (2008), argues that it 'cannot be fully subjected to the laws of the self-regulating market without causing some form of human insecurity, and eventually, a counter-movement aimed at re-embedding it within the political sphere' (Roberts, 2008, p. 547).

Feminist political economy problematises the overwhelming reliance on women's work to produce labour-power for the economy, and this work's inferior status due to its positioning as outside the money economy (Bhattacharya, 2020; Çelik, 2023; Ferguson, 1990; Katz, 2001). The steady dispossession of the rural population through capitalist agriculture in the Global South, not only produces cheap, surplus labour, but also obliges households to diversify their labour sources, where women end up taking the

burden of engaging in unwaged activities such as smallholding, thus becoming the 'last guarantors of the survival of the family through various types of work and services' (Mies cited in Çelik, 2023, p. 4). When access to water is diminished, women bear the brunt of seeking alternative sources to complete daily tasks, whether for household consumption or plot irrigation. Roberts quotes an observation made by Cindi Katz that:

> [w]hen reproduction [of capital] is highly mobile but social reproduction necessarily remains largely place-bound, all sorts of disjunctures occur across space, across boundaries, and across scale, which are as likely to draw upon sedimented inequalities in social relations as to provoke new ones (Katz cited in Roberts, 2008, p. 549).

This absorption of mobile capital by social reproductive processes is far from linear and manifests often in contradictory ways, or 'all sorts of disjunctures'. Similarly to how the use of space resulting from capitalism's encroachment into rural areas is ridden with conflict and contestation, so is capital's effect on rural populations not singular but highly fragmented, dispersed, and internalised by local material and political conditions. In fact, based on the literature, it changes the 'texture of livelihoods' by continuously redefining inhabitants' relations with labour and nature, summarised in the literature as a movement from 'vulnerability' towards 'precarity' (Cruz-Del Rosario and Rigg, 2019; Kusakabe and Myae, 2019; Rigg et al., 2016). Vulnerability is conceived as sensitivity to stresses and risks, and difficulty coping with those risks, reproduced through structural relations and ecological stressors (Baumann, 2023). It is the condition communities face when living in isolation while relying on scarce resources (Kusakabe and Myae, 2019). Precarity, in turn, looks at how the 'extension of market relations can harm (*as well as assist*) certain groups and individuals' (Rigg et al., 2016, p. 66, emphasis added). In their study of the effects of the expansion of rubber plantations on precarisation among smallholders in Laos and Myanmar, Kusakabe and Myae explain:

> Having limited land holdings or lacking access to credit or markets are examples of vulnerability, while dispossession of land, market dependency as well as out-migration are indicative of precarity (Kusakabe and Myae, 2019, p. 588).

Although precarity has been observed to characterise new forms of poverty, the relationship between vulnerability and precarity is far from linear or geographically homogenous; they are often simultaneous and dynamic processes, albeit with different roots.

The effects of precarity, stemming from capitalist transformation, on gendered labour are particularly diverse. On the one hand, lower dependence on smallholding plots and increased participation in precarious work were found to improve women's positions as the gendered relations that previously defined their livelihoods are challenged by new opportunities to earn money. Evidence from Laos found that in certain areas, due to labour shortages, the expansion of Chinese agribusiness offered women the opportunity to work and rent their land plots for banana cultivation, which was conducive to financial

independence (Kusakabe and Myae, 2019). On the other hand, based on a case study on tobacco farming in rural Turkey, Çelik argues that non-market resource access dispossession resulting from agribusiness penetration increased the exploitation of women as unpaid household and small agricultural labourers as men sought jobs outside the farms (Çelik, 2023). In both examples, strategies of survival produce unsustainable solutions; in Laos, women's empowerment was accompanied by a subsistence squeeze through land enclosures and the threat of ecological degradation from chemical-heavy banana production on leased plots (Kusakabe and Myae, 2019).

Furthermore, the internalisation of water dispossession can be embodied as women suffer to gain access to a critical resource that is either depleted or contaminated (Sultana, 2011). Connecting back to Nixon, water access fragmentation has been described as 'slow infrastructural violence', where in their everyday, invisible and banal reality, women's bodies *become* infrastructure to compensate for its deficiencies in order to sustain daily life. Transformations in infrastructures, for example, due to reconfigurations in hydrosocial relations:

> rework relations between people and things in daily life, [and] these relationalities are often 'to the detriment of marginalized actors' but can receive little visibility since their deleterious effects often accrue slowly over time, rather than simply through spectacular events (Truelove and Ruszczyk, 2022, p. 4)

Uzbekistan's rural social reproduction is inseparable from women's work on homestead plots, particularly due to high levels of male labour outmigration to countries such as Russia and South Korea. Even when the male head of the household is present, employed, and involved in homestead production, female household members are responsible for most of the routine work – weeding, sowing, irrigating, fertilising. In many cases, as I have found, the presence of a male is an indicator that the family is struggling financially, as remittances from abroad tend to be high enough to relieve women of some of the hard labour required to render the plot profitable beyond mere sustenance. In Chapter 8, I tease out how the New Agrarian Imaginary and hydrosocial re-territorialisation are implicated in the changing patterns of women's labour, both on the plot and beyond the plot – in other words, how households *internalise* rural change. As I find, these processes are highly ambiguous and engender ambivalent feelings, which aligns with the indeterminacy or diversity of effects of capitalist transformation as suggested in the aforementioned literature on rural precarity.

Counter-hegemonic strategies

Finally, owing to James C. Scott's pioneering work, scholarly imaginaries of rural change have become inseparable from questions of resistance and thus, as tradition demands, must be addressed. Researching resistance in Uzbekistan, however, is difficult. The Uzbek state is known for its unscrupulous approach to quelling protests, most notoriously, massacring 700 Islamic 'extremists' during the 2005 Andijan protests, or more recently, injuring 271 during the 2022 Karakalpakstan protests against the removal of

the Autonomous Region's sovereign status in the new constitution (Amnesty International, 2015; Open Dialogue Foundation, 2022). In both cases, economic grievances were at the heart of what, on the surface, looked like politically motivated rebellions; yet, a deep dive into their causes and entanglements would be unsafe and, at best, would earn a researcher deportation. Importantly, these famous protests absolve Uzbekistani people of all accusations of 'passivity' common in mainstream Western stereotypes about Central Asia. However, nuanced understandings of the limits and thresholds of popular patience remain lacking. In other words, because of the historic level of repression in Uzbekistan, the art of grasping what my interlocutors find 'okay' and not 'okay' about the changes happening around them is an exercise in intuition and comfort with uncertainty.

Theory and empirical studies from other communities subjected to extractivist development, however, allow one to transcend the geographical and historical biases of Uzbekistan's post-Soviet condition. For example, in an illustrative case study of an Afro-descendant village in agro-industrial Colombia, Hougaard (2023) interrogates people's lives after multiple rounds of dispossession to investigate their practices of sense-making against the backdrop of poverty and ecological dependence at the agro-industrial margin. She points to the emergence of a particular form of 'rural precarity', 'characterised by uncertain relations of labour, fragile conditions of life, ecological dependence and reconfigured rural patronage relations' (p. 2438). In Hougaard's treatment, reconfiguration of rural patronage relations is a result of the uncertainty engendered by new agro-industrial players, which de-link former patronage-based support between old landowners and rural inhabitants in favour of impersonal and precarious, yet not undesired wage relations. She argues that these conditions cause political passivity, which limits mobilisation and reproduces existing inequalities (Hougaard, 2023). I find that Hougaard's lens helps me make some additional sense of resistance or lack thereof in my research experience in rural Uzbekistan. Instead of insisting on 'honest' answers from my interlocutors to direct and uncomfortable questions about their thoughts on water scarcity and land enclosures, I can attune myself to the ways in which neoliberal change conjures mixed feelings and contradictory, yet fundamentally agential responses.

For example, Hougaard finds that ostensible 'political passivity' in the face of dependence on wage-labour, is accompanied by a desire for autonomy, which has its own political implications. As she argues:

> In response to dispossession and precarity, people employ various strategies; some use 'weapons of the weak' or 'everyday forms of peasant resistance' (Scott 1985), while others assemble in wider social protests halfway between everyday resistance and 'revolutionary war' {…}. Others deal with dispossession and precarity by repossessing identities, subjectivities and values or trying to live 'otherwise' within the seams of capitalism {…}. In Colombia, this has taken the form of alternative life projects, drawing on notions of autonomy, community, peasant struggle and nonviolence… (p. 2440)

In Chapter 8, I draw parallels between Hougaard's interlocutors in Colombia and Uzbek rural inhabitants, and especially women's responses to change, such as similar desires for autonomy and simmering scepticism of produce grown on agribusinesses. When inserted into the SRA framework, the varied responses constitute counter-hegemonic strategies whose very possibility is inscribed in the incompleteness of hegemonic projects such as Uzbekistan's Green Economy. According to Jessop, 'the appearance of social unity and consensus generated by successful hegemonic projects, this is always a temporary, if not illusory, unity', engendered by the 'gaps between discourses and practices at the micro-level' which open up spaces for alternative conceptions of society (Jessop, 2014a). After all, as expressed in previous sections, hegemonic projects are *designed* to privilege some groups over others, regardless of the country in question. In his more abstract discussion of counter-hegemonic strategies, Jessop underscores theories of the everyday, dispersed forms of anti-disciplinary action, and other varied forms of subversion 'where everyday life is a continuing battle of wits and a site of micro-resistance in which the (un-)structured and covert activities of the liminal seek to accommodate power while simultaneously protecting their interests and identities' (Jessop, 2014a). While these acts are essential to the existence of counter-hegemony, Jessop invokes Gramsci to affirm that resistance will not last unless it leads to the creation of its own 'historic bloc' of cultural, economic, and political structures – something we have yet to witness in Uzbekistan.

Conclusion

This chapter provides an integrative framework for understanding factors that shape the distribution of natural resources by drawing on and elaborating Ioris' (2012) trialectics of state, nature and society. With this framework, I aim to transcend rigid disciplinary boundaries by drawing on perspectives from across critical state theory, critical agrarian studies, and political ecology, while remaining firmly focused on political ecology's emphasis on the reconfiguration of nature-society relations. At the same time, to ensure processual coherence, Jessop's strategic-relational approach to the state serves as the theoretical scaffolding for this thesis, because I identify the *state* as the primary steerer of hydro-agrarian change. The state is identified as the focal (non-unitary) actor in the transformation of nature-society relations, within which global and national hegemonies are mediated and translated to impose a national manifestation of capitalist relations. Therefore, the line of argument is as follows:

1) Capitalist accumulation is ever-fluctuating and constantly creates contradictions. The state is a strategically selective terrain where various forces constantly compete over influence and to devise accumulation strategies and hegemonic projects to manage these contradictions. The coordination of various forces acting on the state requires metagovernance and constant collibration, which upholds the state's hierarchy, while also transforming it. Accumulation strategies and hegemonic projects rooted in particular *imaginaries* produce spatio-temporal fixes that defer the contradictions of capitalism into the future by exploiting extra-economic

conditions upon which capitalism rests. The production of the Green Economy as a new hegemonic project and its accompanying 'New Agrarian Imaginary' are the subject of Chapter 6.

2) Capitalist relations, state-mediated and legitimated via hegemonic projects, materialising in spatio-temporal fixes, 'produce' nature. At the same time, the materiality of nature conditions these forces. In water, this manifests in the alteration of hydrosocial relations and modalities of their territorialisation – the topic of Chapter 7.
3) Re-spatialisation of nature as a result of new hegemonic projects and accumulation strategies affects social reproduction in dispersed and non-linear ways. Sometimes it can be temporarily emancipatory by offering labour opportunities. At other times, it entrenches reproductive burdens, disproportionately affecting women and other marginalised groups. Because state projects are inherently selective in whom they include and exclude, they leave space for counter-hegemonic (however subtle) tactics, enacted by the excluded. I explore these dynamics in Chapter 8.

Ultimately, despite the multitude of concepts and interactions at each level of encounter, the unifying thread within this theory is the downward diffusion of the Green Economy in agriculture, rooted in the New Agrarian Imaginary, though diluted as it encounters forces that act upon it. A thorough application of the theoretical framework requires qualifying the relationship between Uzbekistan's economic imaginary and global hegemonic projects, recognising that biophysical characteristics influence and are influenced by human activities, and treating individuals' actions and reactions to the changes around them as a reflection of their agency.

4. RESEARCH DESIGN AND METHODS

Introduction

This chapter presents the philosophical underpinnings of this research as grounded in Critical Realism (CR) – a philosophy of science that presupposes the existence of a reality external to our cognition, and combines this with a relativist epistemology rooted in the commitment to constantly evolving, always fallible theory to mediate our knowledge of this reality. I justify the adopted, dynamic research design as consistent with CR and Uzbekistan's research context, where access to the 'field' in rural areas proved more challenging than expected. I then explain this thesis's three-level analysis approach as corresponding to the three-tiered theoretical framework, and subsequently elaborate on the concrete data sources used: legislation, state-supported news, grey literature, semi-structured interviews, informal conversations, and two case studies. The following section on data analysis details the procedure for achieving 'retroduction' or theoretical redescription, which is essential for identifying causality within CR. The final section addresses the ethical considerations of this project.

4.1 The ontological and epistemological foundations of the research: Critical Realism

This thesis is based on a critical realist (CR) ontology for two reasons. First, CR is ontologically consistent with some strands of political ecology and shares its concern for social justice and emancipation. The second reason is that Jessop's strategic-relational approach (SRA) draws on CR, particularly its realist ontology and transformational model of change, which are elaborated below. In effect, CR, political ecology, and SRA share Marxian origins (Banfield, 2019). With regard to the first reason, ontologically, CR 'submits that there is a material world of objects, forces, and rules, which exists independently of our knowledge and then posits that our knowledge of this world is necessarily incomplete and socialised' (Walker, 2014, p. 50). This is relevant to political ecology, as the study of human-environment relations makes particularly acute the ontological tension arising from the clash between the materiality of water and humans' tendency to socially construct it in relation to socio-historical conditions. For example, Swyngedouw's genealogy of Spain's environmental transformation and the accompanying fluctuating imaginaries that enabled it demonstrates this very clearly: water, as a material entity, becomes appropriated by policy models which are themselves socialised objects (Swyngedouw, 2015). Similarly, in his review of political ecology as a discipline, Blaikie remarks:

> Environmental issues do not only become so (if at all) because of ontologically real changes in nature, but because they are constructed by social processes, successfully represented and launched (Blaikie, 1999, p. 133).

The contradiction between the fluctuating, constructed and politicised nature of knowledge, and water as a physical object subject to laws in natural science, poses an ontological dilemma difficult to reconcile within the positivist – social constructivist divide in mainstream ontological debates.

A CR position bridges the divide between nature's materiality and our social construction of it using a stratified model of ontology. Bhaskar's argument begins with a critique of positivism and social constructivism. According to him, despite their apparent opposition to each other, both positivism and social constructivism promote an 'epistemic fallacy' by reducing ontology to epistemology, where *reality* is either limited to what can be empirically known through experiments, or is entirely constructed through human knowledge (Bhaskar, 1998). CR transcends the nature-versus-construction dilemma and the epistemic fallacy by combining and reconciling 'ontological realism, epistemological relativism and judgmental rationality' (Archer cited in Danermark et al., 2019, p. 13). In other words, CR contends that there is a material world with objects and rules that exists independently of our knowledge, and our knowledge about this world is incomplete, fluctuating, and socialised (Danermark et al., 2019). This conception, or 'mind-independent nature of reality', applies to both the material and social reality, in the latter of which social structures operate outside of human understandings of them (Sturgiss and Clark, 2020, p. 143). Theories, in turn, help us get closer to this reality by offering tools to identify causal mechanisms that drive social events (Fletcher, 2017).

CR ontology is stratified into three levels. At the *empirical* level are experienced patterns and events as observed and interpreted by humans. Events occur at the *actual* level, whether we are aware of them or not. Finally, at the *real* level are the underlying mechanisms that produce the events at the empirical level. These three layers, as proposed by CR, are not hierarchical – instead, they are constitutive elements of a unified reality, divided by Bhaskar to illustrate the relationship between reality (ontology) and humans' flawed knowledge of it (epistemology) (Fletcher, 2017). The role of research in CR is, based on empirical observation, to come closer to the *real* level of reality by understanding processes at the empirical and actual levels. In other words, it is about searching for causality for a particular observation using theory and interpretation, turning science into an 'ongoing process of production' (Montiel, 2007, p. 89).

Our knowledge of the real world is limited because many objects of social scientific investigation only manifest themselves in 'open systems' – those where invariant empirical regularities are extremely rare, unlike in 'closed systems' (whose causal mechanisms can be identified in lab conditions). According to Bhaskar, social structures, 'unlike natural mechanisms… exist only in virtue of the activities they govern and cannot be empirically identified independently of them' (Bhaskar, 1978, p. 14). In the open social world, conditions are such that a structure's causal power may or may not be activated to have an observable impact at the empirical level (Fletcher, 2017). The fleeting nature of the visibility of empirical effects means that causal mechanisms can only be described as tendencies. Furthermore, these

causal mechanisms operate relationally; they exist within the nexus of enduring relations among people, between people and nature, among activities, things, etc. (Bhaskar, 1978).

In the realm of the 'real', which CR aims to understand, the relationship between structure and agency relies on Bhaskar's 'transformative' model of change. Building on the concept of a dialectic between structure and agency, Bhaskar clarifies that society pre-exists humans, and therefore they do not make it; rather, 'it is an ensemble of structures, practices, and conventions that individuals reproduce or transform. But which would not exist unless they did so' (Bhaskar, 1978, p. 12). Society thus offers humans the conditions for intentional action through 'socialisation' – the process through which an individual acquires the required skills for a given social context, without which meaningful action is difficult to achieve (Bhaskar, 1978). In this transformative model, 'society is […] the ever-present material cause and the continually reproduced outcome of human agency' of both groups and individuals[2] (Montiel, 2007, p. 91). As Bhaskar summarises: 'the transformational model implies that social activities are historical, interdependent and interconnected' (Bhaskar, 1998, p. 58). This view of the structure-agency dialectic is consistent with SRA, where structures are strategically selective, and actions are structurally constrained, emphasising the importance of context, history and contingency, but also possibility for emergence. Furthermore, SRA draws on a CR ontology through its insistence on real structures while admitting that these structures produce effects through actors' interpretation of them, which is never complete and always based on situated perceptions, reflexivity and meaning-making (Jessop, 2005, 2007).

Therefore, and as mentioned previously, CR adheres to epistemological relativism, the rejection of the 'idea that claims can be assessed from a universally applicable, objective standpoint' (Luper, 2004, p. 271). In line with its stratified ontology, it distinguishes between transitive and intransitive dimensions of knowledge. The intransitive dimension comprises causal mechanisms that operate outside our knowledge and interpretation. The transitive dimension comprises phenomena we detect, yet whose interactions and causes remain uncertain. The role of science in the social world is therefore to use retroduction, or inference of deeper causal mechanisms, with the help of socialised, explanatory models (theories) to *explain* (rather than predict) temporary regularities which manifest themselves in a diversity of relations (Jessop, 2005). As Jessop elaborates:

> Evidential statements are the mediated results of investigation and so never directly reflect real or actual phenomena. Experimentation, measurement, observation, etc., are always contingent, fallible, and, perhaps, corrigible (Jessop, 2005, p. 43).

[2] For a discussion on the difference between Giddens' structuration, CR and SRA, see Jessop 2005. In summary, among other criticisms, Jessop argues that Giddens' structuration lacks ontological depth as it treats structures and agency at the level of the 'actual', i.e., actualism, 'the doctrine that the only things there are, that have being in any sense, are the things that actually exist' (Menzel, 1990, p. 355).

Theories are fallible and not all are made equal, but they have a 'truth-like' quality, and can serve as windows into an objective reality. Furthermore, scientific explanations are not necessarily more accurate than experiential explanations, and the former relies on the latter (Fletcher, 2017), while maintaining rigour and explanatory adequacy through 'reasoned critique and development' thus avoiding judgemental relativism, or 'the view that any judgement is as good as any other' (Jessop, 2005, p. 43). The theoretical framework presented in the previous chapter, thus serves as my window into the processes happening in Uzbekistan, as it is instrumental in illuminating underlying causal mechanisms in accounting for the production of water scarcity in Uzbekistan. Table 1 below summarises the relationship between the CR ontology, political ecology, and SRA in this thesis:

Table 1: The relationships between components of this thesis

Ontological level	Reality consists of generative mechanisms and structures independent of our knowledge of them, historically produced in the social realm
Meso-theoretical level	The state is a strategically selective terrain where actors pursue accumulation strategies by devising strategic projects, themselves products of path-dependencies across scales
Practical/substantive level	Spatio-temporal rearticulation caused by the Uzbek state's hegemonic project and the selectivities it engenders. In water, it culminates in hydrosocial re-territorialisation, generating new scarcities, internalised by rural inhabitants depending on their socio-economic status
Empirical level	Three levels of analysis structured by the above levels, providing methodological triangulation to account for complexity, supported by two case studies

4.2 Methodology: iterative research, a dynamic design

4.2.1 Rationale within CR

This thesis adheres to an iterative research design for both theoretical and practical purposes. With regards to the former, as Yeung (1997) argues:

> The realist method is basically a posteriori in that given the social reproduction of knowledge, a critical realist seeks to reconstruct causal structures and their properties on the basis of constant reflections and immanent critique (Yeung, 1997, p. 57).

Yeung adds that to reconstruct these causal structures, one must first experience some of their effects (Ibid.). As mentioned in the introductory chapter, this thesis was initially motivated by an interest in the water-based relationships between small (informal and non-registered) and large farmers (formal and

registered) within the territories of specific Water User Associations (WUAs), through the lens of social solidarity and reciprocity. When I devised my research approach prior to entering the field, I was open to the possibility that the assumptions on which the thesis was premised were either wrong or manifested in a manner I had not envisioned. In other words, I had not yet experienced the empirical effects or regularities that needed reconstruction; the *context* was still alien to me. The provisional nature of my understanding of the 'effects' to be investigated was confirmed by the realisation, after my very first elite interview, that amidst the endless cascade of decrees and resolutions instituted upon the coming to power of Shavkat Mirziyoyev, I had completely missed the sudden dismantlement of WUAs, and the mushrooming of horticultural agribusiness.

I attuned myself to Uzbekistan's new political and hydro-agrarian reality following an initial 'scoping' or exploratory phase, in CR referred to as identifying empirical regularities (Yeung, 1997). It consisted of two months of travelling across Uzbekistan and speaking to farmers, representatives of non-government organisations (NGO) and the Ministry of Water Resources (MWR). Following this phase, which produced a new research concern with unevenly distributed water scarcity, and a subsequent first round of abstraction 'towards conceptualizing and theorizing the real essence, power and mechanism of an object' (Yeung, 1997, p. 57) I arrived at the interpretive framework of the 'hydrosocial cycle' and 'hydrosocial territories' (Boelens et al., 2016), which emphasises that who should get water and how is a result of scalar projections enacted by those with power. Research questions were subsequently readjusted to allow me to qualify the validity of such a diagnosis, engendering a new awareness of the impact of agribusiness, its relationship to the state, the challenge it poses to social reproduction, and ultimately, the need for a theoretical framework that would account for such state actions, until then under-theorised within the 'hydrosocial' literature. These several rounds of oscillation between fieldwork and theoretical abstraction culminated in my sandwiching of hydrosociality between an account of the state, identified as the primary (non-monolithic) driver of change, and the treatment of social reproduction, as reflected in my theoretical framework. This process is consistent with the CR approach, as summarised by Yeung:

> A realist thus starts an empirical problem and proceeds to abstract the necessary relation between the concrete phenomenon and deeper causal structures to form generative mechanisms. As more empirical evidence is collected, a realist may revise or reaffirm his or her abstraction […] (Yeung, 1997, pp. 58–59)

Therefore, iteration, as an intellectual process, has a dialectical relationship with the research methodology, producing a dynamic design. In other words, changes in empirical concern led to changes in theoretical interest, which in turn led to changes in how I collected my data and so forth.

4.2.2 Context and positionality

Furthermore, iteration became a necessity for pragmatic reasons having to do not only with my research philosophy, but also with the nature of research in Uzbekistan and my positionality. Already by its nature, research is inherently messy:

> Far from representing a discrete 'data gathering' step in a linear research process, fieldwork involves carrying out, and repeatedly pivoting among, a broad array of interacting data collection, analysis, and research design tasks (Kapiszewski et al., 2022, p. 2).

These challenges are compounded in unpredictable research contexts, which Uzbekistan still is, despite its liberalisation since 2017 (Dall'Agnola and Sharshenova, 2024). Having read methodologies of my predecessors, such as Veldwisch (2008), I was aware that researching the agricultural and irrigation sectors in Uzbekistan would be a challenging undertaking. However, I chose the topic because at the time of writing the thesis proposal, Uzbekistan was four years into its hailed 'thaw', marked by a lax approach to freedom of movement and speech, triggering Western-based researchers like myself to flock with unprecedented zeal. While my experience generally aligned with these expectations, I found myself struggling with two interconnected issues: a legacy of distrust and institutional opacity, and my positionality as a Russian-speaking, Westernised Central Asian woman from a historically privileged class, which in many cases became a liability.

Almost every fieldwork encounter with a local interlocutor, whether with a farmer or bureaucrat, was characterised by a degree of distrust towards me. On my very first interview with an employee at the MWR, I was warned that water was a sensitive topic and that I was risking being deported. While I was aware that her warning may have been inflated, I found that everyone but one state-affiliated employee in the water sector was unwilling to speak with me for more than 20 to 30 minutes. This appears to be consistent with the experience of other researchers in Uzbekistan, who also report unpredictability and apprehension among interlocutors, long waiting times, and absenteeism, particularly with government officials (Dall'Agnola and Sharshenova, 2024; Kobilov, 2025).

Similar frictions arose during my attempts to enter the 'field' through affiliated institutions, namely Bukhara State University and Samarkand State University of Agriculture. Very often, I was questioned in minute detail about my identity, where I resided, to whom I reported, or my exact home address. Despite being a Tajik, I found that my origins did not pose problems in either villages or institutional contexts, because I always clarified that I had grown up in Uzbekistan. A mixed Tajik-Uzbek heritage is common in Uzbekistan, and my disclosure often worked to my advantage because it was a point of connection. Others interpreted my presence in the country as loyalty to my upbringing in Uzbekistan, which is not an untrue assumption. Eventually, I realised that interlocutors, particularly from universities or those holding semi-official posts, wanted to ascertain that I was neither a 'blogger', currently a politically precarious occupation in Uzbekistan, nor reported to the Uzbek government.

People were often relieved to learn I had an originally foreign institutional affiliation, possibly because of a history of government surveillance.

These issues were compounded by my identity as a woman who is neither foreign nor local nor a native speaker of the local language. Because agriculture in Uzbekistan is primarily Uzbek-speaking and male-dominated, conversations with men, even in the presence of others, were always uncomfortable and distant, due to patriarchal norms, a challenge I was mentally prepared for. I also made a significant effort to find a rural host family to live with for several months and to learn Uzbek, which I had started studying after the scoping phase of the fieldwork. For the first two and a half years, I kept hoping to conduct an *ethnographic* study, which unfortunately never materialised. During the scoping phase, I managed to form a network of rural and urban connections, yet my offers to live, pay rent, and possibly tutor younger household members for free were politely rejected. I am not sure whether this had to do with my inexperience and lack of tact, or my non-foreign identity, for which, from the perspective of rural Uzbeks, there was no adequate cultural explanation. It is not very appropriate for local(ish) women in Uzbekistan to wander around the country on their own; it makes the presence of such a young-ish woman in male-headed households problematic and prone to attracting unwanted attention.

These challenges were partly overcome once I established personal relationships with individuals at Samarkand State University of Agriculture (SSUA), where I was based between March and July 2023, and followed up thereafter. In SSUA, from where I generated most of my data, I was placed in the office of the EU-funded Agricultural Knowledge and Information Systems (AKIS), whose manager was initially tasked with driving me around the Samarkand region to show me the most successful small and large farms, smallholding and agribusiness. This experience was valuable, but it limited my exposure to different types of farms. Eventually, I forged my own connections within this office, particularly with two young employees who were willing to work with me as gatekeepers in a friendly, semi-formal capacity. One of them agreed to support me as a translator, and both brought me to their hometowns and introduced me to their neighbours, small and commercial farmers. Furthermore, I leveraged the constraints imposed by my gender as an opportunity to foster closer relationships with women, especially my research assistant and her family members, whose names I will not disclose, to uphold my commitment to ethical standards.

For the above-listed reasons, theoretical and practical, partly intentional and partly due to necessity and contingency, I had to maintain an open mind to data gathering and commit to an iterative design.

4.3 Triangulation and empirical research at three levels of analysis

As explained in the first chapter, the overarching concern of this thesis is inspired by Mehta's question: 'Whose scarcity?'. More concretely, the thesis is guided by the following questions:

1) Why were WUAs dismantled?

2) How does Uzbekistan's agricultural modernisation reconfigure water access relations?
3) Impact on smallholders: How is the reconfiguration of water access relations affecting small farmers in Uzbekistan? How are these new relations experienced? How does this affect the continuity of smallholding in Uzbekistan?

CR has been referred to as 'a philosophy without a method', primarily because it originated from a goal to challenge positivism in the 1970s and early 1980s (Yeung, 1997, p. 51). At the same time, with its commitment to uncovering causal mechanisms in the social world, the philosophy is relatively flexible with regard to methods and provides certain guidelines, which this thesis is informed by. Generally, while CR recognises the value of quantitative methods, especially to identify empirical regularities to be investigated, the philosophy errs on the side of qualitative methods to generate retroduction, formulated through 'thick descriptions' based on historical and contextual sensitivity (Danermark et al., 2019, p. 173; Yeung, 1997). Furthermore, Danermark and Bhaskar encourage the construction of 'a laminated system consisting of a conjunctive multiplicity of levels of reality' (Danermark et al., 2019, p. 187). Danermark and colleagues use an illustrative example to explain:

> For instance, if a social programme that aims to reduce drug abuse focuses solely on the supply side, neglecting the demand side, it is doomed to fail. Another example: One cannot successfully investigate an issue such as anorexia nervosa without taking the social level into account, such as the thinness culture in the media (Danermark et al., 2019, p. 187).

Complementarily, looking to fill the methodological 'gap' in CR, Yeung (1997) cites Denzin (1970) to recommend triangulation:

> 'with respect to time, place, person and level', theoretical triangulation, of data sources, as well as 'methodological triangulation via both between-method (dissimilar methods) triangulation and within-method (variations within the same basic methodology) triangulation (Yeung, 1997, p. 64).

Data sources can include 'interviews, participant observation, written documents, archival and historical documents, public records, personal papers, and photographs' (Rothbauer, 2008). In CR, this use of multiple qualitative sources of data to identify causal mechanisms via retroduction, or theoretical redescription, requires an 'intensive' approach to research, entailing a 'detailed, intensive and microscopic examination of the data' (Yeung, 1997, p. 61).

Drawing on Danermark's, Bhaskar's, and Yeung's recommendations, the methodology consists of an iterative research practice, at three levels of analysis, using multiple within-method qualitative approaches. Initially, I considered employing the grounded theory method, but I soon abandoned it in favour of a 'looser' approach adapted to the unpredictable conditions of researching in Uzbekistan and challenges accessing the field.

The three descending levels of analysis in this thesis are thus at 1) the hegemonic-discursive, where the aforementioned 'projections' around preferred water users are made, 2) level of (re)territorialisation through agricultural and water policy implementation, and 3) at the individual-community level, where these effects are embodied. These three levels correspond to the three empirical chapters and align with the three core components of the theoretical framework: the level of the state and hegemonic projects; spatial (hydrosocial) and spatial-social reproduction. Furthermore, to illustrate the dynamics of spatialisation, I focus on two case study villages, detailed below.

Answers to the research questions are distributed across the whole thesis, including the background and literature review. For example, part of question two is addressed by the literature review, which provides the essential global context for Uzbekistan's dismantlement of WUAs and additionally identifies national, politico-economic reasons, as explored in the background chapter and Chapter 7. Because both CR and SRA highlight the importance of context, which is historical, both the literature review and the background chapter are empirically and theoretically integral to the argument made in this thesis. For clarification, the relationships between research questions, methods, chapters, and levels of analysis are summarised in Table 3 at the end of this section.

4.4 Methods

4.4.1 Documentation

Because this research examines hegemonic imaginaries, accumulation strategies, and how they mediate the state's relationship with water, official texts, narratives, and documentation are essential to understanding the production of the dominant discourse. Conceptually, my approach to studying documents aligns with critical discourse analysis (CDA), which, in turn, is consistent with CR. I therefore conceive of texts, spoken and written, as a social practice that both reflects and produces the social world, including knowledge and meaning. Discourses share a dialectical relationship with the non-discursive, or extra-discursive entities, and are thus not reduced to them. For example, structures such as Water User Associations or the construction of a road are initially discursively constituted but then acquire a distinct form. Furthermore, in CDA, discursive practices are understood as having ideological effects, because they 'contribute to the creation and reproduction of unequal power relations between social groups', which the analytical approach aims to reveal (Jørgensen and Phillips, 2011, p. 63). Given CDA's concern with emancipation and its commitment to social change, the role of textual critique is to identify discourses that uphold injustice.

My critique of documents, however, departs from CDA in that it does not evaluate linguistic components in texts as endorsed by the method, in favour of an SRA-inspired policy analysis (Jessop, 2004). This is because of my thematic interest in economic imaginaries, rooted in modernisation and efficiency discourses, interrogated in Chapter 2, and how they shape strategic selectivities and material

transformations of water governance, particularly in relation to small farmers. As argued by Jessop (2004):

> Economic imaginaries at the meso and macro levels develop as economic, political, and intellectual forces seek to (re)define specific subsets of economic activities as subjects, sites, and stakes of competition and/or as objects of regulation and to articulate strategies, projects and visions oriented to these imagined economies. Among the main forces involved in such efforts are political parties, think tanks, bodies such as the OECD and World Bank, organised interests such as business associations and trade unions… (p. 163)

I therefore do not perform micro-linguistic CDA, but rather, analyse the discursive content and socio-political implications of policy and development texts for smallholders. This approach is most prominent in Chapter 6, where document analysis constitutes the core of this thesis's data. It also features throughout the thesis in sections of Chapter 7, especially where I interpret statements made by elites, and at the end of Chapter 8.

Data sources

While I draw on a variety of secondary sources, my document analysis focuses on three *main* 'clusters'. The first cluster is reports and grey literature produced by international development organisations, including Country Partnership Strategies, project proposals, and their evaluations. I dedicate most attention to the largest donors and projects at the intersection of agriculture and irrigation in Uzbekistan, namely, but not exclusively, the World Bank and the Asian Development Bank, the International Monetary Fund (IMF), the Organisation for Economic Cooperation and Development (OECD), and the International Fund for Agriculture and Development (IFAD). While I mention other organisations and their contributions, such as the Japan International Cooperation Agency (JICA), UN bodies, or USAID, my emphasis is on budget size and involvement in country-level development strategies, in which the World Bank and ADB have been the leaders in Uzbekistan, and thus are identified as key in the production of normativity and hegemony.

The second cluster of documents is legislation drawn from the repository 'lex.uz'. It is the government's official database of all the Presidential Decrees, laws on land, taxes, and water, National Strategies, and Resolutions of Ministries. I read these critically, and as sources of essential legislative information.

The third cluster includes national news sources such as Gazeta.Uz and Kun.Uz, Presidential Press Releases, and agriculture-specific news such as EastFruit and information on the government website Agro.Uz. While all are formally considered as independent sources, including EastFruit (an international, post-Soviet-focused source of news about horticultural production), I find that all align with the government discourse and are thus treated as disseminators of the official line. They are an invaluable source of specific information regarding types and locations of agroclusters, 'success' stories

of government initiatives, which I treat as indicators of aspirational policy-signalling, and not as instances of serious implementation.

Finally, I spent considerable time reviewing agribusinesses' and agro-entrepreneurs' public social media pages on LinkedIn, Instagram, and Facebook, as well as the comments beneath numerous posts. These platforms advertise their activities, news, and opinions, generating a lot of public discussion, all of which fed into my understanding of contemporary developments.

4.4.2 Fieldwork: interviews and case studies

The fieldwork component of this thesis consists of a wide selection of interviews that aligned with the three-level design, as well as other qualitative methods such as participant observation, informal conversations, focus group discussions, and field note-taking. The second and third levels, relating to the spatialised effects of agricultural modernisation and hydrosocial reterritorialisation, additionally benefit from two illustrative case studies from the Jomboy district elaborated below. The case study approach is relevant in CR (Danermark et al., 2019), as it 'allows the researcher the opportunity to tease out and disentangle a complex set of factors and relationships' (Easton, 2010, p. 119). This is particularly useful for analysing hydrosociality and spatialisation as they are products of interwoven relations between water, land and livelihoods, whose description is best captured by a territorially-bounded (case-study) approach. At the same time, the primary method for obtaining information about a particular location or case is through semi-structured, theoretically driven interviews, which form the core of the data for this thesis. They are a key source of data within the qualitative, 'intensive' dimension in critical realism (Yeung, 1997). As Moore and Kelly (2024) remind us:

> a critical realist social science holds that 'the study of any social practice must start with the agents' conceptions of it', and the interview is a commonly deployed method to generate such data (Collier cited in Moore and Kelly, 2024, p. 4).

Furthermore, in CR, as in CDA, meaning construction and communication reflect, concentrate, and constitute social reality, but are not determined by it. The social and material world exists outside of discursive constructions. Therefore, information obtained from interviews is treated as a partial reflection of reality. Causal categories can emerge from the data, but relationships between causal categories, or the generative mechanisms, must be abstracted by the researcher. Furthermore, interviews have the dual quality of being co-constructed by the researcher and interviewee, *and* serving as evidence of real phenomena. Moore and Kelly (2024) draw on an illustrative quote by Sealey:

> The distinctiveness of a realist approach is that interviews, for example, are understood not simply as discursive versions of the social world, intersubjectively 'constructed' by researcher and interviewee, but as accounts, however partial, of actual experiences, of situations which

> exist independently of participants' perceptions of them (Sealey cited in Moore and Kelly, 2024, p. 8).

The implications of this are that the researcher is in the 'driver's seat', 'generating' instead of simply collecting data (Moore and Kelly, 2024, p. 6). Because of the theory-laden nature of reality and thus research in CR, interviews are 'theory-driven in the sense that the subject matter of the interview is the researcher's theory rather than the informant's 'thoughts and deeds'' (C. Smith and Elger, 2012, p. 12). At the same time, because the researcher is required to constantly move between theory and observation and update her understanding of the world based on evidence and theoretical redescription, she does not *blindly* paste theory onto every conversation, but instead constantly challenges and recalibrates her assumptions. Furthermore, the relationship between the researcher and interviewee is more of a mutual teacher-learning process, where the researcher contextualises information of a more specific nature, provided by the interviewee, while simultaneously explaining and communicating the 'conceptual structure of the investigation', culminating in the co-generation of data (C. Smith and Elger, 2012, p. 13).

Data generation and sources

Approximately a year of fieldwork was conducted, split into three periods:

1. May-June 2022, affiliated with Tashkent State University of Economics
2. February-October 2023, affiliated with the Samarkand State University of Agriculture
3. June-August 2024, affiliated with the Tashkent State University of Law

As explained previously, the first phase was exploratory and important for acclimatising to the setting. Most of the data was generated during the second phase, while in the final phase, I conducted follow-up interviews and obtained final clarifications. Interviews were additionally conducted via Zoom throughout the year.

Participants were selected based on a combination of snowball, purposive, and theoretical sampling. Purposive and theoretical sampling, based on an individual's ability to answer the research question or their potential to refine the theory (Fletcher, 2017), respectively, were most applied to elite-level and agribusiness interviewees because they were easier to reach: my educational and linguistic privileges and my ability to reach out to elites via email made it easier to access these participants. For rural-level participants, as mentioned before, I relied on a snowball approach through connections established at partner institutions.

As mentioned previously, identifying gatekeepers, establishing trust, ensuring reciprocity, and disclosure on my part have all been part of my repertoire for navigating opacity. Initially, because of my commitment to a multi-level analysis, I expanded my geographic reach as widely as possible – from conversing with a soil scientist in Bukhara to Telegram conversations with a rural activist in Ferghana.

This allowed me to identify empirical regularities and establish what the various groups' concerns are regarding water scarcity in Uzbekistan. How does this experience vary regionally? What are some similarities and differences among the narratives of various interviewee groups? However, once I became more comfortable with my topic and conducting research in Uzbekistan, and once I was able to identify two illustrative cases through contacts made at SSUA, the heap of what looked like disjointed interviews, observations, and summaries of encounters slowly fell into coherent categories, which I then built on with intention. The research process, therefore, resembled a 'funnel' (Palinkas et al., 2015), in which the profiles of interview participants, their geographic reach, and interview questions narrowed from broad to specific.

Additional methods employed in this research include two days of participant observation at a national Tashkent agricultural conference organised by the Food and Agriculture Organisation (FAO) on extension services and digitalisation for smallholder farmers, as well as informal group discussions. Participant observation enables the researcher 'to learn about the activities of the people under study in the natural setting through observing and participating in those activities' (Kawulich, 2005, p. 2). It is useful for understanding non-verbal, tacit behaviours and thus offers a holistic perspective on a phenomenon (Ibid.). Admittedly, there is very little 'natural' about a conference setting; I was after all an outsider, looking inwards into the policy-making community, made up of representatives from the European Union, FAO, USAID, government officials, especially at the Ministry of Agriculture, and many others. However, this two-day, televised conference, after which I recorded my impressions and reflections in great detail, became instrumental to my understanding of the status of smallholders in Uzbekistan not as integral participants in the agricultural economy, but as appendages to be dealt with. I also engaged in informal conversations with conference participants to gauge their views on 'water access for smallholders'. This allowed me to grasp the general sentiment towards smallholders, one which oscillated from ambivalence to a sense of duty. This experience exposed the uncertainty among elites regarding the smallholder question, which accelerated my theoretical maturation.

Informal group discussions, in turn, were instances when I found myself in an unplanned group setting, and, amid this setting, I asked whether I could ask specific questions and record the answers (consent to record). This occurred on two occasions: the first was with the staff at the Agricultural Knowledge and Innovation Systems (AKIS) office at the SSUA, and the second was with female day labourers in one of my case study areas in Jomboy. While these discussions were brief, with only two or three active participants at most, the format of responses bouncing back and forth elicited earnest answers and was a valuable source of nonverbal sentiment.

This thesis thus draws on 56 interviews, two illustrative case studies from the Jomboy district of the Samarkand region, participant observation, and two informal focus group conversations. Interviews are split into five categories:

1) Policy elites: government officials, representatives of international development practitioners, experts and consultants.
2) Agribusiness: owners, directors, or managers of modern agribusiness enterprises, whether farms, clusters or export companies
3) Local water and agriculture practitioners: water masters, soil scientists, activists, and employees of district irrigation departments
4) *Fermers* or individual commercial farmers: fruit and vegetable farmers using traditional cultivation and irrigation methods
5) Smallholders, or kitchen garden (*tomorqa*) owners: male and female rural inhabitants who either live in a house with a *tomorqa*, or cultivate on one, and who do ***not*** own large farmland. A number of smallholders interviewed additionally rent a parcel of land of 1 to 5 hectares from the government, and due to the small size of this additional land, they are still categorised as smallholders in this study. *Tomorqa* sizes in this research range from 0.02 to 0.3 hectares.

Table 2: Qualitative data sources

Category	**#**	**Code**	**Location of activity**	**Initial question list**
Elites	15	E	Tashkent	Agri-reform strategy, causes and views on water reforms, clusters and agribusiness, water scarcity causes
Agribusiness	5	B	Tashkent, Samarkand province, East Uzbekistan (anonymous)	Challenges of doing business, how water is accessed, crops grown, technologies adopted, technology subsidies, and views on small farmers
Water and agriculture practitioners	6	M	Vobkent district irrigation department (DID) (Bukhara), Jomboy DID, Navoi	Method of water distribution, role of water masters, who gets water, how, and when
Fermers	4	P	Jomboy district	Main sources of water, scarcities, crops grown, change over time, land size changes, views on agribusiness, irrigation service fees, method of paying fees, relations with *tomorqa* owners
Smallholders	26	T	Jomboy, Tashkent province, Toylaq, Bulungur, Jizzakh,	Land plot histories, water access changes, extent of reliance on plot, other income sources, crops grown, change of

			Shahrisabz, Gilon Valley, Chiraqchi, Ferghana	cultivation strategy, labour used on plot, water-sharing with neighbours, plans for future
Informal focus group	2	FG	Samarkand State University of Agriculture, Jomboy district	For both: views on agribusiness, views on smallholding plots, land enclosures Group 1: staff at the Agricultural Knowledge and Innovation Systems at SSUA Group 2: women's work brigade having tea during their break outside a tomato plot of 1 ha
Participant observation	1	PO	Food and Agriculture Organisation Conference on Smallholder Farming and Digitalisation in Tashkent	No set question list, but informal conversations revolved around the commercial viability of smallholders and whether and how they should access water.
Total	59			

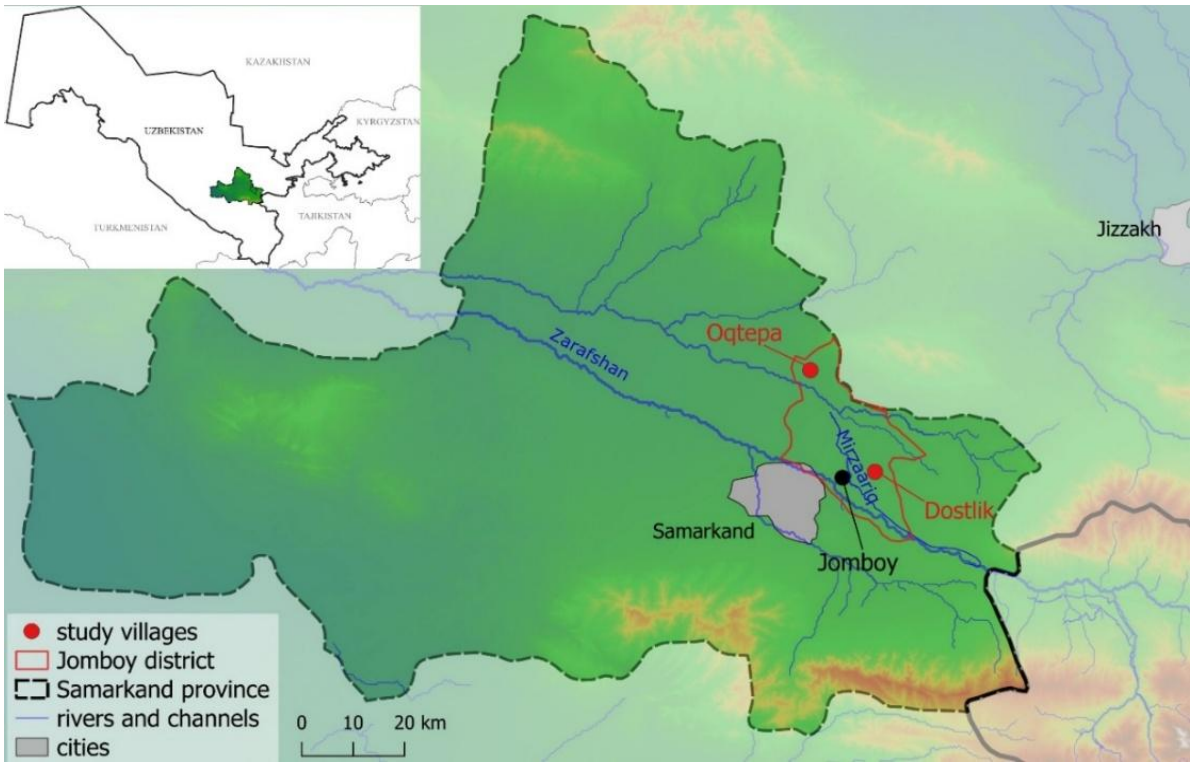
On case studies

While this research draws on interviews with smallholders from across Uzbekistan, the core of the data on rural-level dynamics is anchored by two case studies from the district of Jomboy, based on villages I pseudonymised as 'Dostlik' (Case Study 1) and 'Oqtepa' (Case Study 2). As mentioned previously, I accessed these villages thanks to two AKIS employees at SSUA: a young man originally from 'Dostlik' and a young woman from 'Oqtepa'. The young woman eventually worked with me as a translator, and accompanied me on all my visits in the Samarkand region. The selection of these villages was thus not intentional; however, their contrasting economic and geographic conditions proved empirically valuable. For instance, due to its proximity to the centre of Jomboy and to the Mirzaariq water canal, Dostlik is wealthier and more water-abundant. Oqtepa, in turn, is further from Jomboy's centre and Samarkand city; it is remote with fewer jobs, and struggles with water security, whose effect is more acute due to a shortage of economic opportunities. Furthermore, because of the gendered affiliation to each village, the majority of participants from Dostlik are male, while in Oqtepa – female. Access to the masculine perspective, particularly to private commercial farmers (*fermers),* who tend to be men, offered a window into water relations between large and small farmers. The Dostlik case study, therefore, forms the basis for my explanation of the manifestation of hydrosocial reterritorialisation in Uzbekistan in Chapter 7. Insights into women's experiences in Oqtepa, in turn, helped me understand

the social reproductive implications of water scarcity, as well as transformations pertaining to seasonal labour, where women tend to be hired. Their views represent the majority of findings in Chapter 8.

In each village, we walked through the network canals and traced how they are distributed between the houses and commercial farms. Interview topics included land plot history, changes in water access and availability, household plot cropping practices, the extent of reliance on the plot for livelihoods, impressions of agribusiness, and general views on recent changes. Through the interviews, I sought to tease out how interdependencies in water flows among commercial farmers (fermers), smallholders, and recently introduced agribusinesses have been reconstituted, and how these relate to institutional change as outlined in Uzbekistan's development strategies.

Figure 1: Map of Case Study Locations



This map was produced by Atabek Umirbekov, Research Associate at the Leibniz Institute for Agricultural Development in Transition Economies, 2025.

Table 3: The relationship between level of analysis, methods and research questions[3]

Level of analysis	Chapter	Methods	Research questions addressed
Global	2	Academic literature, grey literature analysis	1
National-historical	5	Academic literature, grey literature analysis	1 and 2
State - hegemonic	6	Document analysis, elite interviews	1 and 2
Spatial/hydrosocial	7	Agribusiness and elite interviews, Case study 1	2 and 3
Spatial/social-reproductive	8	Smallholder interviews, Case study 2	2 and 3

4.5 Data analysis and retroduction

Data processing in CR is a precondition for retroduction or theoretical redescription. Yet, there is no consensus on how best to move from data generation to retroduction; in some cases, scholars apply flexible deductive codes (Fletcher, 2017), while others employ a CR-adapted thematic analysis (Christodoulou, 2024; Fryer, 2022). In most cases, researchers follow Bhaskar by framing data according to its ability to identify causal explanations for an event (Christodoulou, 2024; Stutchbury, 2022). In this thesis, the retroductive logic consists of an iterative movement between empirical encounters, abstraction, and theoretical refinement.

Fryer endorses Bhaskar's recommendation to differentiate between: experiences, events, and causal mechanisms. Experiences are feelings and participant impressions of events; events are things that are experienced, and causal mechanisms are things that cause events to occur (Fryer, 2022). Applied to this research, this translates into three layers: 1) people's views, feelings on, for example, water scarcity, how it should be tackled, 2) how this scarcity is experienced by various groups (especially in rural areas), and 3) what are the causal mechanisms for this difference? These are not interview questions, but they correspond to the CR ontology, or layers of reality, which guided how I processed my data.

To arrive at these separations, I moved continuously between data and theory, eventually letting the latter lead the way. Following Fryer (2022) and Fletcher (2017), during and after the first phase of fieldwork, I familiarised myself with the data and took notes, then expanded my reading list to make

[3] Questions on page 62.

sense of new findings and impressions, and adapted my interview questions accordingly. After the second phase, I conducted an initial round of flexible, descriptive coding via NVivo, where data was coded on the basis of *events* – such as increasing groundwater reliance and a sense of shortage among smallholders taking place *simultaneously,* with expansion of horticultural agribusiness and work opportunities on new farms. Once a narrative around spatial, hydrosocial reconfiguration through dispossession, as a process which *mediates* causal mechanisms was established, I set out to identify these causal mechanisms, via a round of open coding of elite interviews, taken during phases one and two of fieldwork periods. This rendered a long list of provisional, organisational codes, or 'topic-based 'bins' into which information is sorted' (Fletcher, 2017, p. 186). As I moved the codes around, I began to identify recurring patterns: constant references to both new and old developments, such as 'hokim control' and 'irrigation technology subsidies', which led me to Bob Jessop's SRA. SRA helped me account for the eclectic mix of the new and old identified in my data, and helped me make sense of the uncanny contradictions within *events*, such as the relationship between the dissolution of Water User Associations and simultaneous adoption of the Green Economy strategy, which in turn informed how I 'read' document analysis in Chapter 6. Finally, codes at the level of experiences – such as sentiments among rural dwellers about agricultural modernisation – are distributed across all chapters as they reflect perceptions and views of all participant types, from private consultants to the Ministry of Water Resources, to women living in remote Oqtepa.

4.6 Ethics

As required in Uzbekistan, I obtained permission to conduct research through institutional affiliation at every phase of the fieldwork, namely with the Tashkent State University of Economics, the Samarkand State University of Agriculture, and the Tashkent State University of Law, which also provided visas for my stay. Tashkent State University of Economics and Tashkent State University of Law had pre-existing agreements with DCU, while a separate Memorandum of Understanding was signed with Samarkand State University of Agriculture. Whenever possible, I presented informants with the Plain Language Statement, which outlined the purpose of the research and participants' rights. Because of the atmosphere of mistrust in Uzbekistan, I also received permission from the Ethics Committee to obtain oral consent on audio to avoid requiring respondents to sign anything. In this case, I read aloud the purpose of the research and the participants' rights. In several instances, I did not receive permission to record or take notes during the conversation, in which case I summarised my impressions *post factum*. In line with cultural expectations in Uzbekistan, when invited to someone's home, I always brought food. I also frequently engaged in member checking, particularly with key informants, running my understanding of the field and my research ideas by them and asking whether I understood things correctly; I was often corrected. After each interview, I asked participants whether they had any questions for me and whether they understood the purpose of my research. All participant names but

one[4] have been pseudonymised, as well as village names or the names of their organisations. My strict adherence to anonymity was probably the single most important enabling factor in this type of research.

[4] This participant is very public, vocal, and critical, and explicitly told me she did not mind.

5. WATER AND AGRICULTURE IN UZBEKISTAN

Introduction

This chapter provides an historical background on water and agriculture in Uzbekistan from the Russian Imperial era to the presidency of Islam Karimov. Both Critical Realism and the Strategic-Relational Approach emphasise the importance of historic context, as explanations within both lenses are premised on the idea of contingency. As this overview highlights (and as established scholarship on Uzbekistan shows), the system of state order under President Islam Karimov represented an entrenchment (albeit a transformed one) of Uzbekistan's agricultural production relations during the Soviet Union. In independent Uzbekistan, agriculture consolidated into a bimodal structure, characterised by resource interdependencies between smallholders and large farmers, which this chapter qualifies.

The second half of this chapter, drawing on principles of SRA, theoretically re-interprets established knowledge around the causes and outcomes of the adoption of IWRM at the local level, to argue that its insertion into the system of cotton production and bimodal agrarian structure constituted a modality of hydrosocial territorialisation. It marks the beginning of this thesis's venture into reconstructing the Uzbek government's strategic rearticulation of development approaches to serve its national accumulation strategies, a theme I attempt to sustain throughout the following chapters.

5.1 The beginning of the cotton burden under Tsarist Russia

Accounts of Central Asia's agrarian and hydraulic transformation during Russia's Imperial conquest and the Soviet Union are plentiful (O'Hara, 2000; Peterson, 2019; Teichmann, 2007; Trevisani, 2008; Wegerich, 2000)[5], whose detailed exposition would be redundant in this thesis, particularly given that it concerns dynamics unfolding more than thirty years after the fall of the Soviet Union. However, the legacies of past attempts to rein in Central Asia's unruly rivers, the Amu Darya and Syr Darya, for cotton production remain palpable, not least because, despite considerable efforts to diversify, Uzbekistan remains among the world's top ten cotton producers (World Bank, 2025b). Therefore, to provide sufficient context for understanding changes in water use in contemporary Uzbekistan, the following paragraphs summarise key processes in Central Asia's agricultural transformation prior to independence and highlight their implications for the smallholding sector.

Cotton has been cultivated in arid (and semi-arid) Central Asia's irrigated valleys since ancient times, clustered around the Ferghana Valley, as well as Khiva, Bukhara, and Samarkand. It was typically grown on small family homesteads of around 1 ha and linked in a reciprocal relationship with grain (Whitman,

[5] By far a non-exhaustive list.

1956), irrigated through an equitable management system, highly reminiscent of the arrangement that initially inspired Ostrom's design principles. Irrigation systems consisted of networks of small canals governed at the village level by a mix of Sharia and customary law (Peterson, 2019; Wegerich, 2000). Water was brought from rivers to plots through a network of channels that narrowed and flattened, allowing gravity to carry it into the field. Oversight, maintenance, and even distribution scheduling on the secondary canal was ensured by a 'water ruler', *mirab,* while at the head canal – the *mirab-bashi* or *ariq aqsaqals* (canal elders), all of whom were elected by village communities dependent on the network. Water users maintained the smallest channels, while cleaning the main canal was a communal task performed in winter. These institutions were accompanied by a body of technical knowledge, such as how to use groundwater reserves, manage soil salinisation and prevent evaporation (Peterson, 2019). Because access to water determined the living standard, 'irrigation structured the social order of the populations living along the rivers and canals' (Teichmann, 2007, p. 502)

Even before the Russian conquest, Central Asia, made up of three principal polities, namely the Emirate of Bukhara, Khanate of Khiva, and the Khanate of Kokand, had been trading cotton with the Russian Empire. However, traditional cultivation methods, defined by high labour requirements, native (smaller) varieties, poor processing, and camel-based transportation, rendered Central Asia's cotton highly expensive for the Russian market, the bulk of whose supply was met by imports from America (Whitman, 1956). The juncture prompted by the US Civil War-induced 'cotton famine' and the onset of Russia's Imperial annexation of Central Asia[6] from the 1860s opened the opportunity for 'domestic' cultivation, which took full effect from the 1890s (Morrison, 2021; Peterson, 2019). This marked the beginning of the large-scale transformation of Central Asia's agrarian landscapes through large-scale irrigation works, and accompanying institutions to facilitate cotton production, such as land tenure changes, tariffs, taxes, credit, and hence indebtedness, leading to land captures and consolidations, squeezing out small cultivators (Whitman, 1956).

Among the most notorious of Tsarist policies have been the introduction and incentivisation of American upland, water-demanding cotton seeds, discouragement of the cash crop rice and other food crops, and forced and violent sedentarisation of nomads of Semireche, modern-day Kyrgyzstan and Kazakhstan, to turn these lands into the 'bread-basket' of Central Asia as its southern regions specialised in cotton. Large-scale irrigation works, spurred by the romanticism of the irrigation age and civilisational ambitions, were initiated across the region, most notably the Hungry Steppe – a vast stretch of land between Samarkand and Tashkent (and Tajikistan) – using manual labour of locals and settlers from Russia. As early as the 1900s, land degradation due to the increase in swampland and salinisation foreshadowed the environmental perils of cotton monoculture. While the Tsarist

[6] The Khanate of Kokand and parts of the Emirate of Bukhara were incorporated into the wider Governorate General of Turkestan, consisting of lands of modern-day Kyrgyzstan, Tajikistan, Turkmenistan and Kazakhstan. The Emirate of Bukhara and Khanate of Kokand remained as protectorates.

administration initially sought to uphold Sharia and customary water governance arrangements, tolerance soon waned amid colonial impatience to increase productivity, not least due to the rising population and influx of settlers. Nevertheless, attempts to override customary water governance proved unsuccessful due to the need to balance the multiple demands of drafting a new water law ensuring property rights, financial obligations of irrigation expansion, and the need to maintain steady production of cotton, all of which were not sufficiently met prior to World War I, the onset of revolution in Russia, and revolts in Central Asia (Peterson, 2019). Quoting Williams (1967), O'Hara summarises:

> [The Russians'] laissez-faire approach to local water management created problems in that changes in land tenure, taxation, agriculture, and other aspects of the local economy wrought by the Russian arrival were not matched by any kind of organised approach to change water management. Local custom was left alone, but the context within which the custom had developed was irrevocably altered (Williams, cited in O'Hara, 2000, p. 375.).

5.2 A delicate rural balance: cotton, water, and subsidiary farming

The Soviet authorities were eventually able to carry out many of the hydraulic and agricultural ambitions initially set out by the Tsarist administration (Peterson, 2019; Weinthal, 2002). By the 1920s, a decade of violence and disruption stemming from the spillover of the Russian civil war into Central Asia had left the region's irrigation systems in dire need of restoration. It was an effort that was 'highly charged with symbolic meaning' as the Bolsheviks continued their predecessors' legacy of establishing themselves as a modernising power (Teichmann, 2007, p. 503). However, rather than through private capital, as initially intended, under the Soviet Union, the constitutive republics' economic integration was achieved through centralised means (Weinthal, 2002). Ownership of land and water was transferred from Khanates to the Soviet State (Weinthal, 2002). Local water institutions were then coopted by, for example, financially supporting 'poor peasant' *mirabs,* which was seen as a way to assert control by reining in the 'anti-Soviet' village structures still dominated by elites, in a process ridden with conflict as regional, central, and republican governments worked to set up a Central Asian centralised irrigation system (Teichmann, 2007).

Following Stalin's orders in 1929, 24.5 million Soviet peasant households were to be consolidated into collective (*kolhozy)* and state (*sovhozy)* farms. In Central Asia, now split into five distinct republics, namely, Kyrgyzstan, Kazakhstan, Turkmenistan, Tajikistan, and Uzbekistan, collectivisation was targeted at three sectors: grain and livestock, concentrated predominantly in Kazakhstan and in parts of Kyrgyzstan, and cotton, for Soviet-wide self-sufficiency – in the remaining republics, of which Uzbekistan became the largest producer. Unlike in Kazakhstan, the settled populations of Central Asia dodged the tragedy of mass starvation. However, as in the rest of the Soviet Union, collectivisation in

Uzbekistan entailed mass-scale dekulakisation[7] and deportation either to other republics or the *gulag*, of those who resisted or were deemed dangerous, namely *bais* – (landowners), the Muslim clergy, or those accused of being rebels (Kamp and Pianciola, 2021).

As highlighted by Teichmann in his influential study of irrigation and collectivisation of the early Soviet period: 'from the viewpoint of centre–periphery relations, by the mid-1930s Uzbekistan's importance had been reduced to solely that of a cotton-producing region' (Teichmann, 2007, p. 507). The task of meeting production targets set by the Centre in Moscow, and ensuring compliance with water distribution plans, was mired in coercion and terror as 'peasants and irrigation workers cheated and embezzled, […] and the Uzbek Central Committee lied about cotton yields and the size of irrigated areas', (Teichmann, 2007, p. 507). Notoriously, these patterns would go on to define the Uzbek republic's relationship with Moscow throughout the Soviet period (Ilkhamov, 2004). More relevantly to this research, the (precarious) feasibility of cotton monoculture was enabled by granting collectivised farm workers plots to cultivate food for subsistence, as well as the option of keeping livestock. As declared by Stalin in 1931:

> In socializing fully all land holdings, the land immediately adjoining the houses (vegetable gardens, orchards, etc.) shall remain for individual use, while at the same time, where necessary and on the decision of the management committee, confirmed by the general meeting, the size of the garden can be altered. […] In the case of farms with a single cow, the latter is not collectivized: in the case of farms with several cows, one cow is to be left for personal use, whilst the others are collectivized....In districts where a small livestock industry does not exist, pigs and sheep are not collectivized. Poultry are not collectivized (Stalin, 1931, cited in Rowe, 2009, p. 693,)

Water-use patterns among farm workers reflected the socio-economic balancing act that emerged in the context of terror-ridden collectivisation. Teichmann demonstrates that in the 1930s, imprudent use of water and neglect of canal and drainage systems contrasted with the regularity with which private plots were watered and guarded, as peasants reconciled 'large-scale cotton production with their own survival needs' to hedge against the risk of famine (Teichmann, 2007, p. 509). This was enabled by a 'localised water distribution system' where local agreements with newly emerging elites were made to allow for deviations to secure water for private plots (Ibid.).

Following the onset of relative political and financial stability after World War II, Central Asia was able to receive large financial and technological investments into its irrigation network under Khrushchev's (1953-1964) 'virgin lands' campaign, and later under Brezhnev (1964-1982), marking the consolidation

[7] Purge and repression of 'wealthier' peasants.

of the Soviet 'hydraulic mission'[8], described as a feat of 'high (authoritarian) modernism'[9] (Bichsel, 2012), or 'hydro-authoritarianism' (Spoor and Thiemann, 2025). The goal was to expand irrigated lands for cotton cultivation by extending and widening irrigation canals, building reservoirs to hedge against seasonal variation, and installing pumps to lift water to supplement gravity-operated canals (Bichsel, 2012). In this new hydraulic reality:

> a single local source no longer irrigated the land as in the past. Rather, irrigation water came from considerable distances. The Kara Kum Canal, for example, considered to be one of the engineering feats of the Soviet Era, now transfers c. 12.9 km3 of water from the Amu Darya along its 1400 km length every year and irrigates an area of c.[10] 1 million ha (O'Hara, 2000, p. 375)

Very little had remained of the community-based management characteristic of pre-Tsarist times. Prior to the 1980s, water distribution was fully top-down. The Moscow State Planning Committee set production and water distribution targets, while the Ministry of Land Reclamation and Water Resources (Minvodkhoz), based in Moscow, determined the timetables and the allocation of irrigation water between upstream and downstream republics. These decisions were then filtered down to regional (*oblast)*, district (*raion),* and eventually farm levels, enabled by a 'physical construction of a centralized irrigation system that provided water to the collective and state farms through a chain of canals and hydrotechnical structures' (Weinthal, 2002, p. 92).

By the 1980s, irrigation management involved elements of a bottom-up approach whose main principles survive in Uzbekistan to this day. At the beginning of each growing season, irrigation requirements were determined using calculated hydro-modules depending on soil type and climate. Farm brigade leaders (for every 50-100 ha) would communicate their plot needs upwards to a hydro-technician, who would then calculate them for the whole farm. This information then moved up the chain to the national level before being collated for all of Central Asia (O'Hara, 2000). These functions were additionally supported by basin water management organisations (BVO) for the Amu Darya and Syr Darya Basins set up in the late 1980s (still in place today). BVOs served as executive functions of supporting transboundary water infrastructure, while maintaining subordination to *Minvodkhoz* in Moscow (Weinthal, 2002). After the collation of limits at the regional level, 'instructions were sent to the various agencies responsible for water deliveries informing them of when, and how much water was to be moved to various parts of the network' (O'Hara, 2000, p. 376). Furthermore, at the regional level, the transboundary sources of water operated on an energy-water nexus based on the Soviet policy of economic specialisation, which created a network of interdependence. This was exemplified by the

[8] As remarked by Peterson (2019) and Wegerich (2002) the hydraulic mission was not exclusive to socialist states – modernist ideas about man's control over nature were *du jour* in the 20th century.
[9] See Bichsel (2012) on the merits and faults of applying Scott's *'Seeing like a State'* (1998) to Soviet irrigation projects in Central Asia
[10] Circa

arrangement whereby upstream, water-abundant republics, namely Tajikistan and Kyrgyzstan, released water in summer to irrigate downstream cotton fields rather than retaining it for their own winter hydropower generation. In compensation, the fossil-fuel-rich downstream republics – Kazakhstan (coal), Uzbekistan, and Turkmenistan (gas and oil) – supplied the upstream republics with energy during the winter months (Weinthal, 2001). Turkmenistan, Uzbekistan, and Kazakhstan, in turn, benefitted from the system of dams, pumps, and channels that irrigated what made up the 'cotton belt' using water from upstream Kyrgyzstan and Tajikistan via the Amu Darya and Syr Darya irrigation networks (Muckenhuber, 2013).

With the crystallisation of collectivised farming[11], at the local level, the traditional roles of *aqsaqal* and *mirob* were replaced by the Soviet farm institution elites, involving the *kolhoz* chairmen (*rais)*, the hydrotechnician, and the *brigadier*, chief of the farming brigade, among other administrative staff such as the engineer and accountant[12] (Trevisani, 2008; Wegerich, 2000; Weinthal, 2001). Under the strict pressure to ensure the fulfilment of production quotas, the upward chain of accountability from the *kolhoz,* to the district and provincial levels engendered a network of patron-client relations (Wegerich, 2000). According to Weinthal, cotton monoculture was a form of social control:

> [which] manifested itself through a layered patron-client network composed of three main interest groups linked together in various reciprocal relationships through the production and delivery of cotton. The first relationship binds Moscow to the republican leadership, including the regional elites. The second relationship integrally connects the republican and regional elites with the general population. The third relationship ties Moscow directly to the population (Weinthal, 2002, p. 97).

While Trevisani (2008) warns against simplistic accounts that reduce Soviet policy to an obsession with growth and economic indicators, as it fails to acknowledge the role of the local community that significantly shaped the expression of Soviet presence (Trevisani, 2008), Weinthal's formulation gives clarity to the pressure points that incentivised the informal economy, namely household plot production. She argues that because:

> Moscow needed cheap cotton extraction […]. The leaders of the various republics supplied this through the regional leaders in exchange for a certain degree of freedom over internal affairs. Here the regional leaders in particular benefited. As long as they 'brought in' good cotton harvests, they could control strong patronage networks through the resources they managed (Weinthal, 2002, p. 97).

[11] While cotton was the main crop, grains, orchards, tobacco, dried fruit were also grown on collective farms.
[12] Scholars argue it was more a form of superimposition of new institutions onto old that only further entrenched patronage (Wegerich, 2000; Weinthal, 2002)

Following the argument, the population, in turn, benefited from Moscow-supplied social protection and thus did not engage in overt protest (Ibid.). This last point is especially reductive, as it denies any genuine merit to Soviet socialism, which had settled into stability in its later years. Indeed, this 'social protection' formed the basis of a varied cultural life, as in addition to housing, collective farms disbursed healthcare, schooling, vacations, as well as access to 'houses of culture' with libraries and other educational resources (Trevisani, 2008, p. 73).

Household production on plot sizes averaging 0.12 ha economically supported this stability (Patnaik, 1995). As emphasised by Weinthal, it was *indeed* enabled by the system of patronage relations, where the *kolhoz* chairmen were pivotal. As the 'implementers of centrally directed policies' (Trevisani, 2008, p. 66), they wielded significant power by mediating the Soviet state's tolerance for participation in the informal economy (and participating in it), and coordinating scarce resources, including inputs such as water and fertiliser for private plots, whose harvests were sold on the local market, significantly complementing incomes from work on collective farms (Weinthal, 2002). As elaborated by Rowe (2009):

> Although the produce from these gardens was supposed to be strictly for home use, a burgeoning market for fresh fruits and vegetables developed throughout the Soviet period and households would concentrate on certain crops that would net them a profit, as they could transport their crop to the bazaars, the only place where they could reap the rewards of their own initiative, more quickly than the collective or state farms (p. 693)

The question of household plot production became central to understanding the low levels of rural outmigration in Soviet Central Asia, particularly in Uzbekistan and Tajikistan. Rural Uzbekistan was characterised by increasing, but nonetheless low levels of mechanisation (arguably, to absorb surplus labour) relative to the rest of the USSR, decreasing productivity and income levels, and demographic growth with a young population. Particularly towards the latter decades of the Soviet Union, it had a 'high potential to release manpower' to urban areas, which never fully materialised (Patnaik, 1995, p. 149). The reasons for this are complex and form a distinct body of literature (Kamp, 2016; Kandiyoti, 2007; Patnaik, 1995; Trevisani, 2008). However, in summary, it was likely a product of the interplay between economic and cultural factors rooted in the gendered consequences of the 'Soviet paradox', which both 'expand[ed] opportunities for women's education and public presence and stall[ed] processes of occupational and spatial mobility commonly associated with modernity' (Kandiyoti, 2007, p. 616). Rural Central Asian women, now literate and employed on collective farms, nonetheless remained in low-level jobs, constrained by the need to balance their responsibilities to the home and the Soviet state (Kandiyoti, 2007). The economic priority of collectivised farming, and a hybrid Soviet-traditional Muslim society, preserved life in extended families, which was economically supported by production on private subsidiary plots, largely carried out by women whose mobility was defined by these cultural and political pressures (Kandiyoti, 2007; Patnaik, 1995; Trevisani, 2008). These plots

were irrigated through a system of subsidised, 'practically free' inputs that allowed the use of resources for personal purposes, integral to the implicit social contract necessary for the continued production of cotton (Weinthal, 2002, p. 100).

This delicate socio-political, economic, and environmental balance that sustained the Uzbek SSR's cotton monoculture for decades eventually tipped. Most notoriously, it culminated in the Aral Sea crisis. The previously explained centralised water administration allowed much scope for discretion, particularly at the farm level, and inhibited effective monitoring and communication between provinces, resulting in a lot of water waste (Weinthal, 2002). Yet, as remarked by Wegerich, management was not the only problem, as data from the 1960s shows that:

> the primary reason for the reduction in the water reaching the Aral Sea was the massive expansion of the irrigated area onto the intervening steppes. As a result, not only was evapotranspiration greatly increased but much of the drainage flows failed to return to the rivers and ended up in shallow desert lakes (Berkoff cited in Wegerich, 2000, p. 117)

On the political level, the excesses of the Soviet incentive structure, where cotton fulfilment became the sole performance indicator for Uzbekistani upper, middle, and lower leadership, blew up into one of the Soviet Union's largest corruption scandals (Weinthal, 2002). Referred to as the 'cotton scandal' or 'Uzbek affair,' it was found that between 1978 and 1983, '4.548 million tons of non-existent cotton were falsified, for which *kolhozes* and *sovkhozes* received from the state 2.866 billion rubles', involving over 20,000 people, and leading to six years of terror as purges ensued (Cucciolla, 2017a, p. 653). While the details of the scandal are beyond the scope of this thesis, it is worth noting that the political fallout of the scandal, and *not* the environmental catastrophe of the Aral Sea, became the ideological, 'decolonising' rallying point once Uzbekistan's First Secretary of the Uzbek Communist Party Islam Karimov became President of Independent Uzbekistan in 1991. As Cucciolla argues, it was foundational to Karimov's 'ideological shift' from communism to *Mustaqillik* – the ideology based on the values of Uzbek independence. *Mustaqillik* was a sensitive identity issue of revenge and resistance against the former Soviet overlords that legitimised the new Uzbek state and mediated Islam Karimov's consolidation of the country's regional power networks (Cucciolla, 2017b, p. IX).

5.3 Uzbekistan's agricultural system and delineating the development of the contemporary smallholder sector

5.3.1 Cotton monoculture at the national scale

Unlike most former communist countries in Central and Eastern Europe and the Soviet Union, Uzbekistan resisted the 'shock therapy', a common policy package prescribed by the International Financial Institutions (IFI) and other Western advisors, in favour of a 'gradualist approach'. While shunned as an 'outlier' and gaining notoriety for its repressiveness, over nearly three decades of

independence, Uzbekistan was able to bounce back from the post-Soviet disintegration recession faster than most countries in the former Soviet Union, and achieve an average annual growth of 5% between 1996-2016, earning it the title of the 'Uzbek growth puzzle'. While political economic explanations for this range from categorising it as an anomaly (growth without reform), to comparing it to a state-led 'developmentalist' model, to the nature of its incorporation to the international division of labour, most agree that the answer lies in the way it managed its natural resources, and particularly agriculture (Galdini, 2021; Lombardozzi, 2019; Ruziev et al., 2007).

As Kandiyoti succinctly put it, upon gaining independence, Uzbekistan faced (at least) two crises. First, it was cut off from revenue from Moscow. Second, disrupted trade links caused food and grain shortages. The solution for both was found in the agricultural sector: namely, through the continued reliance on intensive cotton production for foreign currency, the expansion of acreage dedicated to wheat, and by increasing the quantity and size of private plots to hedge against famine and loss of social service financing (Kandiyoti, 2003). Politically, this was achieved by suppressing all opposition and a high degree of centralisation of power, where the President Islam Karimov strengthened links between central and local levels by:

> [supporting] legislation and structural changes that usurped some of regional leaders' 'traditional' spheres of influence – such as appointing regional legal bodies and administrative heads at the *raion* (district), city and village levels – and accorded the sole authority 'to punish or pardon heads of administration [at all levels] to the president (Ilkhamov, 2004, p. 164)

In other words, governors (*hokims)* at the provincial, regional, and district levels were now directly accountable to the President. This allowed the central government to rein in political control over cotton production, which by 1992 accounted for over three-quarters of total export revenue (Ilkhamov, 2004, p. 166). Agricultural land and water remained as state property, and the fulfilment of cotton quotas continued to form the basis of rural economic life. However, this time, the cotton proceeds were strictly appropriated by a central government that extracted surplus from agriculture as the monopsonistic buyer, and 'by driving a wedge between the procurement price and the export price of cotton', facilitated by a fixed exchange rate (Kandiyoti, 2003, p. 227). Proceeds were then rechannelled to actualise an import-substitution industrialisation growth model, or 'backward industrialisation', legitimated by the *Mustaqillik* (self-reliance) ideology (Fazendeiro, 2017; Galdini, 2021; Ilkhamov, 2004).

At the village and farm level, regional and local elites were deprived of the resource base on which they had relied during the Soviet Union, 'while leaving them responsible for fulfilling production targets' (Ilkhamov, 2004, p. 167). Attempts at hard-line centralisation were thus challenged by a system that largely reproduced the same structural relations characteristic of the Soviet period. District and regional governors maintained significant power over the distribution of farm inputs, including water,

machinery, and fertiliser for cotton and grain, which they leveraged for private gain while meeting their responsibilities to the central government. Furthermore, as remarked by Trevisani (2007):

> An interest the regional elites ha[d] in common with the local producers consist[ed] in expanding the sector of agriculture not devoted to cotton production, as this is the sector that they [could] control autonomously and that allow[ed] them to earn the material resources that [were] no longer available through the governmental budget (Trevisani, 2007, p. 88)

Moreover, owing to the 'fuzziness' engendered by the lack of private property rights on land, and opaque legislation, district and provincial elites had discretion over land leases to new private farmers as well as distribution quotas for the household economy, thus significantly shaping the bimodal agrarian structure (Djanibekov, van Assche, et al., 2012; Ilkhamov, 2004; Trevisani, 2007; Veldwisch and Bock, 2011) on which IWRM was eventually superimposed.

5.3.2 The bimodal agrarian structure

While the structure of the agricultural system has been well covered by the extant literature, (Djanibekov, van Assche, et al., 2012; Galdini, 2023; Ilkhamov, 1998; Lombardozzi, 2021; Melnikovová and Havrland, 2016; Pomfret, 2000; Trevisani, 2008), a demarcation of its key elements is essential for understanding water sector reforms and their implications for smallholders.

Between the 1990s and the early 2000s, Uzbekistan underwent a series of land restructurings from *kolhozes* to *shirkats* (agricultural cooperatives), culminating in a dual system comprising two main producer groups: fermers and smallholders. *Fermers* constituted the commercial sector, and were given cultivation rights based on 10-50 year land leasing schemes, and were allowed to hire non-family labourers, but tied to state procurement through a system of contracts that determined crop types and acreage allocated to each crop. For example, by 1997 the government reduced the state quota share of the total produced by a farm to 30% for cotton and 25% for wheat, the remaining of which *shirkats* (and later private *fermers*) could sell at higher 'contract' prices, or use the land to grow other cash crops such as rice. In reality, as Ilkhamov emphasizes, these shares were determined 'at the top', on the basis of previous yields, without taking into account expenditures on land improvement equipment, or effects of soil salinisation which brought down the yield every year. If farmers failed to meet the state order even by one percent, the entirety of their crop would be bought at the 'state order' price (Ilkhamov, 1998). The state's purchase of the majority of the state-order crops at below market prices meant that fermers struggled to profit from these crops and resorted to informal cultivation of higher-value crops through agreements with district governors (Galdini, 2021; Veldwisch and Spoor, 2008).

Most notoriously, due to low mechanisation and unwillingness to pay fair wages, Uzbekistan's cotton regime engendered an especially harsh form of forced labour, where public sector workers, students, and school children as young as 10-11 were mobilised to harvest cotton for two to three months a year,

for a small fee, between September and November. Children often skipped school, or had to live in harsh conditions, with poor access to food, working for 10-12 hours a day. The operation was coordinated by the *hokims,* the National Security Services, and police who 'patrolled cotton fields, inspected farms, and monitored workers to ensure the success of the harvest' (McGuire and Laaser, 2021, p. 564). Farmers, too, operated under threat – those unable to meet their production quotas were subjected to land confiscations, beatings, or financial penalties. By 2011, 331 international brands boycotted Uzbek cotton for labour rights violations (International Labour Organisation, 2022).

The majority of the rural population, however, constituted the *dehqon* sector, made up of peasants and smallholders, accounting for 15-25% of irrigated land (Djalalov et al., 2006, p. 321). To understand the idiosyncrasies of irrigation institutions in *contemporary* Uzbekistan, the *dehqon* sector must be disaggregated into *peasant* and *smallholding* farms. The post-independence period led to an economic crisis, resulting in nonpayment or payment in kind of agricultural wages at collective and, later, commercial farms. To avoid food shortages and mass poverty, with the Law on Peasant Farming of July 1992, and Law on Dehkan Farms and the Land Codes of 1998, former collective farm workers and certain categories of rural social infrastructure workers were allotted additional land plots, on former collective land, for lifetime inheritable possession for private use, an expansion of a process which started in the late Soviet period (Galdini, 2023; Ilkhamov, 1998). In addition to the freely allocated land plots, a peasant sector was created, where heads of rural households could lease a small plot of land via a tender with the district governor, (*hokim*) and *register their farm* (Ilkhamov, 1998). Ilkhamov defines the peasant sector as the following:

> Peasant (*dehqon*) farms and privatized livestock farms are those that have acquired the status of a *juridical person* and the right to open their own bank accounts. According to official statistics, by the beginning of 1998 the country had 20,000 independent peasant and *dehqon* farms (Ilkhamov, 1998, p. 547, emphasis added)

What is considered the *dehqon* sector in Uzbekistan's legislation is thus an attempt to expand the land leasehold market. However, probably because *dehqon* translates to 'peasant', much of the literature (Djanibekov, Bobojonov, et al., 2012; Djanibekov, van Assche, et al., 2012; Galdini, 2023; Veldwisch and Spoor, 2008) does not conceptually differentiate between peasants with merely a household (*tomorqa*) (in this research – smallholders) and a registered, leased *dehqon* farm. This could also be due to the numerical prevalence of the former. However, to this day, legislation and even statistics tend to lump them as one 'type', yet as will be shown in subsequent chapters, this distinction is becoming increasingly important. Based on the law, the key difference is that a *tomorqa* plot is often adjacent to the house (although this varies), and is the 'private' property of the male head of the household, while *dehqon* farms are usually located further away, tend to be larger in size, and are leased from the government for 10 years ('Law on Dehkan Farms', Government of Uzbekistan 2021).

Both *tomorqa* and *dehqon* land share the characteristic of household or family-based farming of high-value products, although *dehqons de facto* had less freedom to choose what to grow due to remaining administrative intervention by district governors into their practices (Ilkhamov, 1998). Whether or not households had an additional *dehqon* farm, they supplemented their income by working on private *fermer* land either by selling their labour or informally renting plots of land from *fermers* for their own cultivation, or employment in other sectors (Galdini, 2023; Ilkhamov, 1998; Veldwisch and Spoor, 2008). Since land was, and still is, not a commodity, as previously mentioned, for all three land types, especially *dehqon* and *fermer* lands, access and management of leased land involved patrimonial networks, composed of bribes and shadow dealings[13] (Djanibekov, van Assche, et al., 2012; Ilkhamov, 1998; Kandiyoti, 2003; Lombardozzi, 2020; Melnikovová and Havrland, 2016; Rasanayagam, 2011; Trevisani, 2008). Important to note is that *fermers* also had, and continue to have their own *tomorqa* which they will have received during these allocations. Furthermore, scholars emphasise the high level of inequality the system created; for example, *fermers* accounted for 5-10% of total rural households while occupying 65% (Ilkhamov, 1998, p. 541) (and later 85%) (Galdini, 2023, p. 177) of the sown area in 1996, which concentrated all assets and income.

Three main producer categories in the agricultural sector 1998-2005

Type of farm	Average size (ha)	State order status	Crop type	Legal status
Commercial *fermer*	Variable 20-200	Command	Cotton and wheat	Legal entity (contract-farming on leased land), can hire labour
Peasant *(dehqon)*	Variable 0.45-30 ha	Mixed	Horticulture, cotton, wheat, rice	Legal entity, leased land, can hire labour
Smallholding *(tomorqa)*	Small 0.1-0.35 ha	Market-based	Horticulture	Unregistered, lifetime inheritable possession

(Table adapted from Ilkhamov 1998 and Trevisani 2008)

Of a total of over 4 million hectares of arable land, in 1996, and based on the State Statistics Committee of Uzbekistan (SSCU), *dehqon* lands accounted for 308,000 ha (8%), and represented 20,000 farms, while private smallholdings covered 15% of arable land with 650,000 ha (Ilkhamov, 1998, p. 551). Land allocation of private smallholder plots slowed down after the 1998 land reforms, to expand the commercial sector of leased *dehqon* and *fermer* lands (Kandiyoti, 2003).

[13] For example Trevisani's extensive research uncovered how rural elites appropriated leaseholding contracts and rented their land to poorer farmers for cultivation, paying them in-kind or by allowing these farmers to grow high-value horticulture crops on this land (Trevisani, 2007)

According to a 2020 World Bank report, in 2018, the SSCU reported 5 million *dehqon* farms, cultivating 500,000 ha of land, of which 23 thousand had a legal (*dehqon)* status (Zorya et al., 2020, p. 20). Parallel statistics of the Farmers' Council reported 530 thousand farms cultivating 60,000 ha of land, while the Land Cadastre reported 47 thousand farms on 14,000 ha (Zorya et al., 2020, p. 20). SSCU data indicate that the number of registered dehqon farms barely changed over 20 years (despite an additional series of land restructurings, the details of which are beyond the scope of this thesis), while the massive discrepancy in numbers across departments signals the overall unreliability of the statistics. Due to the relative consistency in SSCU's reports of the size of the sector between 1998 and 2018, and other literature's reliance on their figures (Asfaw, 2020; World Bank, 2012a), this research is based on the estimate of around 5 million, mostly unregistered smallholdings, representing an estimated population of around 15 million people (Zorya et al., 2020).

Smallholding, or cultivation on household plots, thus constitutes the largest form of production within the *dehqon* sector. The key feature of the bimodal agrarian structure was rural households' limited access to land and inputs, and high demand for work, and the *fermers'* need for labour but high access to resources and inputs, which created a high level of interdependence between the two farm types (Djanibekov, Bobojonov, et al., 2012; Lerman, 2008; Lombardozzi, 2018; Veldwisch and Bock, 2011).

Furthermore, this *bimodality* was characterised by smallholders' high productivity in *food* crops, something that is consistently recognised in nearly 30-year literature on Uzbekistan's agriculture (Asfaw, 2020; Ilkhamov, 1998; Zorya et al., 2019, 2020). In 2008, it was reported that excluding wheat, household plots produced more than 75% of all food output, including livestock (Galdini, 2021, p. 179). For 2017-2018, drawing on government statistics, Asfaw reports that the smallholder sector accounts for 70% of all agricultural production in the country, 56% of all crops, and more than 65% of all horticulture crops (Asfaw, 2020, p. 2). The revised data for 2017 and 2018 available on the government's statistics page attributes 49.1% and 52.2%, respectively, of all crop production to smallholder farmers (Statistics Agency Under the President of the Republic of Uzbekistan, 2022). World Bank, in turn, found that in 2020, smallholder farms generated 48% of crop output, 60% of horticulture production, and 92% of livestock output (Zorya et al., 2020, p. 92), compared to 42.3% of crop production for the same year reported by the statistics agency (Statistics Agency Under the President of the Republic of Uzbekistan, 2022). Despite variations, sources agree that the smallholder sector is key to agricultural output.

Qualitative studies demonstrate that due to the exodus of men for migrant work or their employment in higher-paying jobs, agriculture underwent mass feminisation, where women performed most of the work on plots and in seasonal cotton labour, including during sowing season and harvest (Galdini, 2023; Kandiyoti, 2003; Mukhamedova and Wegerich, 2014). The sheer labour shedding due to decollectivisation overwhelmed the country's job creation capacity, leading to a growth in the informal sector by 31% and a rise of casual, seasonal (or precarious) workers by 50% in 2006, where women were overrepresented (Galdini, 2023, p. 180). Kandiyoti, in particular, highlighted that:

> gendered divisions of labour are centrally implicated in the reproduction of a rural economy based on the operations of an export-oriented commercial cotton sector that relies on an unremunerated or underpaid workforce which is, in turn, dependent on entitlements to land for self-subsistence (Kandiyoti, 2003, p. 226)

The gendered division of labour characteristic of household production during the Soviet Union was thus reproduced, if not intensified, in independent Uzbekistan due to the collapse of wages and social welfare provision. Rural households were compelled to diversify their livelihood strategies, away from 'self-provisioning and sale or barter of produce from personal plots or animals, income from trading and other informal activities, and benefits and entitlements (such as pensions and maternity benefits)' (Kandiyoti, 2003, p. 232). At the same time, the combination of high smallholder productivity and mass feminisation indicates that women's labour subsidised food production as the state accumulated rents from cotton export.

5.4 Water as a regional issue in Central Asia

In the wake of the dissolution of the Soviet Union in 1991, among the myriad challenges facing the newly independent Central Asian states was a resource crisis caused by the four-decade-long withdrawal of an unprecedented amount of water from the Aral Sea Basin (Spoor, 1993; Weinthal, 2001). Against the backdrop of the shrinkage of the Aral Sea, high soil salinity, and degradation in downstream countries, there was the question of transboundary water management of the Syr Darya[14] and the Amu Darya[15] rivers now distributed among five republics (Gleason, 1993; Weinthal, 2001). Previously relying on the Soviet-era federally managed electricity-water grid, Central Asian countries were confronted with the task of establishing institutions that would allow respective states to optimise the resource's economic potential while maintaining a high degree of regional cooperation (Dukhovnyĭ and Schutter, 2011a).

Despite the potential for grave conflict, in October 1991, after the August putsch, the leaders of the five Central Asian countries' water departments convened to establish the Interstate Coordination Water Commission (ICWC) and the Agreement on Co-operation in the Field of Joint Water Resources Management and Conservation of Interstate Sources, and in 1993 – the Interstate Council on Aral Sea Basin Problems (Dukhovnyĭ and Schutter, 2011a). The ICWC had final authority over water allocations and helped ensure the continuity of agricultural practices after the collapse of the Soviet Union. In addition to committing to technical and scientific cooperation, the ICWC was responsible for water regulation, its rational use, and overall protection of water sources (Dukhovnyĭ and Schutter, 2011a; Weinthal, 2001). The ICWC oversaw the activities of the basin water management organisations – the

[14] Kyrgyzstan, Uzbekistan, Tajikistan, Kazakhstan
[15] Tajikistan, Uzbekistan and Turkmenistan

Amu Darya BVO and Syr Darya BVO, which were already established by the Soviet government four years prior, and acted as the 'executive and interdepartmental organs' of the ICWC (Dukhovnyĭ and Schutter, p. 218, 2011).

Literature evaluating the effectiveness of these bodies is abundant; however, there is policy and scholarly consensus that their aims never fully materialised. Explanations highlight overlapping mandates, failure to regulate agricultural production (the main water consumer), and the eventual reorientation of Central Asian countries toward self-sufficiency in hydropower production among upstream countries (Kyrgyzstan and Tajikistan) and food-import substitution and continued cotton cultivation among downstream countries. This has led to recurring regional tensions across the water grid (Djanibekov et al., 2016; Dukhovnyĭ and Schutter, 2011a; Weinthal, 2001). Together, mountainous Tajikistan and Kyrgyzstan supply an aggregate of 80% of the average annual basin river flow, 55% and 25% respectively, withdrawing only a small fraction of it. Oil and gas-rich Kazakhstan, Turkmenistan, and Uzbekistan withdraw 83% of the Aral Sea basin water, despite contributing only 14% (Menga, 2018, p. 52).

Attempts to resolve transboundary water tensions took the form of barter agreements that exchanged water and energy resources to regulate dam operations in upstream countries. However, these often ad hoc arrangements were insufficient to generate a satisfactory level of regional cooperation and were undermined from the outset by the economic turmoil that followed the Soviet collapse (Djanibekov et al., 2016; Weinthal, 2001). Instead, relations have been marked by 'an overall coexistence of conflict and cooperation' (Menga, 2018, p. 63), like a ping-pong, bouncing back and forth between declarations of friendship and bursts of animosity. Under Karimov, determined to safeguard irrigation for the perennially important cotton crop, Uzbekistan sought to maintain its Soviet-era privileged water status by exercising 'hydro-hegemony'. It produced knowledge and co-opted international organisations, and was by 'far the most vocal opponent of the construction of large hydroelectric plants upstream', whose realisation it was able to successfully impede or slow down, aggravating tensions with neighbours. As a historic supplier of gas to Kyrgyzstan and Tajikistan, Uzbekistan exercised leverage over the countries 'by imposing high purchase prices, and uncompromising payment deadlines, and frequently cutting gas supplies, causing serious energy crises' (Menga, 2018, p. 12). Domestically, Karimov engaged in considerable fear-mongering about imminent water tensions and wars (Menga, 2018), leaving a significant imprint on the Uzbek population's regional political consciousness[16].

In 1993, committed to avoiding the eruption of acute conflict[17], Central Asian states turned to international development organisations, initially the World Bank, the European Union, the United

[16] Being raised in Tashkent while frequently travelling to Tajikistan, I grew up amidst these narratives from both sides. This was also a recurring theme during my fieldwork, especially among the older population.
[17] Conflict was mainly avoided between upstream and downstream countries and not between upstream countries as evidenced by water-related tensions between Kyrgyzstan and Tajikistan, frequently erupting pre and post-independence.

Nations Development programme, and USAID to devise a series of 'negotiating sets' that led to a number of energy and water projects. While the evaluation of transboundary cooperation is beyond the scope of this research, these events paved the way for the eventual introduction of IWRM and the establishment of Water User Associations (WUA), in Uzbekistan renamed to Water Consumer Associations in 2009 (WCA), which became an integral part of water cooperation efforts and aimed to improve agricultural practices at the national level (Weinthal, 2001).

5.5 A strategic-relational approach to understanding water governance in Uzbekistan

5.5.1 Background to the introduction of Water Consumer Associations

The dissolution of state and collective farms and the creation of a 'private' subsector of independent farmers and households created an infrastructural and institutional void, where water was still delivered by the state up to the boundaries of the former collective and state farms, after which, *fermers* and smallholders were expected to organise water allocation amongst themselves. With the socioeconomic instability of the 1990s, disruptions in water delivery hit the rural population especially hard, and the lack of a formal coordination mechanism created acute tensions between individual farmers (Dukhovnyĭ and Schutter, 2011b; Veldwisch and Mollinga, 2013). This period was characterised by three sets of issues: 1) inefficiency of the water distribution system 2) budget constraints and, 3) rise in the number of water users (Yalcin and Mollinga, 2007a).

In 1996, the Uzbek government contracted the Central Asian Irrigation Research Institute (SANIIRI) to study other countries' experience with Water User Associations and to establish the legal and institutional framework for their creation. In 1998, the government cooperated with the European Technical Assistance to the Commonwealth of Independent States to rehabilitate the irrigation systems of 14 private farms, train their operators, and establish the first water user association in the Khorezm region (Wegerich, 2000). It also worked with the Asian Development Bank and, later, the World Bank, on other WCA-related projects in other parts of the country. Around the same time, in 1997, the Uzbek government created a Ministry of Agriculture and Water Resources (MAWR) by merging the existing agriculture and water ministries, and following ICWC's recommendations, replaced 13 administrative-based regional water coordination institutions with ten main water and one canal irrigation basin management authorities, based on *hydrographic* principles, as required by IWRM (Yalcin and Mollinga, 2007a). Similar processes were taking place in neighbouring countries Kyrgyzstan, Tajikistan, and Kazakhstan, and, to a degree, Turkmenistan, where countries embarked on their own paths to implementation of IWRM with the help of development partners (Dukhovnyĭ and Schutter, 2011b).

In Uzbekistan, WCAs were conveniently absorbed into the new, decollectivised agrarian structure. Based on their study of Khorezm province, Veldwisch and Mollinga emphasise that Uzbekistan's

experimentation with WCAs was a *government* initiative, indicating that there was 'an autonomous driving force within the Uzbekistani water bureaucracy for WUA-focused irrigation reform, which translated into decrees and formal government documents' (Veldwisch and Mollinga, 2013, p. 761). Their country-wide adoption was 'based on (provisional) decrees by the Cabinet of Ministers, particularly Decree No. 8 of 5 January 2002' (Ibid.). As the authors elaborate:

> The decree mainly dealt with the dissolution of unprofitable state and collective farms, rather than with WUAs. However, it also provided a (provisional) legal basis for the establishment of WUAs in the country (Yalcin and Mollinga, 2007b, p. 11). In practice, WUAs were established by decree of the (regional) *hokims*, with reference to the decree on the national level (Veldwisch and Mollinga, 2013, p. 761).

These processes were then supported by organisations such as the Swiss Agency for Development and Cooperation, whose projects in the Ferghana Valley helped institutionalise WCAs as the guiding policy across Uzbekistan (Moss and Hamidov, 2016; Yalcin and Mollinga, 2007b). To demonstrate 'best practices' in participatory water governance and support their proliferation across the country, international donors such as USAID, ADB, and the World Bank funded pilot WCAs through loans and social and technical assistance across Uzbekistan's regions (Zavgorodnyaya, 2006). Furthermore, in 2003, influenced by the rollout of IWRM-promotion development projects, the government established Irrigation Basin Management Authorities (BISA) along hydrographic borders as prescribed by IWRM, as well as Irrigation System Authorities (ISA) at the district level, completely restructuring the irrigation system (Moss and Hamidov, 2016; Yalcin and Mollinga, 2007b). By the mid-2000s, 1654 WCAs were created in the country, involving 170,000 members and a service area of 3.8 million ha (Kim and Hornidge, 2016, p. 207)

5.5.2 The strategic subordination of IWRM to the agricultural policy

As outlined in the theoretical chapter, a strategic-relational analysis sees state action as shaped by structurally inscribed selectivities that privilege certain strategies over others. Metagovernance, in turn, refers to the state's coordination of different modes of governance – hierarchies, markets, and networks that operate 'in the shadow of hierarchy' (Jessop, 2002a, p. 5). In this sense, the adoption of Water Consumer Associations (WCAs) in Uzbekistan can be understood as part of a metagovernance strategy in which internationally promoted 'participatory' water institutions were incorporated and reshaped to fit the structural selectivities of the cotton production regime. Rather than enabling autonomous, user-led management, WCAs were inserted into existing hierarchical relations of command, thereby synchronising IWRM with the practical imperatives of maintaining state control over irrigated agriculture.

Ultimately, IWRM was superimposed on a system of water allocation inherited from the Soviet Union, with its own structural selectivities, that shaped the trajectory of reform in water governance. MAWR

continued to set the water-use quota and then passed it down through the water management hierarchy, namely to the BISA, then to ISAs at the district level, and finally to the WCA and the farmers. Irrigation service fees (ISF), as per IWRM, were also introduced and were only charged for the delivery of water and not its total amount, thus preserving state-subsidisation of water for cotton and wheat. WCAs could only be created under the recommendation of the Ministry of Agriculture and Water Resources (Abdullaev et al., 2006), which undermined the very principle of self-organisation – the main point of criticism around their adoption (Kim and Hornidge, 2016; Moss and Hamidov, 2016).

Yet despite the persistence of the water limit allocation system, the creation of new, privately managed farms caused coordination issues, which WCAs filled by serving as a 'bridge' between state irrigation management organisations and water users' (Veldwisch and Mollinga, 2013, p. 762). Donor financing, in turn, subsidised the filling of this institutional gap (ADB, 2023; World Bank, 2023b). This was convenient because, as explained by Yalcin and Mollinga (2007b), 'the government did not want to spend money from the state budget to finance annual expenses for on-farm system maintenance while the *Shirkats* were being abolished' (p.11).

The eventual institutional outcome at the WCA level was a hybrid of the old and the new. A typical WCA consisted of an elected general assembly of farmer representatives, an audit committee, a governing/management body, a WCA chairman, and technical staff – the irrigation and land reclamation specialist, a *mirob* (hydro-metering specialist), an accountant, a pump operator, and an engineer (Moss and Hamidov, 2016). However, this configuration was not just an institutional blending, or *bricolage* or syncretism (with connotations of symmetry), as argued by Sehring in her study of IWRM in Tajikistan and Kyrgyzstan (Sehring, 2009) but a case of hierarchical steering, in which participatory elements were absorbed into existing irrigation structures while nonetheless transforming them in the process. In effect, as shown in the final section of this chapter, at the province and district levels, IWRM reforms manifested differentially, depending on localised resource relations around cotton production.

Once adopted in Uzbekistan, WCAs were found to exclude smallholders from formal water rights, thereby reproducing their need to acquire them on a semi-formal, situational basis. A 2006 ADB manual for Uzbekistan provides a normative definition for WCAs in Uzbekistan as:

> a nongovernment, non-profit organisation, initiated and managed by a group of farmers and other water users along one or more hydrological subsystems or watercourses. Its potential members are water users such as individual members of lease-holding farms and *shirkats* (collective farms), owners of private and *dehqon* (peasant) farms, and owners of home garden plots. By organizing themselves, they can put together the financial, material, technical, and human resources needed to manage, operate, and maintain an efficient irrigation and drainage system in their locality' (Abdullaev et al., 2006, p. 1).

That same ADB manual goes on to provide an in-depth analysis of the Uzbek water legislation, noting the following:

> The criterion for membership in a WCA is defined in Article 1.2 of Decree No. 8 as 'newly created leasehold farms (*fermer xojaliklari*)' and other juridical and physical entities. However, the phrasing of Article 2.2 inadvertently excludes *dehqon* farms (small garden plot farms) from membership: '...the District MAWR Department is to protect the interests of non-members, the list of which includes *dehqon* farms, schools, healthcare institutions, communal farms, and other similar entities.' (Abdullaev et al., 2006, p. 68)

Aside from the recurring confusion around *dehqon* vs. smallholder exhibited in these texts, the legislation therefore recognised the existence of smallholders' water interests, without making explicit how these interests should be protected, leaving, yet again, a considerable degree of 'fuzziness'. Therefore, despite their efforts, donors were unable to instil principles of community empowerment and mobilisation through which they sought to spur a bottom-up 'revolution' and change the fundamental functioning of ground-level agricultural operations (Kim and Hornidge, 2016; Kreutzmann, 2016; Moss and Hamidov, 2016; Veldwisch and Spoor, 2008; Yalcin and Mollinga, 2007b).

Furthermore, IWRM was caught up in the state's own power-balancing act among the various government factions, reflecting the internal administrative conflict that created incentives for the central state to restructure governance arrangements. As Yalcin and Mollinga show, the creation of an irrigation basin management system based on hydrographic principles, which stipulated the establishment of one main canal management authority in Ferghana and ten irrigation basin management authorities, served to reduce *hokims'* (district governors) interference with water allocation. The previous system of administrative boundaries of water management involving province and district level offices led to frequent day-to-day interference of *hokims* in canal management, which resulted in a 'peculiar polycentric management system creating an atmosphere of frictions and conflicts of interests between agricultural enterprises, water and agricultural institutions, and the local authorities' (Yalcin and Mollinga, 2007a, p. 20). The transition to hydrographic boundaries stripped some of that power away, centralising it within the MAWR. The *hokims,* as stated previously, were directly accountable to the President for meeting production quotas, which incentivised interference with water allocation. (Veldwisch and Mollinga, 2013; Yalcin and Mollinga, 2007b). As Yalcin and Mollinga explain:

> no matter how authoritarian the political system is, it is not always a single authority that decides everything. Though the Uzbek political system is highly closed and centralized, and the policy processes are decided within the bureaucracy, most decisions seem to be taken in dynamic processes within that closed environment (Yalcin and Mollinga, 2007b, p. 7)

The authors highlight that the very decision to merge the ministries of Water and Agriculture was driven by the then-powerful Minister of Economy, who complained about the two ministries' overlapping

tasks, and by the need to challenge the then-Minister of Melioration of Water Resources, who wielded extensive formal and informal power. With regard to WCAs, the authors additionally note the peculiar role of foreign donors 'who push management models inspired by 'society-centric' views of water governance, notably the establishment of Water [Consumer] Associations, as independent, non-state, irrigator-governed bodies that can 'participate' for enhancing system performance', which are in turn adapted to 'local conditions', warning that such structures have limited application to authoritarian contexts where the population and civil society have minimal influence on reform (Yalcin and Mollinga, 2007b). Notably, limiting *hokims*' interference at the basin level merely devolved to the WCA level, where they were often appointed as directors, personally selected managers, or *de facto* in charge of water distribution (Veldwisch 2008; Moss and Hamidov 2016).

5.6 Cotton as underpinning the modality of hydrosocial territorialisation

Relations of water access and distribution that revolved around WCAs' subordination to the cotton priority, coordinated by district and provincial governments, servicing primarily *fermers* while *de jure* excluding smallholders, can be argued to have constituted a particular modality of hydrosocial territorialisation. As a reminder, hydrosocial territories are:

> time - and space-bound networks entwining physical, hydraulic, political-economic and socio-cultural actors, acts, artifacts and institutions. They evolve through contestations between and materialisation of particular imaginaries about how water and people are and should be managed (Hommes et al., 2018, p. 152)

In this body of literature, 'territory is the socio-materially constituted and geographically delineated organisation and expression of and for the exercise of political power' (Swyngedouw and Boelens, 2018, p. 117). Therefore, the modality of hydrosocial territorialisation is not as much about the formal and substantive features of a particular territory, such as its size or the number of people it represents, but how (unevenly contested) power dynamics are expressed within it. For example, a typical WCA could encompass anywhere from 10-15 *fermers* cultivating on 20 ha of land in Khorezm province (Veldwisch, 2008) to around 50 *fermers* covering 2200 ha in Ferghana province (Moss and Hamidov, 2016). Furthermore, due to land consolidation policies, such as in 2008, when the government endeavoured to increase average land sizes, the same WCA could represent fewer *fermers* while covering the same hectarage (Moss and Hamidov, 2016). Notwithstanding the particular variations in the expressions of this modality, hydrosocial territorialisation was underpinned by the production of cotton for the state order, which constituted the axis around which surface water was disbursed and acquired by various agricultural producers, particularly smallholders.

The most distinct characteristic of the modality of hydrosocial territorialisation is the high degree of interdependence it engendered. WCAs were state-controlled organisations that served 'an important role in the control over (state) agricultural production by privatised *fermers'* (Veldwisch, 2008, p. 165).

Fermers, based on their 'socio-political' position, employed multiple strategies to secure access for their fields, such as making alliances with better-off *fermers* to receive water after them (Veldwisch, 2008). As argued by Veldwisch and Bock (2011):

> The profitability of cotton production depends on the terms of trade that fermers manage to negotiate with these state organisations, and may depend on the actual delivery of the assigned inputs (especially fertilizer and diesel); the ability to mobilize tractors and obtain water at the right time; and negotiations on the weight, quality and moisture content of the cotton…In terms of profitability, cotton cultivation in itself [was] not interesting for *fermers*. However, producing cotton is a prerequisite to obtaining access to large portions of land and permission to grow other crops (p. 592).

Cotton cultivation therefore mediated access to land and income from other crops. Eichholz and colleagues (2013) described this scenario as 'trading capitals', a situation where, when resources cannot be bought or sold on the market, non-economic forms of capital, (social, cultural, symbolic, political capital)[play a] more important role than in market-based economies' (Eichholz et al., 2013, p. 877). Others describe networks of relations in terms of 'gatekeeping' or 'paternalism' (Djanibekov and van Assche, 2013; Kandiyoti, 2003; Veldwisch, 2008); as Veldwisch and Bock explain:

> the *fermers* who appear as patrons in their relations to [smallholders] are themselves involved in relationships of dominance and dependency, as their access to resources has also been secured through personal relationships (Veldwisch and Bock, 2011, p. 595).

Formally, smallholders were at the bottom of the hierarchy, as *fermers* received priority because they grew crops for the state order. However, in some cases, local norms compensated for this unfairness. For example, Veldwisch found that in Khorezm, *dehqon* farmers and owners of household plots received their water due to the *cultural* expectation that water goes to the people first, enabled by relative water abundance:

> Household production is generally accepted as a higher priority than state-ordered cotton and commercially produced rice, both by the state and by fermers. The situation of relative water abundance makes it possible that water distribution largely follows the various demand signals without causing any substantial social tension (Veldwisch, 2008, p. 141).

In most cases, however, smallholders scrambled to secure water amid contestations that both complemented and challenged cotton production in the context of the bimodal nature of the agricultural system. In her analysis of water relations also in Khorezm, Oberkircher conceives of relative water scarcity as a result of the conflicting interests of the state, *fermers* and *dehqons* (in this case smallholders):

> Water scarcity was a major threat to subsistence farming and therefore to the livelihoods of *dehqons* in 2008. Likewise, fermers were faced with the threat of losing their land and a large part of their income if their yields were too low. The state and its bureaucracy were continuously interfering in everyday water use to secure the state's interests in the strategic cotton yields (Oberkircher, 2011, p. 1277).

Oberkircher's findings echo studies arguing that strict socio-political control, shaped by the state procurement system, produced dependence on patron-client relations and led to informal negotiations between *fermers* and smallholders to share water. While pump- and water-sharing were often based on ties and friendships, in the absence of these ties, smallholders were obliged to rent the pumps or to 'steal' water at night, without warning other users (Oberkircher, 2011).

Struggles to access water also took on a gendered dimension, especially in areas with high male out-migration to Russia. Gender – or women's compromised ability to 'negotiate' – was found to entrench water inequality between the two farm types. Women were less likely to be notified about water deliveries, or be completely excluded from consideration for water, obliging them to also resort to water theft at night or contest its absence with the district *hokim* (Kim and Hornidge, 2016; Mukhamedova and Wegerich, 2014).

From a material, socio-natural perspective, an overlooked point is that this downward chain of water (inter)dependence was contingent on withdrawals from canals. The socially reliant nature of fermers' and smallholders' resource access strategies presupposed the availability of surface water for cotton and wheat. At the village level, smallholders and *fermers* shared this water, often in highly conflictual relations, especially during summer seasons, when water scarcity was particularly acute (Gazieva, 2023). Spatially, the dispersion of the network of canals supplying water to farms and villages, whose acquisition was mediated by 'patron-client relations' or 'informal institutions', can be qualified as a horizontalised form of resource distribution, conditioned by the materiality of the canal as a technology. The cotton-oriented modality of hydrosocial territorialisation was thus a constellation of produced nature's material qualities, intertwined with class-based and gendered strategies of contestation, and embedded in the wider political economy of Uzbekistan's agricultural system.

Conclusion

In this chapter, I have outlined some key historical processes in Uzbekistan's agrarian trajectory. In doing so, I have additionally foregrounded the role of smallholders in Soviet and independent Uzbekistan's agricultural structure, to emphasise their central role in supporting this structure. Because of the sheer monumentality of productive, resource, political, and historical transformation that rural Uzbekistan has undergone, with the exception of some works (i.e., Weinthal 2002; Kandiyoti 2003, Trevisani 2008), most scholarship tends to treat smallholding as an appendage to Uzbekistan's political economy and livelihood strategies. Furthermore, I have carved out smallholders – owners of private

subsidiary plots – as fundamentally distinct from *dehqons*, who are producers on small *leased* plots, something the literature also tends to overlook. I did this to emphasise that it is the former (at least in the government's conception) that accounts for the large share of food production in the small farm sector.

The second part draws on existing studies on Uzbekistan's water reforms following decollectivisation, to emphasise that IWRM's participatory ethos was starkly at odds with Uzbekistan's command system of cotton monoculture. Instead, through the Uzbek state's metagovernance, WCAs were adapted to uphold this system, within which socially mediated strategies to access surface-level water constituted a modality of hydrosocial territorialisation, spatially characterised by horizontal socio-natural relations. Employing this conceptual lens serves as a starting point for making sense of contemporary hydro-agrarian change, examined in the empirical chapters.

6. TRACING THE EMERGENCE OF A NEW AGRARIAN IMAGINARY

Introduction

As explained in the previous chapter, until the recent wave of agricultural modernisation, Uzbekistan's rural landscape was dominated by a state monopoly over cotton, which initially served as a lever for import-substitution-industrialisation (ISI). Towards the second half of the 2000s, cotton ceded its place to mineral exports as the primary source of foreign currency; however, the rural social and economic relations integral to its cultivation persisted until the inception of the 'cluster model'. Smallholders and the rural population, in turn, were the source of surplus labour that subsidised the 'Uzbek growth model', while also supplying the country with the majority of livestock, and fruit and vegetables irrigated on the basis of the horizontal modality of hydrosocial territorialisation.

As demonstrated in this chapter, Uzbekistan's *early* experiments with agricultural diversification, supported by development institutions, sowed the seeds for the eventual replacement of smallholders as primary horticultural producers by agribusinesses. As this chapter argues, it laid the foundations for the agricultural sector's convergence with the 'Green Economy' hegemonic project and ideas (imaginary) about a resource-efficient agribusiness-led rural economy we are witnessing today. This initially subtle emergence of a new accumulation strategy is the product of the Uzbek government's 'strategic selectivity' – or structures which have a bias towards a particular set of actions (Sum and Jessop, 2013). Uzbekistan's timing and particular *manner* of agricultural diversification are products of the strategically selective encounter between foreign aid's agricultural development strategy for Uzbekistan and the political and social relations that accompanied the cotton-dominated agricultural structure detailed in the previous chapter.

This chapter tracks the high-level causal mechanisms behind 'hydrosocial *re*territorialisation' in Uzbekistan. It demonstrates how hydrosocial reterritorialisation is a product of Uzbekistan's strategic-relational dynamics with global hegemonic processes mediated by international financial institutions, which have culminated in a Green Economic *vision*, or imaginary, for agriculture. To recap, according to Jessop and Sum, an economic imaginary is an 'ensemble (or meaning system) without tightly defined boundaries… which privilege and seek to stabilise some economic activities from the totality of economic relations and transform them into objects of observation, calculation and governance' (Sum and Jessop, 2013, p. 165).

In what follows, I critically 'read' major aid interventions in Uzbekistan's horticultural sector, to argue that development projects, through their interaction with Uzbekistan's implementation institutions, have empowered a private agribusiness sector while marginalising smallholders. The process of contingency launched in the horticultural sector had laid the foundations for Uzbekistan's contemporary agricultural modernisation strategy based on vertically integrated 'clusters' for the production of value-added goods, as well as intensive gardens, both of which are the government's preferred recipients of scarce water resources. At the national level, the water-saving discourse, folded under the Green Economic agrarian imaginary, or what I call the 'New Agrarian Imaginary ', justifies and reinforces water and land grabbing for the sake of the environment and development.

6.1 Agricultural diversification and tracing the rise of agribusiness prior to 2016

Shortly after independence, Uzbekistan's leadership anticipated an eventual transition towards modernised agriculture, yet may have been short of plans for its particular *form*. In published speeches from 1998-2003, prior to committing to cooperate with foreign development organisations, the former President Islam Karimov made passing comments about progress requirements in agriculture outside of cotton, albeit without laying out concrete policy actions for their achievement. For example, he mentioned the need to adopt water-saving technologies in cotton to ensure 'ecological safety' (Karimov, 1998, p. 12) or to diversify agricultural production in favour of less water-intensive crops, again, using water-saving technologies and with 'rational methods of natural resource use' (Karimov, 2002, p. 351). However, more consistently, the former leader prioritised routine and moral objectives. Examples include the need to address environmental conditions such as water scarcity and soil salinisation (Karimov 2002, p. 351; Karimov 2003, p. 70), cultivating a sense of 'ownership' for land in farmers and smallholders (Karimov, 1998, p. 24; Karimov, 2003, p. 69), and the poor quality of governance of *hokims* in their relations with smallholders, farmers and *shirkats* and their (in)adherence to state quotas in cotton (Karimov, 2003, pp. 71-72). The intention to produce value-added goods, a key feature of the contemporary agricultural strategy, is mentioned mainly in relation to cotton and other industries (Karimov, 1999, p. 13).

Instead, references to smallholders prevail in Karimov's early speeches on non-cotton agricultural production. Smallholders and, to an extent, commercial farmers are referred to as in need of opportunities to take initiative in livestock and horticulture production, after which they would be 'able to feed the country and be active exporters of their products' (Karimov, 1999, p. 25). Furthermore, the smallholding (*dehqon*) sector is explicitly labelled as self-sustaining, and capable of meeting the labour and food demand. For instance, when discussing the importance of registering smallholder farmers, the President stated:

> The goal of the Law on Dehkans, and its significance and interests are that if the *dehqon* farm produces its goods and sells them on the market, then this will first of all, relieve the state of its burden. The *dehqon* farm not only feeds itself, but will actively supply the market with products. This should be cherished and welcomed. Furthermore, by legalising the *dehqon* farm, we created conditions under which its owner will be entitled to a pension – a guaranteed source of state support. This way, unemployment is prevented (Ibid., p. 38)

Although, as explained in the previous chapter, few smallholders actually registered, this quote exemplifies the intended policy regarding the smallholding sector as occupying the primary position in national food production. As reported in EBRD's 2002 transition report,

> The former household plots of farm labourers have been turned into peasant farms (*dehqon*), which have become the main source of dynamism in the agricultural sector. In 2000, the government exempted the export of fruits and vegetables from foreign exchange surrender requirements and this has markedly boosted export earnings. (EBRD, 2002, p. 215)

Regardless of whether the Uzbek government's leadership had a blueprint for an agribusiness-oriented strategy for the coming decades, the late 90s to the early 2000s were marked by a horticultural policy geared towards smallholder production, evidenced by the special discursive and export-policy attention it received.

Uzbekistan began its path towards agricultural diversification as early as 2006, when 'agri-firms' or 'non-government associations and private firms that participate in the distribution and processing of fruits and vegetables were established in the horticulture sector' (World Bank, 2014, p. 2). State-led capital investment in high-value crops (HVC) increased from 14 to 45 billion sums/year between 2003 and 2013, 240,000 ha of land were converted from cotton into HVCs, and 40,000 ha of orchards were introduced in the following years, not subject to crop placement (Lombardozzi, 2020, p. 641). The reform was crystallised by the resolution 'On additional measures on deepening processing of raw agriculture products, increasing volume of production and expanding assortment of food products for 2012-2015'. The reform stipulated an increase in the target production of vegetables by around 25% and their processing by 15.45%, an increase in the production of fruits by 13%, and the corresponding increase in fruit processing by 5%, indicating a serious commitment to the expansion of vertically integrated horticulture clusters. Additional measures were implemented to increase cultivation of safflower, soy, and sunflower for oil production, as well as livestock production (UzDaily, 2012). Horticulture was Uzbekistan's second-largest agricultural export (mainly by smallholders), and in 2012, the World Bank estimated that there were about 267 mostly non-producing agri-firms in the country (World Bank, 2014).

According to a Radio Liberty[18] article published in 2015, drip-irrigated intensive (horticulture) gardening was formally launched in 2010 to address water scarcity. The project was popularly referred to as 'Shavkat's Gardens', after the current President Shavkat Mirziyoyev, who at the time served as Uzbekistan's Prime Minister until Karimov's death. Mirziyoyev, who oversaw the agricultural sector, especially the execution of repressive measures in cotton (Lemon, 2019), was now personally charged with Uzbekistan's venture into intensive gardening, a method of accountability inherited from the Soviet Union and common in the region. As stated in the article, from their inception, intensive gardens were tainted with accusations of state monopolism. Farmers complained that 'not everyone is permitted to create intensive gardens' because they require special permission from the Cabinet of Ministers. As the quote proceeds:

> If you look carefully, intensive gardens around the whole of Uzbekistan are established along roads, on well-irrigated plots. But this land is not available to all. Only to those who receive permission for the Cabinet of Ministers. I know one such corporation involved in intensive gardening. They have 400,000 hectares in Nurata. They have gardens in Angren and Jomboy. Recently, this corporation was given 1800 hectares in the Surkhandarya region – and from this you can see, that this sector turned into a monopoly (Radio Liberty, 2015).

This was unlike the procedure to receive land for a standard cotton or wheat farm, which was historically limited to the acquisition of permissions from the district and regional *hokims* (Trevisani, 2007). More importantly, it highlights that the current rollout of agricultural clusters and intensive gardens in contemporary Uzbekistan stems from a policy that, from its inception, presupposed barriers to entry higher than those for cotton and wheat.

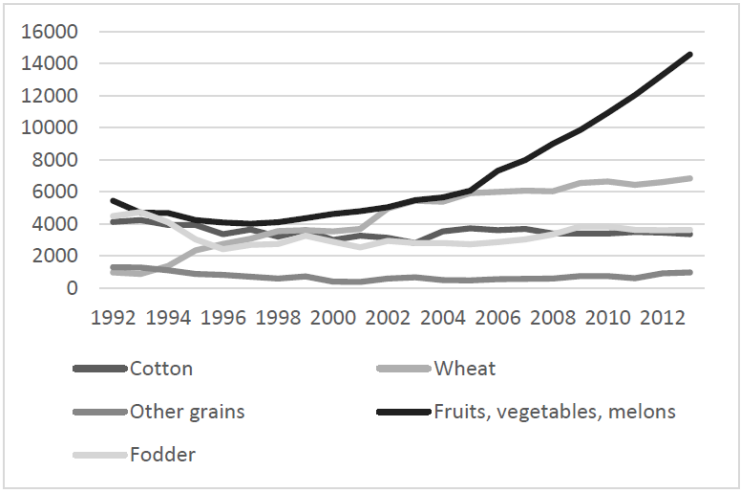
Galdini and Lombardozzi offer two diverging explanations for agricultural diversification in Uzbekistan: exogenous and endogenous. Following Galdini's exogenous explanation, the Uzbek gradualist path mediated the country's adaptation to capital accumulation on the world market in the context of decreasing global demand for cotton and the rise of minerals prices 'on the back of the Chinese-demand-led commodity super-cycle' in the early 2000s (Galdini, 2021, p. 65). As the argument goes, gradually, Uzbek cotton, struggling from low productivity due to soil salinisation and water scarcity, ceded its place as a key strategic productive sector to the more profitable gold and natural gas in the country's balance of trade. Following this, the transition from the export of primarily cotton to gold and gas maintained Uzbekistan's international division of labour as a raw material exporter, while the de-prioritisation of cotton as the primary source of foreign currency paved the way for diversification and partial liberalisation (Galdini, 2021). Lombardozzi, in turn, highlights endogenous and environmental factors driving diversification, such as soil degradation, land desertification, and water depletion from cotton production. Additional causes include the oversupply of rural labour from

[18] US-funded source of free media in Central Asia, subject to closure following Trump's policies.

the smallholding class, which needed to be absorbed by agro-processing companies, as well as opportunities for multiplier effects from horizontal linkages on logistics, packaging, certification, and trade (Lombardozzi, 2018). While Galdini views the Uzbek state as a mediator between the world market and domestic production to achieve 'backward industrialisation' through rent subsidisation, Lombardozzi qualifies Uzbekistan's model as a form of *agential,* state-led developmentalism through intentional distortions to achieve steady growth.

In this thesis I draw on both perspectives and do not challenge either argument. Instead, I complement them by assuming that Uzbekistan's diversification was a coincidence of its readiness to diversify, as a result of both exogenous and endogenous factors, as proposed by Galdini and Lombardozzi, while foregrounding development aid's role in facilitating diversification once it was faced with Uzbekistan's resistance to reform in the cotton sector. Uzbekistan's selective and structurally relevant adoption of foreign aid's export-promoting agenda in the agricultural sector paved the way for contemporary agricultural modernisation, which is now overrunning the role carved out for the smallholding sector in the early 2000s. It launched a process of contingency which culminated in Uzbekistan's 'Green Economy' – a path to development highly synchronous with global hegemonic norms.

Figure 2: Aggregate volume of agricultural production – production index number 1992-2012



Source: (Lombardozzi 2018, based on FAOSTAT)

6.2 The role of official development assistance in agricultural diversification

Support for agricultural diversification in Uzbekistan was an attractive avenue for intervention by international financial institutions (IFIs) because it allowed them to promote non-cotton industries at a rare moment when national and international interests coincided during Karimov's isolationism. IFIs such as the ADB, World Bank, and IFAD spearheaded efforts to reduce child and forced labour by supporting the high-value crops (HVC) sector across all types of producers: commercial farmers,

agribusiness, and smallholders (ADB, 2013; World Bank, 2012a). Furthermore, because cotton and wheat production were 'strategic crops' subject to strict state oversight, support for the horticulture sector was an opportunity to promote agricultural market relations without the direct risk of being involved in its highly controversial elements, namely, forced labour in cotton and its connection to the Aral Sea crisis. However, as will be shown below, the confluence of the development agenda with Uzbekistan's project implementation system and asymmetrical rural power dynamics (predictably) resulted in the unequal empowerment of private agribusiness over the smallholder sector, despite concerted efforts to target the latter.

Uzbekistan's engagement with development aid acquired certainty following its adoption of the Millennium Development Goals in 2000, after which, a technical assistance agreement was reached with the ADB. This was followed by the 2001 Living Standards Assessment and the Macroeconomic Policies and Poverty in Uzbekistan studies, conducted by the World Bank and UNDP (Welfare Improvement Strategy of Uzbekistan 2008-2010, 2007). Following a slower uptake compared to its regional neighbours (Foreign, Commonwealth and Development Office, 2004), findings from these studies, as well as contributions by the IMF, World Bank, and other representatives of the international community, formed the basis of the government's Living Standards Strategy 2004-2006 (LSS), which in turn was followed by the Welfare Improvement Strategy 2007-2010 (WIS-I) and the Welfare Improvement Strategy 2013-2015 (WIS – II) (Independent Office of Evaluation, 2021; Welfare Improvement Strategy of Uzbekistan 2008-2010, 2007).

In the progression of these poverty-reduction strategies, devised as anchors for cooperation between the government of Uzbekistan (GoU) and the development community, agricultural objectives provided the scaffolding for the agricultural modernisation strategy rooted in what I refer to as the 'New Agrarian Imaginary' we see today. For example, outlined in the LSS is the emphasis on the state's de-monopolisation of the cotton sector, introduction of water pricing and water saving, and 'supporting SME development for producing, manufacturing and trading agricultural products' (Welfare Improvement Strategy of Uzbekistan 2008-2010, 2007, p. 21). By 2007, WIS-I reported that following the government's 2003-2006 agricultural strategy, there is a 'widening process underway of farms founding agri-firms specialized in production and the advanced processing of horticultural and vinicultural produce, processing companies and other businesses' (Welfare Improvement Strategy of Uzbekistan 2008-2010, 2007, p. 23). Across the two strategies, WIS-I and WIS-II, support for horticulture agribusiness was prioritised through 'capacity building, access to finance, and investment in climate-resilient agronomic systems and sustainable land and water conservation techniques' (International Fund for Agricultural Development, 2022, p. 18). Commitment to support smallholders, through the 'adoption of a special target programme designed to support the personal subsidiary plots and *dehqon* entities in rural areas' is also mentioned in WIS-II (Welfare Improvement Strategy of the Republic of Uzbekistan for the Period of 2013-2015, 2013, p. 51). However, as discussed in the

following paragraphs, these pledges were undermined by large horticulture development sub-loan programmes that struggled to reach the lower segments of agricultural producers.

6.2.1 Empowering agribusiness through sub-loan programmes

The consolidation of development aid's pivot towards horticulture was signalled by two similar and important projects launched between 2012 and 2014. The first was the International Fund for Agricultural Development's (IFAD) 2012 Horticulture Support Project (HSP), with a projected cost of $31.69 million, and the second was the World Bank's 2014 Horticulture Development Project (HDP), with an initial loan of $150 million. Both projects were implemented by the Rural Restructuring Agency (RRA), an executive branch under the Ministry of Agriculture and Water Resources of Uzbekistan. The ADB, in turn, had a $100 million agriculture and natural resources envelope that accounted for 8% of the Country Partnership Strategy 2012-2016 (ADB, 2012)[19], and included initiatives such as the Amu Bukhara Irrigation System Rehabilitation Project, which sought to 'upgrade irrigation infrastructure and promote efficient water-use', as well as the Innovations for Agriculture Technical Assistance Fund (TA) of $1 million launched in 2013, whose findings eventually gave rise to the Horticulture Value Chain Development Project, approved in 2016 (ADB, 2013; Asian Development Bank, 2018). Explicitly stated in the objectives of ADB's TA fund is the aim to support the Uzbek 'government's commitment to enforce international labour standards by working on key aspects of the agriculture strategy', such as diversification through HVC production, mechanisation and agri-business development (ADB, 2013).

IFIs' and other development organisations' emphasis on horticulture was preceded by earlier, unsuccessful attempts at market reforms in the cotton sector. This is evident in the difference in objectives between the World Bank's US$ 36 million loan for a Rural Enterprise Support Project – I (RESP) approved in 2001 and active between 2002 and 2006, and its offshoot, RESP-II, worth over US$ 100 million, approved in 2008 and active between 2008 and 2016 (World Bank, 2001, 2009). The objectives of RESP-I were motivated by Uzbekistan's restructuring of *shirkats* (collective farms) to individual commercial, predominantly cotton and wheat farms. According to RESP-I's project appraisal, its aim was to 'to support the restructuring of collective farms and associated agricultural enterprises into privately operated units' within WB's general strategy of promoting domestic trade liberalisation and removing inefficiencies in rural resource-use (World Bank, 2001, p. 2). This was to be achieved through dedicated technical and financial services aimed at reforming the cotton procurement systems by reducing obligatory sales to the state and providing cotton farmers with access to foreign exchange to purchase machinery, resulting in higher yields, improved irrigation infrastructure, and the creation of WCAs, among others. However, the RESP-I evaluation report found that the pilot programme to allow farmers to sell cotton at above quota prices was ineffective as the

[19] ADB's Country Partnership Strategy for 2012-2016 focused on investments and projects in energy diversification and modernisation.

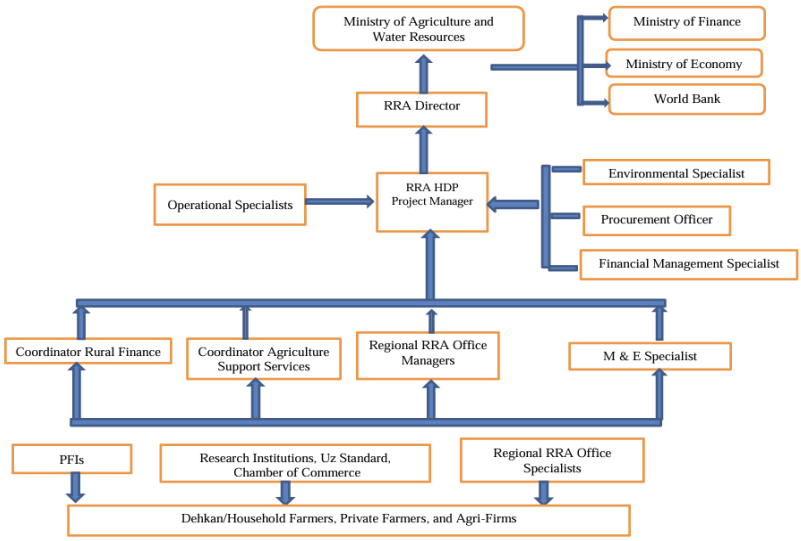
GoU did not 'consider the agricultural sector sufficiently mature to face market price fluctuations' (World Bank, 2009, p. iv). While the subsequent RESP-II project appraisal maintained its support for cotton sector modernisation through access to credit for machinery, it placed stronger emphasis on agricultural *diversification*. As the justification note for lending to the agricultural sector states:

> The authorities of Uzbekistan have embarked on a programme to modernise and diversify the economy, including the diversification of the agricultural sector. The government sees such sub-sectors as poultry, horticulture, dairy, etc., as a way to diversify out of wheat and cotton production, the two strategic crops (World Bank, 2012a, p. 28).

Indeed, RESP-II had dropped its focus on reforming the cotton sector, instead opting to support a '*broad range of investments'* (Ibid., p. 2, emphasis added) while emphasising benefits to environmental sustainability through investments in irrigation and drainage and water governance institutions. This subtle de-prioritisation of the cotton sector between RESP-I and RESP-II illustrates the manner in which WB's agricultural strategy responded to the Uzbek government's insistence on preserving the cotton monopsony by proceeding to concentrate its efforts on the horticultural sector.

Building on lessons learned from RESP-I and RESP-II, the World Bank's HDP, approved in 2014 and extended multiple times, including an additional $500 million loan in 2018, became the largest development assistance initiative in horticulture in Uzbekistan. The first phase of the project, valued at US$ 150 million, consisted of three key components: 1) agricultural support services (implemented by the EU from 2017), 2) access to credit, and 3) project management (World Bank, 2014). The primary project beneficiaries comprised 'farmers, farmer groups, private enterprises, agro-firms, and agro-processing enterprises, involved in the country's horticultural sub-sector [as well as] small *dehqon* farms (smallholder) with up to 0.5 ha of household plots per farm, and private farms with land size of up to 5 ha per horticultural farm' (World Bank, 2014, p. 30). The goal of HDP was to facilitate agroprocessing in horticulture and to, similar to ADB, '*diversify the economy and thereby reduce its reliance on a few commodity exports, such as cotton*' (World Bank, 2014, emphasis added). The project description goes to great lengths to emphasise its benefits to smallholder farms, estimated to number 4.7 million in the document, in increasing their income through support for modern technology adoption and farming practices, value chain development, and access to credit (World Bank, 2014, p. 82).

Figure 3: HDP Implementation Arrangements Chart



Source: World Bank (2014)

However, based on official reports and my conversations with a former staff member involved in the project, the source of HDP's success lay in its ability to empower the *agribusiness* sector by disbursing loans through Uzbek banks, coordinated by the Uzbek government's RRA. A 2018 ADB report on the Horticulture Value Chain Development Project (HVCDP), which directly complemented the World Bank's HDP, evaluates HDP's activities to warn that:

> Credit should be demand driven, rather than part of a directed government programme: Government, through the RRA will try and limit the availability of credit to only pre-approved loan applications that match the perceived needs of the sector (Asian Development Bank, 2018, p. 3).

Following Figure 3 (World Bank 2014), household farmers, private farmers, and agri-firms are represented horizontally as an equal group of beneficiaries, despite smallholders' disadvantaged position vis-à-vis commercial farmers, as detailed in the previous chapter. Considering the enterprise-oriented agricultural policy of the Uzbek government as indicated by the aforementioned decree 'On additional measures on deepening processing of raw agriculture products' and the manner of the land conversions towards intensive gardening by Shavkat Mirziyoyev, HDP's ability to disburse credit to smallholder farmers, through the RRA, is cast into doubt. In effect, a 2017 World Bank loan restructuring paper reports that 90% of the initial US$ 150 million was disbursed between 2015-2016, mainly due to the 'high demand for sub-loans from the project beneficiaries for investments in fruit processing and packaging, cold storage, greenhouses, and intensive orchards' (World Bank, 2017, p. 3). Considering the economic, social, and political exclusion of the smallholding sector, these listed activities are clearly targeted at large, commercial beneficiaries. HDP's beneficiaries additionally received support for the introduction of Global Good Agricultural Practices (GAP) and Hazard Analysis

and Critical Control Points (HACCP) (also endorsed by the European Union, USAID and GIZ in separate projects) to address 'quality needs associated with getting products into more advanced markets such as the EU, Korea or Japan' (Asian Development Bank, 2016b, p. 5). In turn, the implementation of 'Agricultural Support Services', which was to finally mobilise the smallholder sector's engagement, was lagging behind, as it waited for the EU's grant-financing to be processed (World Bank, 2017, p. 3).

ADB was not the only entity to conclude that RRA skewed loan disbursements. In April 2022, IFAD's Independent Office of Evaluation published the project evaluation of the Horticultural Support Project (HSP 2013-2019, US$ 26.7 million), also implemented by the RRA. The conclusion of IOE's report was that the Uzbek government prioritised loan disbursement over institutional and capacity development and regulation, and that 'there was a tendency, in practice, to *promote larger loan sizes and more support was provided to non-dehqons (agrofirms, larger farmers)*' (Independent Office of Evaluation, 2021, p. v, emphasis added). According to the report, disbursing loans to women was especially challenging due to cultural factors. The evaluation highlights that capacity development for commercial banks would have sensitised them to the specific needs of smallholders who face barriers to accessing finance; however, this was hampered by the fact that 'government staff [were] evaluated on their disbursement performance' (Independent Office of Evaluation, 2021, p. 20) while local banks reported that 'the operational costs (especially the time to process the documents) are too high' (p. 24).

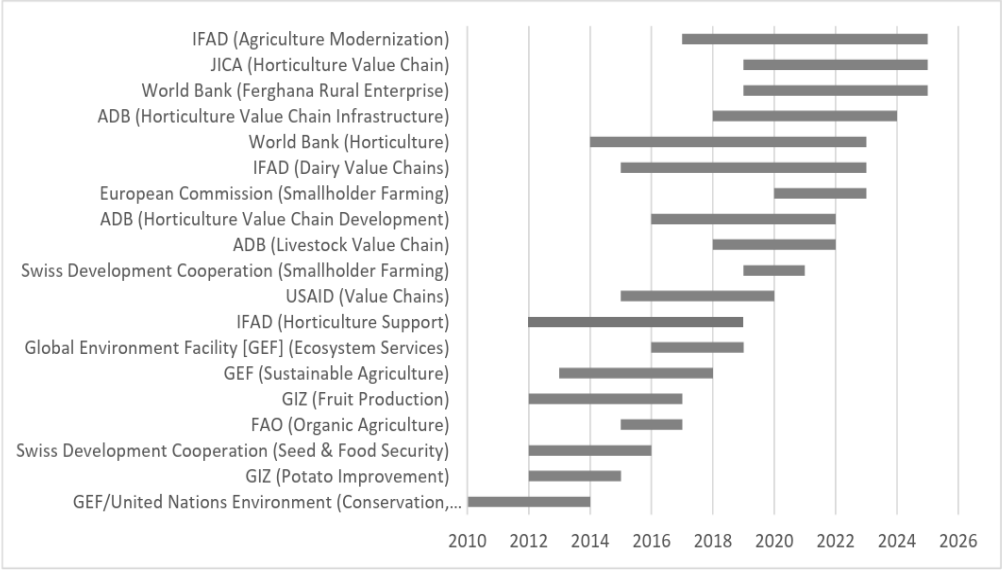
Agricultural diversification in Uzbekistan was almost entirely foreign-sponsored. The available data from the OECD and the World Bank, as well as analyses by the Overseas Development Institute (ODI) on agricultural expenditures in Uzbekistan, indicate that development aid was the primary source of credit for the bourgeoning horticultural sector in the years leading up to the 2016 reforms. According to Figure 4 (IFAD), nine horticulture projects were launched from 2010 to 2016. Based on my estimates from this report, their total cost, including grants and development bank loans, was around US$ 200 million. While this looks like a conservative sum, considering an average of US$ 1 billion per year in ODA between 2012 and 2016, these projects represent almost half of all ODA assistance in the agricultural sector, which, according to the OECD, amounted to around US$ 500 million between 2010 and 2016. OECD's metrics include irrigation infrastructure assistance, livestock, forestry, and fisheries, as well as individual DAC member projects not accounted for in the graph below (OECD, 2022). World Bank's first Agricultural Public Expenditure Review for Uzbekistan for 2016-2018, in turn, demonstrates that in 2016[20] and excluding development finance, Uzbekistan spent around US$ 380 million on agriculture[21], 72% of which was channelled to irrigation operation and maintenance for cotton and wheat, with the rest in the form of direct payments or subsidies for cotton and wheat producers. The document states that projects from international organisations '*are used for projects in*

[20] Data on agricultural expenditure in Uzbekistan before 2016 is not available.
[21] In 2016 Uzbekistan was the third largest spender on agriculture in the world (Kovach, 2020).

horticulture and livestock subsectors, and in irrigation, and many of them finance credit lines' (World Bank Group, 2019, p. 106, emphasis added). A report from ODI additionally claims that between 2014 and 2018, 67% of official development finance to agriculture and rural development came in the form of non-concessional finance in the livestock and horticulture sectors, adding that these were deemed as 'projects that can deliver economic and financial returns' (Kovach, 2020, p. 10). The non-concessional orientation of the majority of loans in the horticultural (and livestock) sectors supports the claim that commercial horticultural farmers and agribusinesses were empowered by development aid, despite the latter's stated intent to support smallholders.

The investigation of the role of ODA in the structure of Uzbekistan's agriculture reveals several implications for the status of smallholders. The first is that horticulture became the primary terrain for liberalisation and agribusiness promotion in Uzbekistan, paving the way for smallholders' decreasing relevance in food production. Furthermore, despite commitments to support smallholders, development projects' encounter with the implementation mechanisms of the government's RRA and the structural inequalities faced by the majority of smallholders, meant that the latter struggled to achieve the pace of progress of the private commercial and agribusiness sectors. IFIs and other development organisations thus significantly accelerated rural inequality.

Figure 4: Timeline of Horticulture Projects in Uzbekistan (IFAD)



6.2.2 The pivot away from WCAs in horticulture-development projects prior to 2016

As explained in the previous chapter, foreign aid was instrumental in the institution of IWRM in Uzbekistan. It also provided support to the water sector through infrastructure and knowledge development. According to UNDP, between 2001 and 2005, water projects accounted for 60% of all donor funding, with the World Bank and ADB accounting for a combined 74% of funding across all sectors (UNDP, 2007). Between 2010 and 2016, there were 63 water-related active projects in the

country, with agricultural development and institutional capacity accounting for 33% and 29% of all foreign funding in the water sector, respectively. Water activities within the agricultural development category included the construction and rehabilitation of irrigation and drainage infrastructure, such as secondary and tertiary canals, pumping stations, metering devices, and other related systems. Outdated infrastructure from the 1960s and 1970s was found to obstruct water supply, with current calculations estimating up to 36% water losses in earthen canals (Asian Development Bank, 2006; CAREC, 2023). Institutional capacity, in turn, concerned support for IWRM implementation, including WCAs, and continued well into the change of leadership in 2016 (Djumaboev et al., 2017). However, large donors' support for Uzbekistan's agricultural diversification as a means of reducing demand for irrigation, which, as demonstrated in the previous section, materialised through the influential promotion of horticulture via a sub-loan structure that glossed over smallholder needs, helped consolidate the coupling of water efficiency and agribusiness, characteristic of the 'Green Economy' and its agrarian imaginary

In other words, the promotion of the agribusiness sector was accompanied by horticultural projects' simultaneous and incremental de-prioritisation of participatory water governance through WCAs and support for commercial farmers' access to irrigation technology. The most conspicuous example is the shift in the narrative and objectives around WCAs between two of the World Bank's RESPs and the subsequent HDP (World Bank, 2001, 2009, 2014). ADB's Horticulture Value Chain Development, proposed in 2016 and implemented after the change of government, also contained critical silences regarding institutional elements of water governance, with a similar emphasis on facilitating finance for access to water-efficient technologies and on addressing water scarcity through crop diversification (Asian Development Bank, 2016c). As will be demonstrated in the following paragraphs, because the adoption of irrigation technologies was embedded in access to finance within large horticultural projects, and thus faced similar structural constraints to those described in the previous paragraphs, agribusinesses were *a priori* empowered to be technologically more sophisticated than smallholders.

The World Bank's 2001 RESP-I was among the larger initiatives to establish WCAs in Uzbekistan. In addition to supporting land and cotton procurement reforms, it included a large irrigation infrastructure rehabilitation component, to be overseen by the newly established WCAs across five regions. Costing US$ 16.6 million (of US$ 36 million), it envisioned:

> (i) the successful transfer of [operation and maintenance] responsibilities of on farm infrastructures to the new private and Dehkan farms and (ii) the development of cooperation amongst neighbouring farmers for the use of shared resources in a more efficient way especially in situations of water scarcity. (World Bank, 2001, p. 35)

Over four years, the project aimed to create 50 financially empowered WCAs, with a gross irrigated area of 162,000 ha (Ibid.). Failing to predict the persistence of the state's monopoly over cotton as the

defining feature of water governance for the next 25 years, WB's RESP-I project developers saw the dismantling of collective *shirkats* as an opportunity to promote private farming and democratic, collective self-management by both *dehqons* and *fermers*.

World Bank's RESP-II water component reflects this transition to technology-adoption financing (total cost of US$ 110 million). It mirrored RESP-I in its dual objectives of promoting agribusiness (albeit across a wider range of produce), and developing the operation and maintenance of irrigation and drainage. By 2012, three years before its completion, RESP-II had provided financial and institutional support to 105 WCAs in seven project regions across the country (International Fund for Agricultural Development, 2012), and carried out 359 workshops for over 10,000 water management specialists through parallel financing with the Swiss Agency for Development and Cooperation (SDC) (World Bank, 2012b). RESP-II's water component, however, broadened its predecessor's scope beyond the financial support of O&M activities through WCAs by providing training on the use of water-saving technologies in cooperation with SDC and local WCAs. For example, according to the implementation completion report, 'about 20,593 farmers were trained on using the demonstrated water-saving technologies' (IEG, 2016, p. 8). These included drip irrigation, furrow irrigation with black perforated film, and flexible hoses. The report commends the outcome of these trainings by citing high, 60-97% adoption of water-saving technologies demonstrated by the farmer field schools and their ripple effects to 30% of neighbouring farmers who implemented said technologies 'after learning of the benefits and subsequently receiving training from WCAs' (Ibid.). As early as 2012, private farmers and agribusinesses began using WB's sub-loans, distributed through the government's RRA, to purchase irrigation equipment, although information on the exact number and type of equipment is not available (World Bank, 2012b). While I was unable to verify the validity of claims around the success of the described project components, these 'success stories' reflect an incremental rise of water-saving technology as a preferred form of intervention in the irrigation sector, which eventually proliferated into sub-loans to commercial farmers, particularly across large horticulture projects.

The notion of WCA as the institutional link between water and its use, and between the state and farmers, assumed in RESP-1 and RESP-II, is entirely absent in WB's HDP launched in 2014. Explicitly stated in the project proposal is that HDP builds on RESP-I and II, and despite the successes in WCA engagement reported in the RESP-II project evaluation, the horticulture project completely omits engagement with water governance bodies in its objectives (World Bank, 2014). HDP's approach to tackling irrigation is exclusively through access to credit for water-saving technologies, among 'a wide range of investments in horticulture-related activities […] aiming towards enhanced competitiveness of agribusinesses' (Ibid., p. 38). WCAs, in turn, are mentioned once and solely in the context of their inability to incentivise the use of water-saving technologies:

> There are few incentives for application of water saving-technologies because farmers do not see direct costs of water provision; rather, water costs are covered by an overall land tax and are not tied to use of inputs; moreover, water user associations are not well-established (p. 75)

This marks a sharp pivot from RESP-I and II's endorsement and celebration of WCAs, and suggests several things. Firstly, it reflects the waning relevance of the 'good governance' agenda, as by 2014, 'Nexus' and the 'Green Economy' had started taking root at the global level. Furthermore, it indicates WB's recalibration of its water strategy to align with the Uzbek government's demands to empower agribusiness. Finally, it demonstrates WB's awareness of the incompatibility of participatory governance in a cotton and wheat state-order system (Romanova et al., 2016).

Other organisations continued their efforts to blend public and private components by combining support for horticulture producers, WCAs, and irrigation infrastructure. For example, IFAD's HSP (2013-2019) included a dedicated 'Improved irrigation network' component aimed at supporting horticultural producers, small and large. HSP allocated US$ 5.4 million (of US$ 25.7 million budget), including a beneficiary contribution of US$ 8.3 million, split between the government and recipients, for on-farm (tertiary) irrigation and drainage networks and accompanying technology such as water measurement devices and pumping stations, as well as inter-farm (secondary) systems. Proposals for on-farm irrigation were to be endorsed by the corresponding WCA, while inter-farm systems were coordinated by the Administration of Irrigation Systems, with budgets per investment ranging from US$ 50,000 to $300,000 (International Fund for Agricultural Development, 2012). While IFAD's proposal expresses its commitment to cooperate with local water governance institutions, it simultaneously recognises that the 'general performance of WUAs has been weak, due to overall low capacity in management and operational skills'. At the same time, it justifies its cooperation with water organisations by adding that 'considerable efforts to improve the administrative, operational and managerial capacities of WUAs are being made under ongoing donor programmes' (International Fund for Agricultural Development, 2012, p. 12). However, IFAD's reliance on donor programmes to support WCAs' functions proved naïve, and as acknowledged in the project evaluation report:

> WCAs were noted as having weak institutional capacity. This lack of institutional capacity was not addressed by HSP on the assumption that other development projects would provide such support. This assumption did not prove correct.' (Independent Office of Evaluation, 2021, p. 15)

Furthermore, the success of the irrigation improvement component was reportedly constrained by the 'government requirement to adhere to a standardised approach and national technical specifications' (p. 28), as a result of which irrigation works were limited to the rehabilitation of existing canals.

Instead, private beneficiary financing, particularly agribusiness, proved more promising, as evidenced by the declared success of loan disbursements for the introduction of water-saving technologies, with

80% of recipients receiving investments for greenhouses and intensive gardens. While the endorsement of drip irrigation within the framework of the project was modest (over 314 ha), the evaluation concludes that:

> that the scale of future irrigation investments should be larger and include modern technology and innovations, such as drip irrigation and other water-saving methods, so as to maximize the potential for impact and adaptation to climate change (which in turn would increase the resilience of farmers). (Ibid., p. 39).

This conclusion is made despite the project's aforementioned admission that smallholders are eclipsed by the government's preference for agribusiness support, and the report's recognition that water distribution at the canal level is highly unequal between the two producer groups (International Fund for Agricultural Development, 2012).

Finally, ADB's Horticulture Value Chain Development Project (HVCDP), inspired by WB's HDP, IFAD, and other horticultural projects' experience, represents a consolidation of diversification as a strategy to address water scarcity (Asian Development Bank, 2016c). The project, with a loan of US$ 154 million, consisted of a purely loan-disbursement strategy aimed at all producer types, although, as yet again recognised in the completion report: 'smallholder farmers and SMEs faced multiple challenges in accessing financing from commercial banks, which were reluctant to extend loans due to perceived riskiness of the agriculture sector and high transaction costs' (Asian Development Bank, 2023, p. 3). Water governance, infrastructure development support, and institution-building were entirely omitted from the project approach. As part of its outcomes, HVCDP financed 359 horticultural projects, including 25 intensive orchards with drip irrigation systems on over 4,000 ha, with the rest covering greenhouses, agro-processing lines, and machinery to support the post-harvest phase of production. Twenty-five orchards across 4,000 ha implies an average of 160 ha each, suggesting that the recipients of the sub-loans were owners of expansive horticulture farms (Asian Development Bank, 2023). Therefore, despite the project's stated efforts to support the unfulfilled potential of the smallholder sector, HVCDP, like its predecessors, the HDP and HSP, facilitated an uneven mode of development in rural areas by empowering agribusinesses set to compete with smallholders for scarce water resources for food production.

6.2.3 Synthetic analysis: pre-economic liberalisation

The main objective of the previous sections is to emphasise the role of foreign aid in configuring Uzbekistan's agricultural and natural resource landscape over nearly two decades. This emphasis is important because, as explained in the previous chapter, Uzbekistan made the unlikely for the region decision to pursue a gradual path to economic liberalisation, and the controlled mechanisms behind this path have concrete political and economic implications for a large portion of Uzbekistan's present-day rural dwellers, whose lives are shaped by the interactions explained above. At the same time, from a

strategic-relational perspective, development aid interventions occurred within a strategically selective institutional environment that both enabled and constrained the paths they could take. Agricultural diversification emerged from a dialectical relationship between 1) the structural selectivities of Uzbekistan's agricultural and hydrosocial order rooted in a bimodal agricultural system based on the state order for cotton and 2) donor strategies that sought to promote market relations in agriculture.

In other words, high degrees of centralisation of Uzbekistan's agricultural system constituted a structurally selective terrain that privileged intervention strategies that preserved cotton rents and government control over natural resources. For example, attempts to liberalise the cotton sector would interfere with *hokims'* requirement to uphold the fulfilment of production cotton and wheat targets, and risk destabilising the internal political matrix of power and accountability. As a result, diversification, as a target for foreign intervention, became more lucrative for donor agencies as the strategic line of least resistance. At the same time, the strategic selectivities within agricultural centralisation rendered some donor interventions in agricultural diversification more institutionally compatible: namely, horticulture credit lines to a newly emerging agribusiness class channelled through the RRA. Like participatory governance in water, an inclusive approach to access to credit, which would pluralise agricultural production and interfere with cotton rents, was incompatible with Uzbekistan's agricultural system. From the donors' side, over time, their strategies became increasingly collibrated (Silvester and Fisker, 2023) to favour technical interventions that circumvented interference with comprehensive agricultural and water reform. In this metagovernance process, donor-financed WCAs filled the institutional void left by decollectivisation, while development aid's support for horticulture diversified agribusiness while leaving cotton production for the state order intact.

These interactions gave rise to new selectivities within horticulture. The influx of project finance through RRA, whose performance was evaluated primarily on loan disbursement, privileged large, capitalised actors with the administrative capacity to meet sub-loan requirements, creating a new private actor in Uzbekistan's agriculture. For example, the government did not initially intend to replace the smallholder sector with agribusinesses, as evidenced by the slow initial uptake of poverty reduction strategies and agricultural reform. This is suggested by passing statements in development reports, such as the following by ADB in one of their documents of the HVCDP:

> Along with a number of other donors, including ADB, the World Bank has been attempting to open dialogue with the Government of Uzbekistan on a diversified programme of support for a broader section of the agriculture production sector, outside of the main cotton and wheat production systems for a number of years and for wide ranging technical, environmental and social reasons (Asian Development Bank, 2016b, p. 2)

Donors' pivotal role in shaping Uzbekistan's diversification is evident from ADB's rural sector assessment for the same project. It claims that the previously described interest in 'Shavkat's Gardens' was a direct result of development organisations' support for horticulture. As stated in the document:

> as the horticulture production sector has increased in value and become more important, government has begun to take note and then to get involved in 'organisation' of the sector. […]As a part of this campaign, the Government has provided significant support to horticulture, focusing on the creation of high-density orchards with dwarf and semi-dwarf fruit trees. Pursuant to orders from the Cabinet of Ministers, seedlings of dwarf and semi-dwarf fruit trees and drip irrigation equipment were imported from Poland, Serbia, Turkey, Ukraine, and other countries, feeding an expansion of about 2,500 ha of high-density orchards in 2011, and other 4,000 ha in 2012 (Asian Development Bank, 2016a, p. 29).

Uzbekistan's initiative to channel support for horticultural agribusiness projects through the Cabinet of Ministers gives credence to the argument that agricultural diversification was politically sensitive and thus needed to be coordinated from the 'top'. Finally, the same rural sector assessment states 'it remains to be seen whether this rush to adopt modern practices is fully suited to the local environmental conditions and also if such a style of production can be effectively managed by the technically less adept managers and small farmers' (Ibid., p. 30). Evidently, this is ironic, given that across almost all large sub-loan-based horticultural projects prior to HVCDP, smallholders were structurally unable to receive funding. More importantly, these excerpts shed light on the dynamics of contingency and momentum that unfolded over the decade of agricultural diversification, gradually sidelining the initial importance of smallholders. With the help of international development aid, they laid the groundwork for the New Agrarian Imaginary based on the 'Green Economy' underpinned, in irrigation, by hydrosocial reterritorialisation which consolidates the hydro-marginalisation of smallholder farmers.

6.3 Agricultural modernisation and the Green Economy

Uzbekistan's 'thaw' following the change of leadership from the late Islam Karimov to Shavkat Mirziyoyev in December 2016, has been characterised by Western scholars as 'authoritarian upgrading' or 'authoritarian modernisation' defined by its priority for economic and partly societal transformation, over political liberalisation and democratisation (Anceschi, 2019; Lemon, 2019; Schmitz, 2020a). The immediate highlights of Mirziyoyev's policies were currency liberalisation, the restoration of neighbourly relations with fellow Central Asian countries, shrinkage of the national security services apparatus, and the abolition of forced labour in cotton – hence the 'thaw' and the government's self-designation as 'Yangi O'zbekistan, or 'New Uzbekistan' (Anceschi, 2019; ILO, 2021; Mirkasimov and Pomfret, 2024).

Despite the apparent breadth of these reforms, their overarching aim can be summarised as 'the globalisation of the Uzbek economy' and transforming Uzbekistan 'into an attractive destination for

capital investment originating in both Europe and Asia' (Anceschi, 2019, p. 112). Uzbekistan's unprecedented 'openness' was thus largely a product of its new goal to synchronise 'domestic goals of economic development with the foreign policy objectives and patterns of interactions evident within other states' (Dadabaev, 2019, p. 896). This is despite, according to observers, the favourable state of Uzbekistan's economy in the wake of the change of leadership; the government's external debt was below 25% of GDP, it had no need to borrow domestically, and real growth averaged 7% per year (Dwight, 2024)[22].

While scholars offer structural and agential explanations for Uzbekistan's economic globalisation (Dadabaev, 2019; Galdini, 2021; Lombardozzi, 2019), for the purpose of understanding the process of hydrosocial reterritorialisation and its effect on smallholder farming, the following sections demonstrate that within agriculture and water, and with the help of development aid through which economic globalisation was mediated, the reforms were package-wrapped as the 'Green Economy' as both a mobilising imaginary and hegemonic project. The 'Green Economy' serves as the basis for a particular course of action within water management – namely, water's increasing transmission to agribusinesses as the sole actors capable of its efficient use.

While the Uzbek government maintained the Karimov-era long-term economic goal of reducing imports and increasing export-oriented manufacturing, the basis for its achievement has undergone a transformation (Dadabaev, 2019). With the change of leadership, the government adopted a new practice of developing long-term sectoral goals instead of annual investment programmes (UzDaily, 2018). As a result, over the years, it developed a series of sectoral and inter-sectoral strategies, both five and ten-year long, in many of which agriculture and water overlap. The first document produced by the new administration, namely the National Development Strategy 2017-2021, sets out five overarching priority directions[23], including the liberalisation of the economy, which in turn includes price, foreign exchange, and trade liberalisation, diversification of the export structure with emphasis on processed and value-added goods, and privatisation of state-owned enterprises. The priority area contains a separate heading (3.3) titled 'Modernisation and intensive transformation of agriculture' and contains some of the following:

1) Ensuring food security, the production of ecologically clean products and increasing the export potential of the sector
2) Continued reduction of land allocated to cotton and wheat, in favour of horticultural products, forage and oil crops, intensive gardens and vineyards

[22] Some scholars argue that Mirziyoyev 'inherited a ruined state' (Schiek, 2018) and indeed many of the economic indicators under Karimov were inflated. However, following the change of leadership, Uzbekistan revised its indicators following which the economic situation was still judged as relatively good (Dwight, 2024).
[23] Others include: reform of the public administration system, the judicial system, development of the social sphere and security and foreign policy

3) Stimulating favourable conditions for farms engaged in both the production of agricultural products and processing, procurement, storage, marketing, construction work and provision of services
4) Further restoration of the state of irrigated lands, development of a network of melioration and irrigation facilities, widespread introduction of intensive methods of agricultural production, primarily modern water- and resource-saving agricultural technologies, and the use of highly productive agricultural machinery;
5) Adoption of systemic measures to mitigate the negative impact of global climate change and the drying up of the Aral Sea on the development of agriculture and the livelihoods of the population. (Presidential Decree No.5635, 2019)

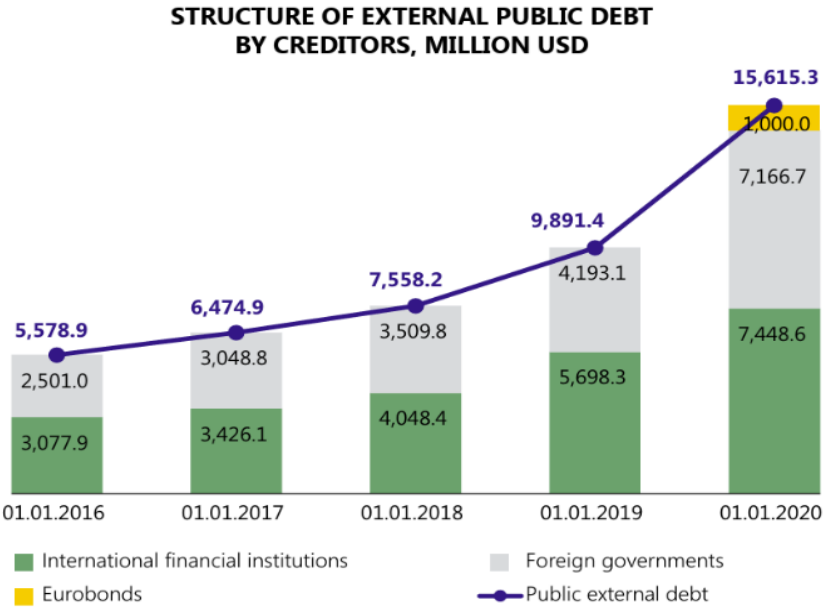
The above points represent a direct continuation and consolidation of activities detailed in earlier sections, with more emphasis on food processing and value-added products. They offer a blueprint for the subsequent parts of the 'Strategy for the Green Economy' and the Agricultural Development Strategy 2020-2030, as well as the 'Water Sector Development Strategy 2020-2030', detailed in the following paragraphs. From its onset, the strategy links 'resource-saving', 'intensive methods of agricultural production' and ecological survival, the basis for which had been forged during Uzbekistan's incremental agricultural modernisation.

The 2017-2021 Strategy famously paved the way for a surge in foreign investment into Uzbekistan. IFI support has been the key driver of Uzbekistan's economic modernisation programme growing from around 3 to 7.5 billion USD between 2016 and 2020, as shown below in Figure 5: Structure of External Public Debt in Uzbekistan. Public and publicly guaranteed loans saw a staggering growth from US$ 6.6 billion in 2016 to US$ 17.01 billion in 2020 (UNDP, 2020). A month after the publication of the National Development Strategy 2017-2021, EBRD reactivated its mission in Uzbekistan after a near-decade-long 'quiet exit'[24], with three loan agreements totalling US$ 120 million. In what could be perceived as a symbolic move, one of the loans, worth US$ 10 million, was allocated to the agribusiness company LLC JV Agromir Juice, one of the largest fruit and vegetable processing Uzbek firms (Usov, 2017). In 2020, agriculture was the largest recipient of foreign finance, where of US$ 2.8 billion loaned from IFIs, it received US$ 546 million for various modernisation and diversification projects, closely followed by COVID-mitigation with US$ 500 million. The two largest investors continued to be ADB and the World Bank, with US$ 4.5 billion and 3 billion respectively (CABAR, 2021).

[24] Sources cite both commercial and human-rights related reasons for EBRD scaling back from Uzbekistan under Karimov (Fitzpatrick, 2011)

6.4 Making Uzbekistan legible: 'The Green Economy' hegemonic project

Figure 5: Structure of External Public Debt in Uzbekistan



Source: 'Citizens' Budget', UNDP 2020

Symbolically, the synchronisation of Uzbekistan's growth strategy with global hegemonic frameworks is most evident through its adoption of the 'Green Economy', both a hegemonic project and economic imaginary upon which 'New Uzbekistan' is founded. Following Sum and Jessop (2013), 'hegemonic projects […] link economic success to the national/popular (or some equivalent) interest that aims to mobilize a broader social constituency behind the growth strategy' (p. 182). In other words, a hegemonic project comprises material, strategic efforts to forge popular consent for a variety of accumulation strategies. The vision for the hegemonic project is the imaginary, which will be addressed in the final section of this chapter.

The Green Economy as a hegemonic project is a direct result of the Uzbek state's alignment with global developmental norms, and is thus a venture to secure consent for its development strategy both internationally and nationally. Just two months after publishing the National Development Strategy 2017-2021, Uzbekistan signed the 2015 Paris Agreement in April 2017. The Paris Agreement was then institutionalised through the adoption of the 2019-2030 Strategy for Transition to a Green Economy and its subsequent consolidation via a formal programme enacted in December 2022 (Babasyan, 2024). The 2019 Green Economy Strategy lays out some of the following goals:

1) Increasing the economy's energy efficiency and the rational use of natural resources through technological modernisation and the development of financial mechanisms;
2) The inclusion of 'green' criteria based on up-to-date international standards in priority areas of public investment and expenditure;

3) Supporting and executing pilot projects for the transition towards the 'green' economy, through the development of mechanisms of state incentives, public-private partnerships and increased cooperation with international financial institutions;
4) Development of a system for training and retraining personnel related to the labour market in the 'green' economy, by stimulating investment in education, strengthening cooperation with leading foreign educational institutions and research centres;
5) Adoption of measures to soften the negative impact of the Aral Sea ecological Crisis (Presidential Decree No. 4477, 2019)

However, the proliferation of 'Green' as the rallying adjective for Uzbekistan's path forward accelerated only after COVID-19, when IFIs and multilateral organisations such as the EU and UNDP endorsed the 'green economy' as the framework for Uzbekistan's pandemic recovery. The pandemic period saw Uzbekistan's poverty levels rise for the first time in two decades, and like in other countries, the international development community seized the moment of crisis as an opportunity to accelerate decarbonisation and the transition to clean energy (Blazquez et al., 2021; UNDP, 2021). According to the OECD, a key driver of Uzbekistan's compulsion to embark on a 'green transition' is the depletion of its gas reserves, which account for 82.7% of the total energy supply, and at current estimates, are expected to deplete by 2030 (OECD, 2023). This would have direct and grave implications for irrigation. Over half of Uzbekistan's agricultural land depends on water supplied by 1,700 pumping stations consuming 16% of the national electricity use (World Bank, 2025a). Furthermore, Uzbekistan's economy is highly energy-intensive, with the fifth-highest greenhouse gas emissions per unit of GDP globally. Green energy, or a transition to renewable energy sources, has therefore become the primary component of Uzbekistan's green strategy (OECD, 2023; World Bank, 2024).

'The Green Economy' has increasingly become the (semiotic) basis for Uzbekistan's relationship with world markets. Based on estimates, the gap between Uzbekistan's investment needs and actual expenditure on sustainable infrastructure is US$ 6 billion per year across all sectors, namely energy, industry, urban development, water resources, and agriculture (OECD, 2023; UNDP, 2021). To finance the gap, following an inaugural bond issuance on the international market in 2019, Uzbekistan issued three subsequent thematic bonds: a Sustainable Development Goals bond in 2021 and two 'green bonds' in 2023 (OECD, 2023). This is accompanied by a National Green Economy Taxonomy developed through a dedicated working group led by the Ministry of Economy and Finance, with the support of the World Bank, which classifies 'green' projects financed by 'green' bonds and loans[25], and serves as an indicator of the investment costs of private and public entities receiving state support (UzDaily, 2023; World Bank, 2023a).

[25] The GoU additionally plans to 'green' Sukuk bonds to attract Muslim investors (OECD, 2023)

However, a large share of external financing for the green transition comes from public financial flows. The new, legible framework of the 'Green Economy', synchronised with the global hegemony (Jessop, 1991), now attracts larger volumes of financial support from traditional development partners such as the UNDP, the EU, Japan's JICA, ADB, the World Bank, USAID, as well as new sources such as EBRD's Green Economy Financing Facility (GEFF), South Korea's Global Green Growth Institute (GGGI), the Asian Infrastructure Investment Bank, as well as China's hydroelectric capacity generation projects (OECD, 2023). Explicitly stated by the World Bank, 'with technical and financial support from the World Bank and other development partners, [the GoU] has set an aspiration to allocate 30 percent of state funding to green projects by 2026' (World Bank, 2024, p. 5). This pertains to projects such as the two phases of the World Bank's 'Inclusive and Resilient Market Economy Development Policy Operation', approved in 2023 and 2024, respectively, with a combined value of US$ 1.6 billion. The objective of the two loans is to create markets, improve fiscal management, and 'support social inclusion and green resilience', through *inter alia* climate-smart agriculture and land use liberalisation to 'enable planting more profitable fruit trees, contributing to [climate] mitigation' (World Bank, 2023c, p. 8). ADB's Country Partnership Strategy (CPS) 2024-2028, in turn, explicitly aims to facilitate the transition to a green economy as its first pillar (Asian Development Bank, 2024). According to the director of the ADB Permanent Mission in Uzbekistan, the CPS:

> supports the adoption of legislation that promotes investments in the modernisation of irrigation systems and smart management of water resources, taking into account climate change, to ensure water security and combat accelerating desertification, which threatens fragile ecosystems' (Kanokpan Lao-Araya cited in YUZ.uz, 2024).

The above quote demonstrates IFIs' discursive reinforcement of the coupling of Uzbekistan's water crisis narrative with private capital as a guarantee for ecological and existential survival. Following the National Development and Green Economy Strategies, investments in the modernisation of *irrigation* bear direct relevance to agricultural reform. IFIs, as co-architects of economic imaginaries and financial guarantors in their execution, become active participants in the production of the sanctioned discourse.

On the national scale, the 'Green Economy' has been operationalised into what Jessop (2014) would call a national-hegemonic project, through its explicit mobilisation by President Shavkat Mirziyoyev as a 'truly national movement' (Mirziyoyev, 2024). The movement includes various sectoral sub-activities and strategies, such as the 'Yashil Makon' (Green Nation) initiative launched in 2021, aimed at planting 200 million tree saplings and shrubs per year, including saxaul near the Aral Sea to mitigate sandstorms and improve air quality. 'Yashil Makon' was kickstarted with a 40-day tree planting campaign, accompanied by the President's announcement:

> every organisation, every citizen must contribute to this project. In order to properly organize this planting work, first of all, the owner of the existing and newly created green areas will be determined by the decision of the district (city) *hokim* (Mirziyoyev cited in Kun.Uz, 2021)

The initiative garnered financial support from UNECE and UNDP as a mechanism for 'building resilient communities in Uzbekistan' (Dmitriy Mariyasin, UNECE Deputy Executive Secretary cited in UNECE, 2022). Furthermore, 'Green' now informs the directionality for regional cooperation, evidenced by agreements such as the 'Caspian Green Energy Corridor' between Uzbekistan, Kazakhstan, and Azerbaijan, intended to transport green energy to the European Union (Castillo, 2024), or the 'green corridor' between Russia and Uzbekistan for the trade of horticultural products grown through intensive gardening and greenhouses (UzDaily, 2017). The year 2025 has been declared as the **'**Year of Environmental Protection and a 'Green' Economy' to cement the wide range of activities addressing issues such as the use of fossil fuels, soil erosion, and water pollution. As summarised by the President:

> In response to these challenges, the national initiative 'Yashil Makon' was launched in Uzbekistan three years ago. The implementation of a Regional Climate Strategy has been launched jointly with neighbouring States. The Central Asian University for the Study of the Environment and Climate Change has been established in Tashkent. In addition, Uzbekistan initiated two important resolutions adopted by the United Nations in this area. At the moment, 'green' energy is becoming one of the drivers of the country's economy (Mirziyoyev cited in Ministry of Ecology, 2024).

The 'Green Economy' as hegemonic project (and imaginary) in Uzbekistan serves as the stabilising mechanism that mediates Uzbekistan's relationship with the external world, at regional and global levels, as well as internally – through direct societal and cultural mobilisation. By discursively pairing economic activities with ecological topics around water scarcity, clean energy and efficient natural resource-use, reproduced by development and government actors, the Uzbek government achieves a level of legibility required for the globalisation of its economy.

6.5 State-led 'clusterisation' of agriculture and the waning relevance of smallholders

On the agricultural front, and as stated in the National Development Strategy 2017-2021 and cemented in the Agricultural Strategy 2020-2030, Uzbekistan has embarked on a modernisation campaign that was launched prior to the announcement of the 'Green Economy', yet legislated and converged with it very soon after. It evolved from international development projects' experiments with agricultural modernisation and intensive gardening, and was supplemented by interpretations of Michael Porter's 'cluster' model, borrowed, according to Babadjanov and Petrick (2025), from Kazakhstan's earlier cotton cluster initiatives. As explained in the theoretical chapter, the Harvard-Porterian 'cluster model'

has been conceptualised by Sum and Jessop as 'Walmartisation' 'with a view to linking clusters with global markets', an accumulation strategy common in the Global South (Sum and Jessop, 2013, p. 324). According to the authors, low-cost supply clusters in Global South countries enter into chains dictated by large retailers, resulting in highly unequal relations between retailers, suppliers, and labourers, where micromanagement and surveillance as devices of exploitation are necessary to sustain price competitiveness. While the concrete dynamics of Uzbekistan's 'Walmartisation' are beyond the scope of this thesis, it is important to keep in mind the globalisation-oriented motivations behind Uzbekistan's 'clusterisation', and their eventual implications for smallholders. The subsequent paragraphs outline the features of Uzbekistan's new agribusiness-oriented model, which, in the horticultural sector, is increasingly competing with smallholder production.

From a strategic-relational perspective, Uzbekistan's cluster policy, endorsed by IFIs through technical and financial assistance (EBRD, 2021), should be viewed as a national manifestation of an economic globalisation project. Agricultural-commercial, non-smallholder land in Uzbekistan has remained as state property. Therefore, clusterisation entails land *management* transfers to private entities. In Uzbekistan, 'clusters' can apply to all forms of agricultural production, including silk, and refer to vertically integrated companies involved in cultivation, processing (such as juice or textiles) and export. Initiated in a top-down manner in 2017 (Babadjanov and Petrick, 2025) Shavkat Mirziyoyev declared that clusters 'must become the 'locomotive' of fast-tracked development of the agricultural sector' (Mirziyoyev cited in Gazeta.uz, 2018). The accumulation logic behind the cluster reform is to attract foreign investment, increase export revenues through value-added goods sold on international markets, address forced labour in cotton while boosting employment in horticulture, and spearhead the adoption of modern agricultural practices such as resource-saving technologies (Asfaw, 2021; Djanibekov et al., 2024).

Based on the latest data (see Table 4), cotton is now cultivated on about 1 million ha, covering 30,000 farmers by 142 cotton-textile clusters (Djanibekov et al., 2024; Fair Labor Association, 2024). Cotton-textile clusters operate on the basis of three models: through direct farming where the cluster employs farmers as wage-labour, through contract farming, and through mixed models (Djanibekov et al., 2024). Presently, there is one cotton textile cluster in each cotton-growing district, and each serves as the sole distributor of inputs and services to farmers within its territory, including water resources. Until 2021, farmers were obliged to sell their harvest exclusively to the cluster operating in their district at minimum prices set by the state – a policy which was reformed to include the *viloyat* (province) level clusters, to encourage some competition and address territorial monopsony (Djanibekov et al., 2024).

Within horticulture, the National Development Strategy and Agriculture Strategy 2020-2030 cement the decade-long processes detailed in the previous sections – namely, to continue and accelerate agricultural diversification, to absorb excess labour and increase the export of fruit and vegetables. In his 2018 address to the Parliament and following the announcement of the National Development Strategy, Mirziyoyev emphasised that the US$ 1.5 billion per year of fruit and vegetable export could be increased tenfold, in which 'agro firms and wholesalers should play a greater role in the production and exports' (Mirziyoyev, 2018a). In 2022, the commercial horticultural sector constituted half of crop output value and 40% of agricultural output, despite being cultivated on 10% of arable land (Djanibekov et al., 2024). As already identified by Lombardozzi, in areas with horticulture production in Uzbekistan, such as Samarkand, producers of high-value crops are at the 'forefront of the 'commodification' process, being protagonists of the most sophisticated forms of output commodification along the value chain' (Lombardozzi, 2020, p. 653). She foresees that the Uzbek state's gradual diversification away from cotton towards high-value crop production and the agro-processing industry will lead to a decline in state-led accumulation in favour of new forms of private accumulation, in the hands of 'few powerful *fermers'* (Lombardozzi, 2020, p. 653).

Table 4: Distribution of total sown area by crop, ha

	ha
Cotton	1,035,942
Wheat	1,258,470
Other cereals	284,039
Vegetables	222,828
Fruit and berries	336,263
Rice	64,249
Vineyards	101,512
Entire area sown	3,396,109
Cotton % of total sown area	30.5
Wheat % of total sown area	38.1

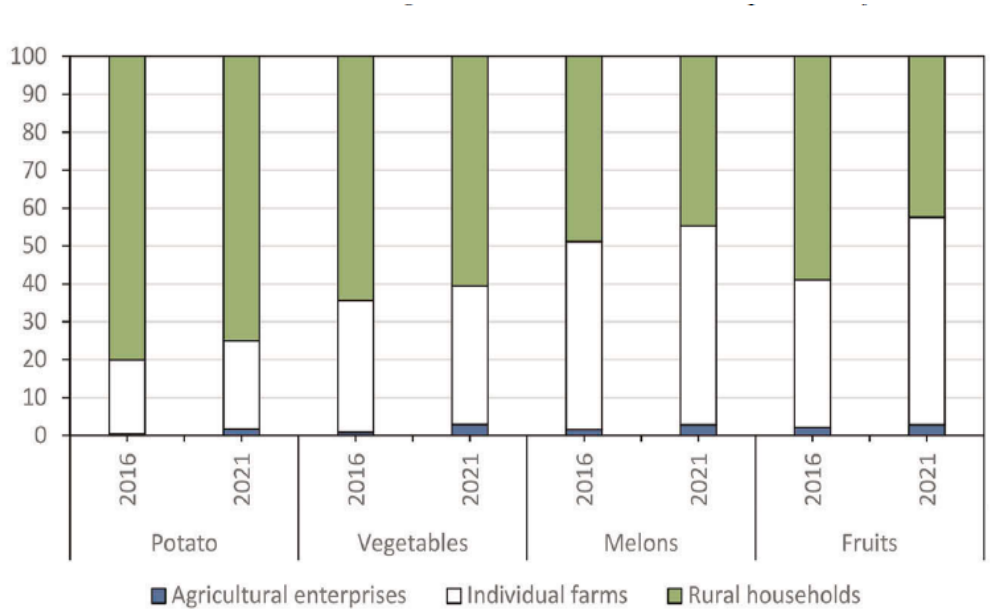
Source: Compiled by the author based on the Open Data Portal of the Republic of Uzbekistan, 2023[26]

Based on the extensive deployment of intensive gardening in Uzbekistan, as well as the directionality of progress illustrated in Figure 6: Share of agricultural producer categories in horticulture (%), the government expects smallholders to cede their predominance in horticultural production to commercial farming. Figure 6 indicates that commercial farms, which includes intensive gardens as 'Agricultural Enterprises', engage in agro-processing, and have now overtaken smallholders in fruit and vegetable

[26] For a number categories such as 'sown area', Uzbekistan's data portal does not display data for previous years, nor is there a comprehensive table that includes all crop types or explanation of what is constituted within a category. Additionally, the table does not include categories such as 'fodder crops', and there is overlap between categories such as 'cereals' and 'rice'. Therefore the above data is at best indicative and its individual points are not meant to add up to the *'entire area sown'*.

production[27]. At the same time, the Agricultural Strategy 2020-2030 recognises that there is a lack of 'partnerships between processing and exporting enterprises and *dehqon* and smallholding farms who account for over 70% of the total gross agricultural output', including livestock. While acknowledging the contribution of the smallholding sector to the Uzbek economy, the Strategy admits that they struggle to integrate into formal export markets due to limited access to packaging and storage facilities, formal export companies, and unstable market conditions. The Strategy thus aims to create linkages between smallholders and clusters and facilitate their access to storage facilities to stabilise the former's participation in global value chains (Presidential Decree No. UP-5853, 2019, p. 8). Whether the intention to empower smallholders will materialise remains to be seen: as a former contributor to the development of the strategy noted, the change of leadership in the Ministry of Agriculture resulted in a waning adherence to the principles of the Strategy (B4: June 7, 2023).

Figure 6: Share of agricultural producer categories in horticulture (%)



Source: Djanibekov et al., 2024, based on government data, 2022

As part of the wider initiative to support the *dehqon* (not smallholding) sector, the government has legalised sub-rental arrangements of up to 10 ha to rural inhabitants for one year, while vulnerable groups are now entitled to 1 to 2 ha of additional land through leases from the government (Djanibekov et al., 2024). Furthermore, the government expanded the number of small and large plots available for *lease* via an electronic auction system, meaning that entitlements are now granted to the highest bidder (Ministry of Agriculture, 2024). According to an interview with someone involved in formulating this

[27] The reliability of this data is questionable as Uzbekistan does not record production by smallholders.

policy, the auction system was implemented to ensure the leaseholder farmer has the financial capacity to cultivate scarce land resources efficiently using modern technologies (E13: October 15, 2024).

These policies aim to expand a regulated, commercial small farm sector that operates alongside smallholders. As the same interlocutor added, it paves the way for the proliferation of landlordism, as new renters will cease engaging in farming in favour of subleasing parcels to multiple farmers. On the other hand, it formalises a process detailed by Trevisani (2007), where rural elites captured land to informally sublease it to poorer farmers. These processes are accompanied by policy measures such as 'One Mahalla one Product' supported by JICA and discussed in the final chapter. In any case, these developments indicate the government's pivot away from envisioning the small farm sector, comprising subsidiary and *dehqon* plots, as a form of welfare support, toward one that seeks to activate its commercial potential as part of the wider strategy of export-led horticultural growth.

6.6 The legislative and structural scaffolding for redirecting water flows to 'clusters'

In 2019, the Uzbek government announced that 'Water Consumer Associations Are Ineffective' (Irkakhodjaev, 2019) due to their inability to collect irrigation service fees, poor operation and maintenance of irrigation canals, undertrained staff, and inability to facilitate improvements in water-saving technologies (Cabinet of Ministers of the Republic of Uzbekistan, 2019). However, considering that Uzbekistan's WCAs' *raison d'être* was to service the farms producing for the state order, the transition to a cluster model renders participatory water governance, however poorly implemented, obsolete[28]. Agricultural reforms, therefore, have changed the very material basis around which water was organised, and spurred hydrosocial reterritorialisation, explored in the next chapter. In the meantime the following paragraphs outline the legal contours of water reforms.

WCAs were dissolved after the re-organisation of water delivery from hydrographic to administrative borders. In 2017, 1500 WCAs were reorganised to 158 'WCAs' subordinated to the 152 District Irrigation Departments. Officially, the motivation for this, according to the head of the International Agency for Saving the Aral Sea, was to 'reinforce horizontal links between water management, agriculture and the local administration at *rayon* (district) level', as well as to provide better water demand estimations, take over the operation and maintenance of local irrigation networks, monitor water use, and involve key stakeholders. The WCAs, in turn, now subordinated to the RIDs, were to be re-registered, take over in the collection of irrigation service fees, and support efficient operations (Sokolov, 2023). Hence, while the name 'WCA' remained the same, they were absorbed by the centralised water administration, and later, as confirmed in three elite interviews, renamed to 'Makhsus

[28] WCAs were viewed highly unfavourably by the leadership. As revealed in an interview with a high-level representative of an institution adjacent to the Ministry of Water Resources: 'the opinion of our President is that WCAs were created by the enemies of the state' (E8: April 15, 2022)

Khizmat' in 2022, translated as 'Special Services' (E1: May 24, 2022, E2: June 06, 2022, E8: April 15, 2023).

The resolution 'On the Optimisation of the Activities of Water Consumer Associations' further outlines the main functions of the new bodies as the following: 1) regulating water consumption relations between *fermer*, *dehqons* and smallholder farmers, cluster organisations and other water consumers, as well as forming agreements on water use 2) together with the organisations of water and agricultural ministries, as well as local executive branches, calculating water limits for water consumers, their delivery within the limits, as well as their accounting and monitoring 3) providing qualified personnel to the new bodies, 4) operation and maintenance, 5) introducing innovative methods of water resources governance, promoting drip irrigation systems and other water-saving technologies. The resolution explicitly states that 'the *hokims* of regions and districts, together with the Ministry of Agriculture and Ministry of Water resources are instructed to provide support for the associations in matters concerning the organisation of the associations, timely service delivery fees, and effective organisation of activities' (Resolution of the Cabinet of Ministers No. 982, 2019). Unlike under the previous WCAs, the mention of smallholder farmers and *dehqons* is explicit; however, while under the previous system, there were relative attempts to limit *hokims'* interference in water allocation, the above resolution *formalises* their decision-making powers. Simultaneously with these changes, the Ministry of Water and Agriculture was separated again into two ministries, which corresponds to the decentralisation of agriculture through the gradual transfer of the cotton and horticulture sectors to private agroclusters away from direct state accumulation in agriculture (Sokolov, 2023).

These policies are embedded in the Concept for the Development of the Water Management Sector 2020-2030, published in February 2020 by the new Ministry of Water Resources and developed with support from the Swiss Development Corporation and the Global Water Partnership Uzbekistan (Sokolov, 2023). The concept complements the Agricultural Strategy 2020-2030 and reiterates that WCAs 'have never become sustainable self-management units of water users' (Presidential Decree No.6024, 2020). The concept announces the partial transfer of water management functions to water consumers – farmer associations, WCAs, and clusters, however, in doing so, it endorses a wider introduction of Public-Private-Partnerships (PPP) and other outsourcing principles into the water management system (Ministry of Water Resources of the Republic of Uzbekistan, 2020). Furthermore, considering the renaming of WCAs into 'Special Services' two years later and their prior dismantlement in 2017, it is likely that their mention is a nod to development organisations who are mandated to preserve democratic elements in water governance.

More emphasis is placed on the value of PPP principles, which 'suppose long-term contractual partnerships between public water utilities and the private sector aimed at development, implementation and financing of water infrastructure projects that are currently managed by the public sector and

financed by the state budget' (Ministry of Water Resources of the Republic of Uzbekistan, 2020). According to an interview with a director of a cotton agrocluster, in practice this means that water management within the cluster's territory now falls under the cluster's responsibility (B1: September 23, 2022). This approach is deemed vital by the government's policy architects who, upon calculation, had come to realise that nation-wide irrigation modernisation, including inter-farm and inter-regional networks, would cost 'multiple budgets' (E6: October 8, 2023). Given the monumentality of costs required to neutralise water wastage from outdated infrastructure, state actors now treat the devolution of on-farm water management to large agribusinesses through PPP arrangements as the most logical approach for mitigating national infrastructural ills. To ease their financial burdens, agri-investors can apply for subsidies to cover part of the costs for water-efficient technologies such as drip irrigation, smart metering, or land-levelling (Presidential Decree No. RP-4499, 2019)[29].

Uzbekistan's water governance reforms thus constitute two simultaneous and somewhat contradictory movements. The first is of *decentralisation*, exemplified by the separation of ministries, and the introduction of PPP arrangements that devolve part of the responsibility for irrigation affairs to private entities. The second is *recentralisation* – in which the aforementioned confusion engendered by water governance 'polycentrism' is now eliminated in favour of a streamlined system where the DID is brought back to prominence as the last formal institutional interface between water delivery and water consumers. At the legislative level, instead of preserving the guise of 'participation' the government has formalised the previously *de facto* powers of *hokims* around dictating water allocations. Representatives of development organisations, qualify these changes as 'concerning'. As one staff member of an international organisation that works closely with Uzbekistan's Ministry of Water Resources lamented: 'WCAs should be preserved, from a good governance perspective – you need some form of participation… currently, most of the financing goes into clusters' (E1: May 24, 2022). As examined in the following chapters, the wave of land redistributions and water governance streamlining under ongoing agricultural modernisation risks creating graver forms of asymmetry between newly established clusters, intensive gardens, independent farmers, and the *dehqon* sector.

6.7 'Green grabs' and scapegoats on the frontline of the transition to water-efficient technologies: the emergence of a New Agrarian Imaginary

As explained in section 6.4, Uzbekistan's Green Economy serves as an umbrella imaginary that frames and permeates all sectors of the economy with its particular vision of social life and order 'attainable through and supportive of, science and technology' (Jasanoff, 2015, p. 27). The technology and

[29] Interlocutors from the private sector argue that this policy comes with too many caveats. For example, clusters are reluctant to make such great infrastructural investments without certain guarantees. Some investors lament that subsidies come with requirements to purchase subpar irrigation equipment. Others argue that the only entities willing to commit to PPP arrangements are development banks.

infrastructure in need of 'greening', or made climate-smart or resource-efficient, are not limited to agriculture. For example, in an instance of imaginary 'co-production' in the form of a co-written article by the Deputy Minister of Economy and Finance and high-ranking members of the World Bank, it is argued that the target for the 'next green wave' is, besides agriculture, state-owned financial institutions involved in housing, chemical production, and electricity generation (Abidkhadjaev et al., 2025). Yet, as prefigured in the theoretical chapter and as Jasanoff reminds us in her treatise on sociotechnical imaginaries, 'they can hold very big things together, such as nationhood or modernity. But imaginaries can also operate at substantially smaller scales…' (Jasanoff, 2015, p.15). Crucially, imaginaries are collective, but not exclusively the property of state actors, and are reproduced and co-produced by corporate interests and the media.

Uzbekistan's agriculture, as a distinct sector requiring 'green' intervention, constitutes a sectoral variation, a sub-imaginary, of the wider 'Green Economy'. In this research, I call this sub-imaginary the New Agrarian Imaginary for two reasons. The first concerns the past. Based on my observations from international forums, for the international, mainly Western community, Uzbekistan's agriculture evokes specific historical and sociotechnical connotations regarding national and Central Asian hydraulic and agrarian ecologies, epitomised by dystopian desertscapes of the Aral Sea, desiccated by Soviet-era monocultural overextraction. Coupled with the notoriety of forced labour, agriculture becomes a fragile 'imagined' site of ecological and human rights crimes, a palimpsest that absorbs and refracts Uzbekistan's collective future-building. The second reason for the 'New' concerns precisely this future. The construction of the aspirational agrarian landscape in Uzbekistan is filtered through new, Green Economic, foreign-inspired ideas of *ideal* climate-smart agriculture, to be actualised by corresponding *ideal* agricultural 'subjects'. The New Agrarian Imaginary bridges historically conditioned, context-bound sources of what ought to be with Green Economic, hegemonic inspirations from 'elsewhere'.

Reflecting on global 'Green Economic' trends, Fairhead and colleagues (2012) argue that resource appropriations in the name of green projects, also known as 'green grabs', reflect the value of the 'economy of repair', where the *repair* of environmental damage from previous economic growth creates a springboard for new growth, akin to monetising ruin. Because 'repair' is sewn into the fabric of the 'Green Economy', the developmental paradigm acquires a moral redemptive quality, particularly at the level of international communication where global investment decisions are negotiated. As argued in Section 6.4, the 'Green Economy' hegemonic project renders Uzbekistan's development legible because it allows national objectives to be synchronised with global ones. Thus, internationally, the Uzbek government's corresponding *narratives* activate the Green Economy's redemptive pathos by filtering its growth agenda through the prism of the Aral Sea crisis. This is exemplified by President Shavkat Mirziyoyev's speeches at UN General Assemblies, which consistently pair reminders of the 'tragedy of the Aral Sea' with expositions of 'green' solutions – whether in energy, water, or technology – for the

given year (Mirziyoyev, 2021; Mirziyoyev, 2023; Mirziyoyev, 2025b). In Mirziyoyev's international legitimation strategy, therefore, moral redemptive sentiments evoked by the Aral Sea reinforce the Green Economy's reparative associations and make them nationally specific. Agriculture hence appears twice (hence palimpsest): as the historic culprit of the existentially threatening Aral Sea catastrophe, and as the greened, now rewritten and reconstructed subject through which that catastrophe is to be redeemed.

However, the Green Economy's overtly redemptive register seems to be reserved for an audience most receptive to it – international, Western-centric policymakers. Domestically, where the future is *actually* built, where the agrarian imaginary is turned into reality, the Aral Sea, positioned on the far end of the Green Economy's spectrum between redemption and growth, cedes its place to the profit motive. As a former private foreign water reform advisor to the Government between 2017 and 2019 disclosed in an interview:

> [the government] has no desire to have a conversation about the Aral Sea or what the long-term opportunities are to stabilise the delta. From the ministries' investments, it was more about how to give more water to farmers. No environmental push, equally, there was a lack of understanding, or willingness to mitigate the issues of climate change (E6: October 8, 2023).

Instead, the national discourse is one of crisis, emergency, and efficiency, whose content reveals how authorities imagine aspirational agriculture. In a 2023 video address with district governors, IFIs, ministries, and other stakeholders, Mirziyoyev declared 2024 as the 'year of transition to an *emergency* mode of operation to save water' stating that without the rational use of water, and considering transboundary dynamics, Uzbekistan's shortages could reach 15 billion cubic metres. As the meeting notes report:

> In Uzbekistan, 90 percent of water resources are spent on agriculture. For example, 10-11 thousand cubic meters of water are spent per year to irrigate 1 hectare of cotton field, while in countries with similar climate and soil conditions, it is 2-3 times less water. And all this is achieved through proper water management and preventing its loss (Government of Uzbekistan, 2023b).

This is after the President's round of public displays of discontent around the poor performance in the deployment of drip irrigation technologies, such as when he threatened to sack the eventually sacked Minister of Agriculture Jamshid Khodjaev, and Deputy Prime Minister Shuhrat Ganiev, adding, 'I saw in Europe in 1993 that every drop of water falling on the ground, every gram of fertiliser is counted. When will we increase the yield and profitability?' (The Tashkent Times, 2021). This echoes the motto 'not a drop of water that we try to get will later be lost to the sea' uttered by Spain's Minister of Agriculture between 1951 and 1957 under Franco's fascist, hydro-modernising regime, where reining in Spain's 'irrational' waters served to rectify past agrarian failures that contributed to its imperial

demise (Swyngedouw, 2015, p. 106). Soon after the announcement of the emergency to save water, the head of state was quoted saying, 'It's time to change the stereotype that water is free' prior to announcing the service charge of 100 sums/cubic metres of water. 'Stereotype' is a questionable and depoliticising descriptor, considering it is rooted in the real experience of historically 'free' water deliveries for cotton production (CAREC, 2024).

As the leadership imagines and publicly communicates it, the issue is not that agriculture must be modernised to halt desertification, but that it is failing to deliver its full economic potential. Reminders of impending shortage (such as of 15 billion cubic metres) then, rather than preserving ecology, legitimise and accelerate the adoption of water-efficient technologies in the service of this *growth*. More relevant to the New Agrarian Imaginary is that the rationality, profitability, and efficiency now expected of agriculture are reinforced through the state's authoritarian disciplinary mechanisms. This is evidenced by the Soviet-inherited practice of publicly scolding officials for their inability to implement 'Green Economic' foreign-aid-endorsed policy measures in agriculture.

As the state sweats to shed undesirable legacies to realise a new agricultural landscape, it forges a new, ideal agrarian subject – namely, the tech- and market-savvy agro-entrepreneur, a 'private investor' who eventually becomes the co-producer of the New Agrarian Imaginary. In a discursive development observed by Huggins in his case on agricultural modernisation in Rwanda (2013), *fermers* and their 'Soviet-style, traditional practices' (PO1: March 1, 2023) are scapegoated as impediments to the widespread and effective adoption of irrigation technologies. As declared by Shavkat Mirziyoyev in his address to the Parliament, 'we are in great need of farmers with the perfect knowledge of agricultural technology, modern production and innovation methods' (Mirziyoyev, 2018b). Accordingly, implied in the speech as the logical way forward, the creation of agricultural clusters becomes a prerequisite for attracting knowledge and technology in the agricultural sector (Ibid.). To enforce the 'entrepreneurship' mentality, the government introduced a 'sustainability rating' across all sectors, including agriculture, where positive indicators such as employee numbers or yields can reduce the land tax burden threefold (Mirziyoyev, 2025a).

Those who possess such an 'entrepreneurship' mentality are increasingly integral to Uzbekistan's productive landscape. Among the exemplary agricultural actors I have spoken to is a popular horticultural exporter and founder of 'Dalatek'. She sources fruits and vegetables from small and large farmers and has developed an online platform that trains producers and future exporters to sort and store goods to meet foreign-market standards. She thus not only co-produces the New Agrarian Imaginary but also actively propagates its standards among other producers. During our conversation, she lamented that traditional *fermers* are not commercially oriented, which creates challenges for meeting standards in overseas supermarkets:

> Take a farmer and his 30-year-old cherry tree. He is so proud of that tree, but for optimal yields, the trees should be no older than 7-8 years old, and they should be of the dwarf variety. They (farmers) lack education and are unwilling to absorb new information, they can't even cut a tree properly (B2: June 14, 2023).

She was not the only agro-entrepreneur to speak of traditional farmers with contempt. Indeed, the combination of export and 'green economic' demands renders the 'old way of doing things' irrelevant. In interviews and informal conversations, employees of the Ministry of Agriculture and foreign-trained and business-oriented actors have expressed frustration with what they call the 'old mentality'.

Traditional farmers' anachronism in 'New Uzbekistan' extends to irrigation. As explained by a local hydrologist, the lack of capacity is one of the greatest sources of mismanagement in water:

> Farmers don't have adequate capacity, we had some periods, where even teachers have become farmers, so they don't have enough knowledge on how to irrigate, where to irrigate, they don't really know about the actual water requirements, so when they have water, they think that they should irrigate as much as possible to have more yields (E11: November 8, 2023**)**

Another agro-entrepreneur echoed this view while emphasising farmers' lack of commercial acumen:

> We need to understand that, from a natural-resource perspective, water is probably the most important resource any country can have; everybody understands that […]. Most Uzbek farmers don't consider the cost of water as part of their financial modelling and so they can afford to plant low value, maybe even super risky low value crops: **'**if it works out – it works out, if it doesn't work out, I'm not losing that much money' … but they're taking the opportunity from some other farmer who potentially has a higher financial capacity or has better understanding of the science or maybe larger companies that could have had a much better output for the economy if they had those things (B4: June 7, 2023)

Agricultural modernisation has created a socio-political chasm between new ideal subjects and their patrons (the state/IFIs), and residual, outdated subjects from 'old Uzbekistan'. Farmers who, over nearly three decades of Karimov's rule, were disciplined to adapt to a monocultural institutional landscape are now scapegoated for failing to adapt, within less than a decade, to the demands of Uzbekistan's New Agrarian Imaginary. As demonstrated in the following chapters, the chasm is overcome by spatio-temporal fixes, mediated by land and water grabs, with serious social and economic implications for small and 'old school' farmers.

Uzbekistan's economic globalisation and the institutionalisation of the 'Green Economy' that mobilises investors, markets, regional neighbours and the population, fixes a new discursive lexicon that is 'firmly located in capitalist networks' (Fairhead et al., 2012, p. 240). It is a discursive strategy which, in agriculture, justifies green grabbing by framing water as a scarce, depoliticised and technocratically

manageable resource. 'Green grabbing' restructures the 'rules of authority of the access, use and management of resources, in related labour relations, and in human-ecological relationships, that may have profoundly alienating effects' (Fairhead et al., 2012, p. 239).

Uzbekistan's transition from state-led agricultural accumulation to private-oriented 'clusterisation' represents this very shift around privileges for the 'use and management of resources'. The mental map guiding this shift is precisely what is meant by the New Agrarian Imaginary. Coordinates on this map include discursive couplings such as 'agri-business', 'cluster', '*intensivnie sadi'* (intensive gardens), 'private investors', 'water-saving technologies', and 'private partnership', shared and exchanged among the government, international organisations, and private investors. The New Agrarian Imaginary is also validated *visually*, through aspirational renderings of *ideal,* fantastic landscapes. The most conspicuous example is AI-generated images featuring ordered farms, wind turbines, and solar panels overlaid on lush hills that roll into a timeless, misty horizon. These ubiquitous images, found on government websites, in posters, and in PowerPoint presentations at flashy forums hosted in 5-star hotels, herald the beginning of a new age of rational, 'smart' and clean agriculture (PO: March 1, 2023). Their ubiquity naturalises and reinforces a sociotechnical fantasy that is increasingly removed from the messy reality in Uzbekistan's villages. The fantasy is *generic,* because much of its iconography could be drawn from anywhere – it is a series of placeless, green agri-tech tableaux that suggest the New Agrarian Imaginary's 'future' axis is, in reality, a global template. These images gloss over the very ecological difficulties the Green Economy claims to address. As examined in the following chapters, exclusion is embedded in the New Agrarian Imaginary. It produces uneven outcomes as rural dwellers, smallholders and poorer farmers alike, adapt to and contest the changes around them.

Conclusion

In this chapter, I have traced the evolution of Uzbekistan's agricultural diversification policies as a strategic-relational interplay between the state's and development aid interventions, and the role of their cumulative effects in providing the symbolic and material basis for agricultural modernisation under Uzbekistan's 'Green Economy' hegemonic project. Several analytical points are worth highlighting. First, after the creation of private commercial farms in Uzbekistan, the government pursued no coherent agricultural diversification strategy, focusing instead on production for the state order. Instead, at least in discourse, smallholders were presented as a key food-producing group. Second, development organisations initially saw Uzbekistan's creation of private farming as an opportunity to instil market principles in agriculture, yet these efforts were soon abandoned in favour of support for agricultural diversification. Initially, large development projects conceived of WCAs as integral to diversification efforts; however, in the second decade of the 2000s, it became increasingly clear that WCAs were unreformable. Sub-loan schemes for all types of producers, including smallholders, for the purchase of technological upgrading, including processing, storage, and water-efficient technologies, became the

preferred mode of diversification support. However, the conditions they imposed, coupled with RRA's disbursement approach, meant that capitalised agricultural actors became the primary loan beneficiaries, while smallholders were marginalised. This is significant because, based on development organisation reports, foreign aid provided the majority of financing for agricultural diversification, as the Uzbek government's agricultural budget mainly subsidised inputs for production of the state order.

These long-term interactions produced the institutional and material foundations for agricultural modernisation under the Green Economy, where the adoption of water-saving technologies, productivity, and export-oriented agriculture are now framed as environmentally necessary and modern. Considering the global nature of the Green Economic paradigm, 'Green' works as a 'branding' strategy to secure foreign finance. The material changes rooted in the financial empowerment of horticultural agribusiness and its discursive legitimation by the Green Economy conjured the New Agrarian Imaginary – the Green Economic basis for agriculture. The New Agrarian Imaginary is a shared vision of a desirable agrarian future, co-produced by development actors and agro-entrepreneurs as the new *ideal* agrarian subject, and supported by a new jargon and a new genre of images depicting *ideal* landscapes. Its on-the-ground workings are explored in the next chapter.

7. THE RECONFIGURATION OF HYDROSOCIAL TERRITORIES[30]

Introduction

The previous chapter demonstrates the mechanisms by which IFI and development-mediated agricultural diversification, export-oriented, labour-absorbing horticultural production, and the race to deploy modern irrigation technologies, have engendered the New Agrarian Imaginary – a 'Green Economic' vision for agriculture. In this Chapter, I demonstrate *how* efforts to turn the New Agrarian Imaginary into reality reconfigure who should use water and how. I look at 1) how institutional selectivities are implicated in new rounds of land grabbing, 2) how the New Agrarian Imaginary metagoverns 'green' water grabs, and 3) how precision technology tends to interact with nature's materialities and institutional selectivities, thereby encouraging groundwater over-abstraction.

Drawing on the case study of 'Dostlik', the second part of this chapter shows that, for rural inhabitants, the implementation of the New Agrarian Imaginary unfolds incrementally through water dispossession, accompanied by ambivalent attitudes toward increasing water precarity. By tracing the production of a new hydrosocial territoriality as a function of *de*-territorialisation and *re*-territorialisation, I argue that Uzbekistan's hydro-authoritarian, agro-modernising venture engenders a gradual shift from *horizontal* water access relations to *vertical* ones. 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.

7.1 Institutional selectivities of hierarchical authority and new rounds of land grabbing

Under Karimov, province and district *hokims* exercised considerable discretionary power as gatekeepers of vital resources and guarantors of various concessions at the farm level. For provincial *hokims,* their direct accountability to the President and duty to meet agricultural production targets incentivised interference with water allocations between the subordinate districts, which collided with the duties of regional water distribution bodies of the MAWR (Abdullaev and Mollinga, 2010; Muradov and Ilkhamov, 2014). At the district level, they exploited legal norms around cropping arrangements, dispensed land leases, manipulated access to machinery (Trevisani, 2008), and channelled water flows (Veldwisch, 2008). These powers were a consequence of the enmeshment of upwards-oriented

[30] Sections of this chapter appear in a published article.

accountability mechanisms exerted upon *hokims*, obliging them to fulfil cotton and wheat targets, with patronage relations with *fermers* at the district level to ensure compliance with said targets and accumulate social capital (Veldwisch and Spoor, 2008). From the metagovernance perspective of the Karimov era, as detailed by Yalcin and Mollinga (2007a), the IWRM-endorsed BISAs were leveraged to reduce the influence of regional and district *hokims* over water allocations. However, as explained in Chapter 5, *hokims* were highly active in WCAs' operations, because the strategic disbursement of water resources played a vital role in preserving their power.

In 'New Uzbekistan', while the power vertical from the president to the *hokims* at the province and district levels has remained unchanged, the nature of their role has become more sophisticated, in line with the metagovernance selectivities of the New Agrarian Imaginary. In an attempt to rein in their Karimov-era discretions, Mirziyoyev publicly criticised their 'authoritarian style' (Schmitz, 2020b), dismissed a number of district-level *hokims* while reshuffling regional ones, likely so as not to disturb 'loyalties and kinship ties [they] built during their tenure' (Hashimova, 2018). Particularly at the provincial level, hokims are the focal points in regional power networks, whose cooperation is indispensable to the rollout of the national development strategy on the ground (Schmitz, 2020b). As a result, in tandem with the 'Green Economy' and fast-paced modernisation, their responsibility to economic objectives is increasingly subjected to degrees of separation from direct production targets in a way that, as this chapter argues, reveals the mechanisms behind the breakdown of relations that formed the basis of water access for smallholders.

For example, province *hokims* are expected to attract foreign investment and promote 'export, export and once again export' (Dadabaev, 2019 quoting Mirziyoyev p.896). A testament to the rank of this new mandate is their newfound requirement to be 'attached' to a particular foreign mission of Uzbekistan abroad, to be in close communication with ambassadors of the mission to which they are attached, and visit the countries where the mission is held, at least twice a year, in order to promote their provinces abroad (Dadabaev, 2019). Failure to attract foreign investment and to develop agriculture constitutes a legitimate reason for a *hokim's* dismissal, as exemplified by the recent treatment of the *hokim* of Syrdarya region. Following the announcement of his replacement, Mirziyoyev put in place a new accountability system for *hokims* to attract foreign investment and issued warnings to the leaders of 16 districts and cities for their poor performance, adding, 'enhancing the efficiency of every dollar of investment must become the primary objective for regional and sectoral leaders' (Ferghana News, 2025). 'Efficiency of every dollar' reflects the new form of governmentalisation of Uzbekistan's territories (Hommes et al., 2018), and while it concerns all of its sectors, in the context of agriculture it mirrors the aforementioned narratives around the efficiency of resource use, particularly water (e.g., 'drop of every water'… see previous chapter).

The result of the policy rationality of the 'export priority' embedded in the new metagovernance logic is formalisation and calculability of agricultural production. In a telling public Instagram complaint, the founder of the horticultural export company 'Dalatek' lamented to her followers:

> In every district, city and region, there are *hokims*, and they have several roles. One of these roles is to increase exports from within their territory. The more agroproducts they export, the more credit goes to them. Export from 'their region' is considered as export by those *companies* which are *registered* in their regions. An exporter's company is registered in one region, but fruits and vegetables grow everywhere, and we receive demands of a wide assortment of goods. We therefore encounter problems when a product needs to be exported from a 'different' region. In 2019, exporters began complaining about the issue, after which the government decided to prohibit *hokims'* interference with exporters from other regions, but the existing system of appraising *hokims* hasn't actually changed. Therefore if all exporters start attacking the produce of a certain region during harvest season, the *hokim* of that region might end up being left without any produce, and it will reflect poorly on his performance. The *hokims* then [informally] *(silently)* prevent external companies from exporting from their regions, despite it being prohibited' ('Dalatek' founder, public Instagram caption June 2023, translated from Russian, emphasis added)

The 'plan for *hokims'* reveals a reliance on path-dependent, top-down governance based on meeting quotas, yet a change in the content of those quotas, dictated by the new administration's preference for private foreign and local capital. The intense pressure on governors to safeguard exports from *registered companies* via land-lease reforms that favour cultivators with the highest investment capacity, combined with the formal consolidation of *hokims'* direct involvement in water distribution, acts as a metagovernance, or *steering* mechanism. The context surrounding regional and district authorities, shaped by disciplinary measures, the ideal agrarian imaginary, and policy incentives and pressures, encourages them to channel resources to agribusinesses. While this has the potential to encourage small farms to get registered, especially considering the government's professed intention to integrate them into export value chains outlined in the Agricultural Strategy 2020-2030, the sheer imbalance of power brought by clusters and intensive gardens skews export promotion efforts in the latter's favour.

The government's decision to 'prohibit *hokims'* interference with exporters from other regions', as highlighted by Dalatek's founder, reflects the increasing legitimisation of the private sector as a *(de jure)* counterbalance to *hokims'* formerly pervasive power, at least in agriculture. Iterations of the central government–private sector–*hokim* nexus have recurred throughout my research, whether antagonistic or cooperative, and especially in large-scale projects involving the Cabinet of Ministers. An emblematic example of the dynamic interaction between the objective to implement Uzbekistan's private investment-led New Agrarian Imaginary, and its conditioning by centre-periphery dynamics inherited

from the previous government, is a foreign-invested fruit agribusiness of over 450 ha[31]. Costing over $10 million, the project hinged on the Cabinet of Ministers' approval to obtain land and construction permissions. The foreign company hired a local, foreign-educated director who treads administrative and infrastructural obligations with utmost caution, balancing foreign investors' privileged relationship with the Government in Tashkent with the need to maintain favourable relations with the province *hokim*:

> We try to balance the game of… for example, eventually one of my decision-making factors for choosing this region was that this particular *tuman* (district), and this village, is the home village of the *hokim*. We knew all this before we even requested the land from him, and he said 'by the way this is my hometown'. I said really 'seriously'? He replied 'yes yes I'll do anything I can to support'. So he checks on it regularly and then we try to tell him that this is going to be one of the leading regions in Uzbekistan in agriculture. We use the latest innovative technology, we took him and his team to [investors' country of origin], we showed them our operations, we even agreed that if he wanted, so he could send some of his agricultural agency specialist to visit our company headquarters anytime they want to, so we can exchange knowledge, so he is personally invested in it, not from a financial perspective but as a reputation. As pride, as economy of [the region] because it is high-end production, that means a lot of labour. It is extremely labour intensive, so for on peak days we need as much as 3,000 people per day for harvesting, so for him it's a good seasonal source of work for that district, and it's good political points for him, and he knows the top connection (*president*), so he tries to do his best to have smooth operations for our project... (B4: June 7, 2023)

However, tensions rose when the agribusiness struggled to secure an electricity supply from the Ministry of Finance and the Ministry of Energy, as internal documents indicated that this was possible only upon completion of 50% of the initial investment commitment. This, according to the agribusiness director, would have been too late, as basic utilities are a prerequisite for investing these 50%. As the director added:

> So then we had to go through, the higher channel, the top channel, all the way… (*president)*, but also locally to the *hokim*, we have a very good local government… So he said, pardon my language, 'Fuck those Tashkent politicians, they're useless! I'm going do it myself' and he just called the head of his regional energy sector agency said 'you have to make it happen if you have any problems let me know and the president's administration'. So the reality is that for most companies if they don't have the proper administrative resources, the government will not even start moving until you've invested 50% of the money. We tried a few times, to solve it

[31] For reasons of anonymity, neither the region, name of company nor its origins can be named.

> locally, but it often gets disregarded because they're expecting something, our company has zero tolerance policy for that. We can do this because we have significant administrative resources. A normal company with that principle would not go anywhere because they wouldn't have any instruments to influence a positive outcome for themselves. For us we can go all the way to the top but then it's a fine balance to keep because it's not always good to keep going top-down-top-down because eventually you will have a lot of resentment from the local authorities. (B4: June 7, 2023)

The agribusiness directors' frequent reference to 'administrative resources' is reminiscent of the necessity to acquire 'political protection' (Trevisani, 2008, p. 100) to get things done, albeit at a much larger scale, by agricultural players external to the state, at a level highly encouraged by the various national development strategies and the President himself, propelled by investment targets and leadership reshufflings. This case illustrates that under Uzbekistan's New Agrarian Imaginary, certain agribusinesses are emerging as powerful actors with significant political clout required to navigate the balance of forces in Uzbekistan's centre-periphery relations. In her analysis of the creation of the Uzbekistan's horticulture value chain Lombardozzi (2020) draws on SRA to frame the government's facilitation of horticulture agribusiness production as 'state-led agricultural upgrading'. She argues that the obstacles posed by short-term capital constraints to successful integration into global value chains are overcome by public investment under a developmentalist model. While, as argued by proponents of SRA, the state in Uzbekistan, and beyond, is 'an institutional and relational actor in the governance of global production arrangements' (A. Smith, 2015, p. 311), an analysis that limits itself to formal policy obscures the balance of forces that define the state as a relation, particularly where patronage networks constitute the scaffolding for these arrangements, highlighting the institutional bounds of intended development strategies. Obscured as well are the processes of displacement (Ioris, 2016) such facilitation entails. In the above case, while the details of the manner in which land was received were not disclosed by my interlocutor, it likely entailed the forceful seizure and redistribution from existing *fermers*, a practice common under Karimov's rule as a punitive measure for failure to meet targets, and presently integral to the deployment of the agri-modernisation strategy.

The most notorious example of overt, recorded contemporary land grabbing in Uzbekistan is in the cotton-textile cluster sector, in which the EBRD, the World Bank's International Finance Corporation (IFC), the government of Japan, and ADB are embroiled. Cluster-based privatisation of cotton was endorsed by said IFIs, who loaned US$ 130 million to Singapore-based Indorama group, a global fibre and chemical conglomerate that inaugurated its cotton-textile clusters in Uzbekistan in 2018 through Government Decree (Bankwatch, 2023). The logic behind IFI support was to introduce 'modern cotton farming technologies' such as GPS/laser land levelling and efficient water resource use. The loan soon drew widespread condemnation after Indorama acquired 75,000 ha of land through questionable

'voluntary' land-transfer processes. In reality, it entailed the mass, coerced termination of land leases on upwards of 2,000 farms by *hokims*, leading to an estimated loss of 13,000 jobs, unfair contracts, and poor working conditions for those employed. As loan disbursement continued, those investigating rights violations were persecuted, while local farmers and informants suffered arrests and threats from law enforcement (Bankwatch, 2023; Lesikhina, 2021). In cotton, cluster companies are 'chosen' under the veil of a competitive tender process, covering a network of business interests that includes offshore companies closely related to the leadership's family and associates (Lasslet, 2020)[32]. These cotton clusters, as well as individual farmers who now constitute a minority in the cotton sector, are additionally recipients of recurring subsidies and concessional loans from state agricultural banks or the State Agricultural Support fund for various cultivation costs and technology installations (UNDP, 2024).

7.2 Metagoverning 'green' water grabs

Land reallocations, mainly affecting non-smallholding farms, are the dominant technology of governance in the deployment of agricultural modernisation. However, they are paired with a Green Economy metagovernance logic of water-use-efficiency that reconfigures territorialities beyond the boundaries of individual farms, contributing to a less visible, 'green' form of grabbing (Fairhead et al., 2012; Mehta et al., 2012) where adoption of 'green' technologies is increasingly the driving rationale behind land (re)allocation. At the level of development reports and public discourse, the proliferation of water-saving technologies is a marked achievement. In their review of the implementation of the Agricultural Modernisation Strategy 2020-2030, the World Bank and its European development partners hail the 'impressive' scaling up of investments in water-efficient[33] irrigation, marking the status of the 19.6% indicator of land under said technologies over the initial 10% target as 'Achieved' (World Bank, 2022, p. 28). Later in 2024, the Deputy Minister of Water Resources, Rustam Karshiev, announced in a press release that Uzbekistan had saved 7 billion cubic metres of water thanks to water-saving technologies, canal concreting, smart water-metering systems, and rational water-resource governance. Currently, according to the release, water-saving technologies cover 1.3 million ha (of 4.3 million), of which 478,000 ha are under drip irrigation, 55,000 ha are under sprinkler systems, and 29,000 ha are under discrete irrigation. As the release goes on, considering Uzbekistan's water-scarcity, caused by transboundary governance challenges, low precipitation, and climate change, as a result of which Uzbekistan now uses 51-52 billion cubic metres, compared to 64 billion in the 1980s, the government aims to subject all of its 4.3 million ha of land to irrigation technologies by 2030 (Karshiev, 2024). Such impressive results are the product of land reform measures: the adoption of water-saving technologies, a pillar of the Green Economy, is increasingly becoming a prerequisite for receiving any

[32] For a detailed exposé of corruption in Uzbekistan cotton cluster sector, see Lasslet's 'Out of the Cauldron, Into the Fire' (2020)

[33] While the Uzbek government terms them as 'water-saving', the given document exclusively uses 'water-efficient' technologies

land above 1 ha. It is a requirement for investment in 'intensive gardening, viticulture and other perennial plantings' (Presidential Decree No.6243, 2021) and highly encouraged under the land auction law, which stipulates subsidies for their implementation (Presidential Decree No.18, 2025).

'Green' water grabbing in Uzbekistan takes place through its legalised capture by superior and technologically advanced farms, facilitated by the selectivities of irrigation technology itself. At the legislative level, the Ministry of Water Resources, the Cabinet of Ministers, and the province *hokims* set surface water limits for each water consumer in their territory, twice a year, following a water intake limit set by the Ministry of Water Resources for each region based on yearly water quantity estimates established at the transboundary level (Presidential Decree No. RP-107, 2023). The regional limits for 2023 are published at the bottom of Resolution No. 107, followed by a subsidy forecast for the adoption of water-efficient technologies for each region. Surface water limits for each user are set based on crop type, land size, and quality (*bonitet)*[34], and whether irrigation technologies had been adopted – a development that has been made explicit only as of 2025 (Norma.uz, 2024). Prior to this, the legislation (Resolution No. 107) was unclear regarding the extent to which a farm's adoption of said technology affected its water limit. These limits also take into account smallholdings and *dehqon* farms based on their hectarage within a given hydromodule zone, with a guiding quantity of 0.45 l/second (Field notes, June 2022; Interview, November 2023). Based on the available legislation, it can be deduced that 'behind the scenes', at the metagovernance level, the privileging of certain agricultural investors and the requirement to adopt precision technology is a significant mechanism driving water captures. Because direct access to district-level allocation data was not possible, this section draws on inference and triangulation (field notes, interviews, and legislation) in line with the critical realist concept of mechanisms (Fletcher, 2017), which directs attention to the strategic biases and selectivities inscribed in policy frameworks at the national level, although their district-level or local manifestations may vary.

As previously mentioned, agricultural projects of over US$ 10 million are to be approved by the Cabinet of Ministers. Furthermore, in the aforementioned Decree No.6243, land leases for intensive gardens, viticulture, and farms with 'other perennial plantings', as well as light-weight greenhouses, must go through the Ministry of Agriculture, which suggests their privileged status over non-perennial cultures, and points to their lower vulnerability to land reallocations by *hokims* in the case of low productivity or export performance. Formally, these two groups of producers – intensive gardens, and any other project of over US$ 10 million – emerge as the most water-privileged in Uzbekistan's agrarian imaginary, as their financial capacity to invest in advanced technologies 'guarantees' higher yields per drop and hence higher exports.

[34] Based on interviews, the *bonitet* also constitutes a form of political leverage at various levels of governance, however, its details are beyond the scope of this thesis.

Additional land and tax concessions in non-irrigated lands are available to farmers who are able to invest in water-saving technologies (Lombardozzi, 2020). In Uzbekistan's hydro-authoritarian logic of water provision (Spoor and Thiemann, 2025), the promise of establishing an agribusiness with water-efficient technologies justifies dramatic diversions from canals supplying water to dry regions. As one agronomist of an intensive 70 ha cherry garden, and recipient of these concessions at the foothills of the Urgut mountains in the Samarkand region explained:

> Before, this was a militarised zone, there was nothing here, until this land was given for exploitation to private farmers. The *intensivniy* sad (intensive orchard) was set up in 2018. There is a cluster nearby, that was set up in 2015. With the help of the DID, water was brought from the Old Anhor canal, piped 3.5 km and lifted by 40 metres (B3: May 11, 2023)

The agronomist confirmed that the investor gradually paid for the piping and technology himself, but received tax exemptions in the first three years of operation. The intensive garden grows dwarf and semi-dwarf varieties of cherries, irrigated using smart technology with water drawn from the second of two nearby *hauzes* (water basin), the first of which is used for filtration. Presently, the intensive garden, registered as a Limited Liability Company, pays a water, land, and energy tax. The Old Anhor canal, from which the extensive water piping and lift infrastructure delivers water into the *hauz*, joins the Qashqadaryo river in the south, which irrigates lands in the Qashqadaryo, one of the most water-scarce regions in Uzbekistan. While the production of export goods irrigated with advanced technologies is commendable, it generates a scarcity and risks neutralising water-saving efforts at the downstream level (Conrad, 2022). The intense push to generate a massive increase in production, up to 20 billion USD, that leads to such projects may offset resource-saving, actually, 'contributing to the exacerbation of the problem that they were ostensibly deployed to mitigate' (Galdini, 2021, p. 212).

The technological superiority and the mechanics of water capture are more poignantly illustrated by the irrigation endowments of the berry agribusiness:

> **M: does the farm use ground or canal water?**
> A: The whole border of our land is category one canal, we're in the prime location.
> **M: So you're upstream along the primary canal?**
> A: The primary canal is on the east border, but we're doing drip irrigation so it doesn't really matter as long as we have access to the water. We're putting together a huge XXX,000[35] cubic metre water reservoir. We have a sediment basin that lets the large particles settle before they overflow into the main water reservoir. This is enough to cover 10 days of our water needs on optimal use. If it's a crisis management situation, we can stretch to about 20 days. But most of

[35] Redacted to preserve anonymity.

> the time, we should have water in the canal; it's just that every year, we might have that peak season around July-August, when there might be interruptions of up to 7 days. But yes it's one of the biggest private reservoirs in Uzbekistan. It is a large volume of water with a high pressure so any small leak can develop into a serious problem. We spent almost a million dollars just on this water reservoir. That's our pumping station *(shows picture)* also big, 35 m x 25 m, it's to pump the water from the canal into the reservoir after which it goes to the orchards. (B4: June 7, 2023)

As demonstrated above, the hydro-authoritarian mode, or the direct nature of water provision, characterised not only by access to prime locations, but guarantees for its supply, and the fetishisation of the techno-fix it entails (Spoor and Thiemann, 2025), is nonetheless combined with a logic of privatisation to produce an (agro)-neoliberal outcome. It is additionally an emblematic example of the political ecology adage of 'water flows to money' (Swyngedouw, 2009, p. 56). This marks a significant break from the relations around water access during the state cotton mandate, where surface water's 'fugitive nature' (Mehta et al., 2012) allowed it to leak into the plots of kitchen gardens, mediated by conflict-ridden relations between *fermers* and smallholders (Eichholz et al., 2013; Kim and Hornidge, 2016; Mukhamedova and Wegerich, 2014). The unprecedented asymmetry introduced by a player like the berry agribusiness negates any possibility of such negotiation, in which the power of the district irrigation department and hokims is instead entrenched due to their centrality in the distribution of water resources. As demonstrated in the last part of this chapter, it contributes to the invisibilisation of smaller water users (Mehta et al., 2012), like smallholders, whose water needs do not fit comfortably in the new streamlined logic of export-oriented motivation for water supply.

7.3 Technological selectivities of precision irrigation

Water capture is additionally facilitated by the selectivities of irrigation technologies, which themselves embed particular knowledges, embody particular governmental rationalities, and have particular distributive effects that transform nature in particular ways (Sum and Jessop, 2013, p. 218). Firstly, certain technical aspects of irrigation technologies have spatial repercussions. As explained in the literature review, studies on the adoption of irrigation technology recurrently point to the 'efficiency paradox', or the 'Jevon's Paradox', that efficiency rarely reduces water consumption, at least at the basin level, and that whether it does, boils down to regulating human behaviour (Grafton et al., 2018; Hamidov et al., 2022; Van der Kooij et al., 2013). In Uzbekistan's case (and beyond), where furrow irrigation was the dominant method, and still is, although decreasingly so (Hamidov et al., 2022), the method produces a large amount of collector drainage water, often reused in water-scarce areas by downstream users as additional surface water supply (Hamidov et al., 2024). When left untreated, its reuse aggravates soil salinity – another major ecological stressor in Uzbekistan, where about 50% of irrigated land is now saline (Hamidov et al., 2024). However, recovery of drainage water constitutes a

dispersed form of water distribution that, according to the technical literature, is disrupted by the introduction of precision technology (Grafton et al., 2018). While this is beneficial for addressing increasing salinisation, precision irrigation reflects an individualised logic of water-use that physically alters the spatial distribution of surface water flows.

Secondly, also pertaining to the technological selectivities of precision irrigation, is the manner in which it alters water's circulation and, in combination with Uzbekistan's institutional context, risks encouraging groundwater over-abstraction. From a technical perspective, with water sources with high sedimentation, like in the Aral Sea Basin, a settling basin becomes a cost-effective way to filter out large particles before standard rounds of water treatment required to channel the water through emitters (Savva and Frenken, 2002). Furthermore, as noted by previous interlocutors and confirmed by an Uzbek hydrologist who works with international organisations, these basins serve as buffer storage to hedge against water supply fluctuations:

> **M: Does drip irrigation encourage artesian water use because it has less sedimentation?**
> A: It doesn't encourage, and at the same time it does encourage – because in some regions, there is no surface water. So you have to use ground water in some areas, you have to hook the system to the ground water and apply irrigation, but when you talk about drip irrigation, many people think that drip irrigation is installed in places where there is no water, not enough water, but it's the opposite: if you introduce this drip irrigation system, you have to have always water – you know, you have to have available water resources always, otherwise you will lose your yield. This is why you need a pond where you accumulate your water and filter it properly, with proper technologies, sometimes farmers use, they have two ponds – one pond for just cleaning the sediments, and then they let the water flow to another pond, they have to clean water additionally. But groundwater is a strategic resource in the region, and it's also a kind of limited resource – every year, people are making boreholes to lift water, but groundwater levels are going down and down.(E11: November 8, 2023)

The requirement to safeguard a regular flow of water to ensure adequate filtration (FAO, 2001), therefore, incentivises settling basin construction, and for less privileged *fermers* who do not have access to prime surface water like the berry agribusiness it can act as a mechanism that encourages groundwater use.

Pieced together, the interview data, the provisions of Resolution No. 107, and *hokims'* upward accountability to the centre for enforcing the 'water-saving regime' additionally point to a second-order effect of precision irrigation. Beyond its material selectivities at the farm level, the technology reshapes the centralised allocation system itself. Because water-saving technologies are presumed to reduce demand, their widespread subsidisation appears to have justified tighter water limits at the regional level, with some discretion left to *hokims* at the district level. Critically, these limits may not take into

account the everyday reality around technology adoption for the majority of *fermers*, a situation identified by the same interlocutor:

> You have to apply water based on the requirement of each single crop, but *fermers* often use more water because many of them think that if they use more water, they will have more yields, so you have to be careful, you need to apply appropriate water resources so you don't lose yields, and you have enough good yields. This innovative technology is being implemented without any research, they are not considering where exactly to implement, for example, drip irrigation, which place is more suitable for drip irrigation, what about the sprinkler irrigation? Or gated pipe irrigation? Or traditional irrigation? And now, there is more than 500,000 ha land is under innovative technology, mainly under drip irrigation, most of it is not working properly (E11: November 8, 2023).

Admittedly, the above expert quotes reflect contemporary forms of governmentality which scapegoat the individual *fermer* as unfit for Uzbekistan's New Agrarian Imaginary. More relevantly, however, they also suggest that the government's centralised-bureaucratic approach to technology promotion, or reliance on the techno-fix, is unfit for the highly context-dependent nature of water-saving. Among all but three commercial *fermers* and agribusiness managers I spoke to, whether or not they use precision irrigation, they supplement surface water with groundwater resources, particularly during the high summer season. However, groundwater is overseen by a separate Ministry, the Ministry of Mining Industry and Geology, in coordination with the Ministry of Water Resources (Schmidt et al., 2024). Yet, according to Resolution 107., the Ministry of Mining is not involved in setting water limits. Instead, groundwater withdrawal is formally regulated through licensing to *fermers* and agribusinesses. Since 2017, boreholes (artesian wells) deeper than 25 m, withdrawing more than 5 m3/day, must be registered with the State Committee for Geology and Mineral Resources and receive a special water permit, thus exempting most smallholders as their uses fall below the limit. Following an assessment by a State Committee-approved drilling company and the State Committee for Ecology, a water permit is then issued to *fermers* and agribusinesses with a maximum extraction limit. Knorr, Theesfeld, and Soliev's investigation into groundwater extraction in regions including Samarkand, reveals that electricity is a common proxy for groundwater regulation in Uzbekistan; most *fermers* fail to apply for permits from the State Committee for Geology and Mineral Resources, instead opting to register with the local government offices (*hokimyats*) and the state electricity supplier. Operation of the well is then subject to an electricity quota, subsidised to varying degrees, which in turn acts as a regulatory mechanism. At the same time, the authors point to the absence of adequate monitoring of agricultural groundwater use, nor sanctions for failures in their registration (Knorr et al., 2022).

Groundwater, as a result, risks compensating for localised water scarcities produced through structural path-dependencies of Uzbekistan's hydro-authoritarian forms of intervention that are now combined with a neoliberalised, 'Green' agrarian imaginary oriented toward fast-paced, high-value crop

production against the backdrop of a crisis discourse of the water-saving regime. When conceptualising water management in Khorezm, Hornidge and colleagues (2011) poignantly contended that:

> Since distributing larger amounts is relatively easier than distributing precisely according to water norms and limits, this water abundance regularly compensates for institutional malfunctioning, facilitated by a technical infrastructure originally designed for the conveyance of large quantities of water to Soviet collective farms (p. 257).

Presently, Uzbekistan's 'Green Economy' techno-fix with all of its dispositives serves to compensate for continued institutional malfunctioning, in this case facilitated by a technical infrastructure used for wide-scale, post-Soviet, state-mandated cotton production. Yet, the end result is that in addition to instituting an individualised logic of territorialisation marked by rational and regimented water delivery, most accessible to highly capitalised agribusinesses, it creates the conditions for groundwater over-abstraction, especially among the second 'tier' of farmers who seek to overcome water-limits and the financial commitments of the expensive technology. The following section demonstrates the empirical reality of water scarcity, most acutely experienced by smallholders, based on the case study of the village pseudonymised as 'Dostlik', in Samarkand region's Jomboy district.

7.4 The New Agrarian Imaginary as seen in Jomboy

7.4.1 Fast-paced agricultural modernisation

The previous sections sought to explain how agricultural modernisation and the Green Economy metagovernance constituting Uzbekistan's New Agrarian Imaginary, characterised by the privileging of efficient technology and export-oriented agribusiness, interacts with path-dependent modes of governance around top-down pressures on *hokims* as the on-the-ground implementers of the said imaginary. Combined with the technological selectivities of precision irrigation, as the following case study will demonstrate, they contribute to the production of a new form of hydrosocial territoriality, where interdependencies between various agricultural producers are spatially and socially delinked through the introduction of a new tier of water and land privileged producers who are dis-embedded from the social relations that constituted these interdependencies. Furthermore, the previous sections identified the general mechanisms that generate strategic biases towards particular outcomes, based on interview data from across Uzbekistan. The case study below on Dostlik localises these mechanisms from the perspective of *fermers* and smallholders, who are now at the lower levels of the agricultural hierarchy.

Dostlik is located in the Jomboy district. Jomboy has a population of 167,000 and is located 13 km North-East of the regional capital Samarkand. The district is crossed in its southern part by the Zeravshan River on its way to Samarkand and stretches northwards to the foothills of the Gobtuntau Mountains along the border with Jizzakh Region. Jomboy has been at the forefront of Samarkand

province's diversification and transition to intensive gardening (Kuvandikov, 2017). In 2023, the Samarkand Herald described Jomboy as the fastest-growing district in the region after Samarkand city itself, credited to the agricultural sector (Rustamov, 2023). According to a formal document published by the Samarkand regional government, of the 24,548 ha of cultivated land in Jomboy, 15,647 ha are dedicated to wheat and vegetables, 3,868 ha to intensive gardens, with the remainder comprising mulberry and vineyard plantations and livestock production (Samarkand Regional Government, 2019). Among the larger of the 102 formally reported gardening enterprises in Jomboy (Samarkand Regional Government, 2019) is a 2,000-ha farm of one of the largest agro-processing companies in Uzbekistan – Agromir set up in 2010, a 777-ha apple and cherry garden owned by Jomboy Gardens registered in 2013, as well as Sag Gardens' 500-ha garden of walnut and almond production opened in 2017 (Agro.Uz, 2023; EastFruit, 2023; Kuvandikov, 2017). Aside from the more staple Agromir, Sag Gardens is representative of the new form of rural accumulation in horticultural production in Uzbekistan, with a total of 6,000 hectares of walnut plantations spread across the country and a recently launched 24-ha in-vitro laboratory called 'Bog'Bon' that propagates drought and pest-resistant clonal rootstocks and grafted seedlings of fruit tree varieties to be distributed to growers nationally (EastFruit, 2022b).

Based on regional news and government press releases, Jomboy's, and the wider region's land conversions to intensive gardens and other horticulture products are ongoing and respond directly to the government's agricultural directives. They are carried out via land seizures from existing *fermers*, to those with the highest investment capacity, paving the way for rapid land-size and access inequality. As already identified by Lombardozzi, these new farmers are 'often decoupled from the traditional arena of conflict and social contracts that have historically been regulated through and around cotton' (Lombardozzi, 2020, p. 653). For instance, to meet the 2019 directive 'On measures for the efficient use of land and water resources in agricultural economy', in 2022, 467 hectares of 'inefficient' orchards and vineyards in Samarkand were to be replaced with 'new modern intensive gardens' (EastFruit, 2022a).

Early in my research, having noticed the predominance of intensive gardens in Jomboy, during an informal group discussion, I asked the employees of an agricultural services centre in Samarkand, 'How does one access farmland?'. In addition to showing me the land auction website, one participant disclosed:

> In Uzbekistan, your knowledge is not important, your money is important. You cannot be a *fermer* unless the land is first given back to the government, however, if you have a project such as a cluster or a startup, you can win over land the government thinks is not used according to its objectives. If you have a project like a cluster or a startup, they will take the land away from its owner and give it to the startup (FG1, May 24, 2023)

I came to understand that Samarkand's inhabitants are concerned that such developments leave independent and insufficiently wealthy fermers insecure. It demonstrates the generation of a new rural anxiety where the former stringencies of cotton production for the state order are replaced by agricultural producers' fears of being (mis)aligned with the new, preferred agricultural subject under Uzbekistan's New Agrarian Imaginary.

7.4.2 The state of formal water service provision in Jomboy

The majority of the water supplied to Jomboy comes from the Zeravshan River south of the district, and the major canals branching out of it, namely Mirzaariq and Bulungur. Polvonariq canal, flowing from the Jizzakh region in the North-East, additionally supplies water to the northern part of Jomboy (Ismatova, 2022). Based on my conversations with Jomboy district's irrigation staff, the district irrigation department (DID) manages withdrawals from the Zeravshan River and from parts of the Polvonariq and Mirzaariq canals, and, in accordance with reforms, indeed works with the newly established Makhsus Khizmat (Special Service). The Makhsus Khizmat, formerly known as the Water Consumer Association, is a non-budget branch under the DID and is responsible for contracts with private farmers for water delivery. Interestingly, conversations with irrigation authorities revealed that they did not functionally differentiate between the new Makhsus Khizmat and the WCAs. The DID hires its own *mirabs* (water delivery masters) at the primary canals, while the *mirabs* of the Makhsus Khizmat are remunerated by the farmers and are responsible for water delivery at each inner ditch separating from the primary canals, which is now to be executed *only* upon the *fermer's* payment for the water[36]. Each ditch corresponds to a certain amount of irrigated hectares (hydromodule zone i.e., 200-700 ha) and can cover more than one village. The guidance for water delivery at the DID level does not differentiate between farm types (smallholders or private farmers), to be serviced by each ditch, however, as mentioned previously, does specifically indicate that there should be a constant flow of 0.45 l/second for smallholders, which, based on my observations, is consistent with other regions such as Bukhara (E16: May 28, 2022).

Furthermore, interviews revealed that, as a result of being released from cotton production, Jomboy is now entitled to less water, as horticultural products and other grains are less water-intensive. While locals agree that horticulture is indeed much less water-intensive, water demand still outstrips supply and must be met through pumping. As one water-delivery expert lamented:

> 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 beach in Jomboy district used to

[36] Supported by the Presidential Decree No. PP-107 'On urgent measures to increase the efficiency of water resources use' 01.04.2023

be full of water, but since 6-7 years it has dried up without a single drop of water *(The Plyaj-Zeravshan is a small lake located near the river, formed by the accumulation of groundwater)* (M4: May 21, 2023).

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).

7.4.3 Hydrosocial reterritorialisation in flux: the case of Dostlik

Until 2016, Dostlik specialised in cotton cultivation for the state order. The village is located upstream of a wide secondary canal separating from Mirzaariq, and is directly surrounded by 16 *fermer* lands between 15-50 ha, cultivating corn, wheat, onions, tomatoes, and carrots among others. In recent years, two agroclusters, upstream and downstream have been established within the vicinity of Dostlik, as well as an intensive garden upstream to the secondary canal, outside the village. Presently, a number of women from Dostlik are employed in seasonal labour in the agroclusters and the intensive orchard.

At the level of surface water in Dostlik, *fermers* and homestead farmers are bound by a tangled, meshed network of canals, narrow streams and ditches running through and around the village. Broadly sketched, the secondary canal and its offshoots supplying the upstream intensive orchard, agrocluster, and the majority of fermer lands run parallel to and around the village, avoiding intersection with households in the middle. 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, under ad hoc, informal agreements with *fermers*. This distribution is complicated by the presence of a natural spring (*rodnik*) that is being depleted, whose water joins the network of ditches flowing *through* the settlement. It is reserved exclusively for irrigation of homestead plots and household needs, including drinking, on the basis of a separate, long-standing verbal agreement among all of Dostlik's nearly 2000 inhabitants. Nostalgically recalled by my key informant as formerly large and a site of leisurely swimming for local children, it has now been reduced to a modest but scenic marsh, situated at the entrance to the village. Most households, including *fermers,* have some livestock comprising one to two cows and chickens, and cultivate crops such as cucumbers, corn, alfalfa, tomatoes, and potatoes on *tomorqas* ranging from 8-20 *sotih* (0.08-0.2 ha), often lined with fruit trees around the edges.

The following sections draw on interviews with four *fermers*, three separate male smallholders heading households of five or more, and three members of a single household with a small plot – a retired woman, her husband, and their son. Their narratives sketch out the changing dynamics of water use and perceptions of scarcity. The aim is to shed light on how the high-level transformations, or the mechanisms for the production of new territory described in the previous section, transform water flows and reconfigure access to water for the inhabitants of Dostlik. Of the three male smallholders, two are full-time farmers, and one earns his income from taxi-driving. Within the interviewed family, the retired woman Shahnoza, her husband, and their two daughters are supported by their oldest son, who works full-time in a government office and cultivates tomatoes on an additional *dehqon* plot rented from the government. All smallholders either fully, significantly, or partly rely on *tomorqa* plots as a source of stable income. Among the *fermers*, three have successfully transitioned from cotton and now run corn and vegetable farms, while the fourth has entered the business only recently and struggles to make ends meet, instead relying on his smallholding plot for a stable source of income.

7.4.4 Water pricing enforcement, scarcity and expansion of informalised pumping among fermers

Based on the interviews with *fermers* from Dostlik, the proliferation of water pumping in the village coincides with the decrease in state water allocations to Jomboy described in the previous section, and stricter enforcement of water delivery fee obligations introduced by the reforms. During cotton cultivation, scarcity resulted from the crop's sheer water needs, whose delivery under WCAs was cheaper and not necessarily contingent on fee payments by *fermers* due to cotton's priority in the state order. Presently, however, many farmers produce for private commercial production, with only portions of their crops submitted to the state order (such as wheat and corn). In effect, two of the four *fermers* interviewed expressed satisfaction with the liberalisation from cotton; as one said 'we can grow whatever we want now' (P1: May 25, 2023). However, the removal of water inputs guaranteed in exchange for meeting the state order, combined with water's commodification and reduced water entitlements following diversification, in Swyngedouw's (2004) words re-territorialises hydrosocial relations at the scale of Dostlik by incentivising unregulated artesian water pumping. This gradual re-orientation 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.

Aquifers supply stored water to natural springs in the form of groundwater discharge. Extraction of water from these springs captures this discharge, thereby depleting 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).

All four of the *fermers* interviewed in Dostlik admitted that they use unregistered artesian wells, which they operate with gas engines – indicating their wells are not connected to the electricity grid and therefore entirely unregulated. Such is the case with the *fermer* Odil, who has a 35-ha farm growing wheat, barley, onions, potatoes, carrots, and tomatoes. His land is upstream and first among a group of farms receiving water from a canal, which does not intersect the village:

> **M: Do you work with the Makhsus Khizmat?**
> A: The *mirob* instructs on how many cubic metres of water I am entitled to, but this amount is insufficient.
> **M: Is there anything else you would like to add that I might have missed?**
> A: Actually I use six artesian wells to make up for the loss. But I plan to install water-saving technologies in the next year. (P1: May 25, 2023)

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 expected of farmers operating on the margins of the New Agrarian Imaginary. 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. Unlike Hornidge and colleagues' *fermers* who invoked institutions, Odil invokes the 'New Agrarian Imaginary's' 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. 'We have good relations with the village. Not giving water to the *qishloq*[37] is dishonest', Otabek explained in a May 2023 interview as we sheltered from the sun under a walnut

[37] Means 'village'

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. Makhsus Khizmat has information about farms, and sometimes they call and tell the farmers how much to pay for the water. Sometimes, the Makhsus Khizmat does not have any water, then I use the artesian well. (P2: May 26, 2023)

Otabek's farm has not yet adopted water-efficient technologies; however, if it does, continued water-sharing with plot owners will be put under question. Water-sharing engenders irregular water flows due to the ad hoc nature of these arrangements, which conflicts with the requirements of precision technology.

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, including 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 of the main canal, 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.

7.4.5 Scarcity-induced water turns and increasing individualisation of irrigation among smallholders

Since the late 1990s, water delivery to households and *fermers*, except for farms located downstream behind the village (such as Otabek's), has been managed separately between the two groups. To this day, the *mirob* services exclusively the *fermers*, while households formerly enjoyed a steady supply from the natural spring. However, problems began two years ago when the water level in the spring dropped sharply. In the absence of running drinking water, most households already supplemented their domestic water needs with a hand pump. As scarcity increased, however, they were obliged to install deeper, motorised pumps to meet their irrigation needs. As the female smallholder Shahnoza whose household formerly relied on irrigation from the natural spring told me:

> 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 *kachalka*[38] had no water, so we had to dig deeper and install a motor (T11: May 27, 2023)

Water scarcity among households in Dostlik presently manifests in two stages, depending on their proximity to the natural spring and to canals flowing through the village to the farms downstream. In the first stage, which has transpired over the last three years, households whose plots are located next to a surface water source began participating in water turns[39] 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. Currently, however, these flows are insufficient. Of the two male heads of households engaging in water turns interviewed, both had two tube wells – one hand-pumped for domestic purposes, and the other – motorised. As a smallholder with a *tomorqa* of 0.02 ha adjacent to a large farm, explained:

> For the water turns, I arrange with the neighbours, or go directly to the *ariq*. 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 thirty years we did not need to take water turns, but due to water shortages, this became necessary (T12: June 1, 2023).

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 *dehqon*'.[40] His labour supports a household of five, including his wife and three sons. He explained that while two of his sons work in a nearby shop, his *tomorqa* constitutes the largest single share of the household income. On his 0.12 ha plot, Azizbek grows a

[38] *Kachalka:* hand pump
[39] Called *asvak*, it's a practice which predates the Russian empire and is applied whenever scarcity arises (Abdullaev & Mollinga, 2010)
[40] He does not rent additional land, so '*dehqon'*, in this case, denotes homestead farmer.

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 caused by the scarcity of surface water, saying that cold subterranean water hardens the soil and that electricity shortages mean the pump's pressure is too low to irrigate the plot comfortably (T23: August 20, 2023).

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 Bekzod's father, a former Soviet-era collective farm brigadier, added, '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' (T13: August 20, 2023).

At the discursive level, despite the anxiety-inducing recession of the groundwater table, the upsurge in 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; they make no reference to diversification, arrival of agribusinesses, or enforcement of payments for water delivery for *fermers*. Older interviewees vividly remember the water abundance of the Soviet-era, cotton-growing Dostlik, when borders and political tensions did not impede flows. For them, that memory contrasts so sharply with the present reality that the more recent depletions pale in comparison. This was the attitude of Shahnoza; when asked 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 (T11, May 27, 2023).

This is not unlike the attitude already observed in Khorezm in 2008 by Oberkircher (2011), in which '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 now reaches 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).

Furthermore, unlike in some earlier findings (Mukhamedova and Wegerich, 2014), mobilisation to complain, or voice concerns to authorities has not emerged as an option during conversations with smallholders. As Shahnoza clarified, their only solution to receive more surface water, is to ask the *fermers* to ask the *mirob* to deliver more water, as the *mirob* is 'only for the fermers', meaning that in practice, the role of Makhsus Khizmat and the DID is indeed limited to maintaining a certain flow regardless of scarcity, and not 'regulating consumption relations' between various consumers as stipulated in the legislation. Instead, smallholders resort to self-reliance. When asked about potential mitigation strategies, one smallholder replied: 'I will find affordable technology' (T2, May , 2023)

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, they 'used to kill each other over water' (T2, May 15, 2023). 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 a palpable relief. Yet, it comes at a new cost to the environment, and *re*-territorialised, and *verticalised* 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.

7.4.6 Enclosures by *agribusiness*es

The advent of agroclusters that benefit from a preferential legislative environment redefines the boundaries of space in the village by enclosing land and water, adding new layers to dispossession. While surface water savings enabled by technologies and agricultural diversification away from cotton are a welcome development in Uzbekistan, the permissiveness of artesian pumping granted to increasingly proliferating agribusinesses creates a new form of administrative territorialisation of groundwater control, which advances elite-based capture and raises new forms of water injustices among local communities (Hommes et al., 2018).

Based on the accounts of the *fermers* and smallholders, the composition of farms on the wider territory of Dostlik is increasingly shaped by the presence of the two agroclusters and the intensive orchard owned by Uzbek entrepreneurs 'from the city' (T11, May 15, 2023) who began receiving lands as part of the restructuring of the village's existing cotton farms between 2016 and 2018. All the agribusinesses draw water from the same canal as the village and *fermers*, particularly the agrocluster and intensive orchard, which are located upstream. The upstream agribusinesses primarily rely on canal irrigation, with any deficits compensated by artesian wells during shortages. The agrocluster downstream is only supplied by artesian water as the canal no longer reaches the farm.

The lands transferred to agroclusters came from existing large cotton and wheat farms. This was conveyed by Nurabek, whose family cultivated cotton from 2000 to 2016 on 100 hectares of land rented from the government for 50 years, at the time irrigated with 'free' water. In 2016, local authorities redistributed 60 ha of their land as a reserve for incoming agroclusters (P3, August 20, 2023). The advent of agroclusters was echoed in a later conversation with Shahnoza's husband, who was a cotton and wheat *fermer* for ten years between 2010 and 2018 on 15 ha of land. He was forced to give up his land because he failed to meet the state's cotton order due to chronic water scarcity. The cluster was subsequently transferred to a private investor and registered as such. Shahnoza's son later disclosed that the agrocluster, which cultivates vegetables such as onions and carrots, is now owned by a 'businessman from outside' (T11, May 27, 2023) and is supplied with water from an artesian well via drip irrigation. He added that the drip irrigation system performs poorly because the workers who manage it constantly change due to seasonal employment.

Shahnoza's husband's struggles to irrigate his farm shed light on the social obligations that mediated water flows prior to water reforms and the arrival of agribusinesses. She explained that her husband used to constantly argue with the smallholders upstream to receive his due canal water, but would often concede 'because he was too nice' (T11, May 27, 2023). As a result, he grew cotton on only two of the 15 ha of land, with the rest under wheat, as it was less water-intensive. He would then sell surplus wheat at a higher price in the bazaar, the income from which he purchased cotton to meet his state quota. Eventually, he built an artesian well, but it was insufficiently deep and too costly to sustain production

at the state-order level. Today, the agrocluster on this land can afford the technology and energy costs of pumping water from a deeper well and adopting water-efficient technologies, despite the aforementioned struggles to operate them efficiently.

After losing cotton land, the *tomorqa* became the economic backbone of the five-person household. Presently, Shahnoza's son supports the family of five by working three jobs: the tomorqa of 0.08 ha growing cucumbers, a *dehqon* plot rented from the government for 30 years, and a job in a government office closer to Samarkand. He told me that 50-60% of their household income comes from the combined profits from the *tomorqa* and *dehqon* plot. However, unlike the *dehqon* plot, their *tomorqa* does not require a rental fee and incurs only a land tax (about 330 sums per m2), so the profits from their *tomorqa* are higher than those from a government-rented plot. Over the last year, the combined proceeds from the cucumber and red kidney bean harvest on the *tomorqa*, sponsored the repayment of one of Shahnoza's daughters' university loans and her son's engagement party.

7.5 Discussion and conclusion

This chapter demonstrates how Uzbekistan's present orientation towards agribusiness, facilitated by the New Agrarian Imaginary, itself developed through strategic-relational processes at the national and global scales, is de-territorialising and verticalising previous territorial formations around water, to create new, spatially and relationally dis-embedded ones. The observed effect is a widespread reliance on groundwater resources; however, the mechanisms that produce this result are far more complex than a simple attribution to 'climate change' or transboundary stressors.

Firstly, the agrarian imaginary, rooted in the ideals of the Green Economy, privileges export-oriented, technologically advanced farms by increasingly embedding precision irrigation adoption in land access rules. At the same time, this privileging is mediated by structural selectivities of Karimov-era modalities of government: namely, the centre-periphery relations, where centralised, top-down coordination now adjusted to correspond to the prerogatives of agricultural modernisation, is nonetheless reliant on *hokims'* localised territorial control. This control is increasingly subjected to the influence of new large agricultural players, whose presence is sanctioned directly by the central government for their ability to make the 'right' investments into agricultural land, namely, installing precision irrigation. These players navigate these centre-periphery relations to receive water privileges granted to them via hydro-authoritarian modes – water diversions, or prime land grabs from existing *fermers.*

Dostlik illustrates how structural and technological selectivities converge to restructure hydrosocial relations at the micro-level. From the vantage point of smallholding, under the New Agrarian Imaginary, the Karimov-era marginalisation of their water needs is not rectified – instead, it is aggravated by water grabbing from larger farmers. The loss of surface water availability previously experienced during cotton-growing years has resulted in a redefinition of hydrosocial relations, as *fermers* resorted to pumping to meet their own water needs, leading to the depletion of the vital natural spring (*rodnik)* and

the disruption in smallholder-*fermer* water dependencies. While shallow water pumping provides temporary respite from tensions arising from water-sharing, the expectation that home tube wells will need to be dug deeper and the reliance on scarce electricity for pumping create additional insecurity in the form of gradual, dispersed 'slow violence'.

Fermers' strategies to mitigate increased costs and surface water scarcity are enabled by the fluid properties of water and invisibility of groundwater itself (Damonte and Boelens, 2019; Hommes et al., 2018) which facilitates the accumulation of wealth among a relatively privileged group at the expense of smallholders' needs. This localised outcome, shaped by decisions trickling from 'the top' reflects processes of resource capture and uneven growth, further reconfiguring hydrosocial relations by generating new cycles of scarcity (Hommes et al., 2018). At the same time, technology and capital, along with water bureaucracies around drilling licenses, combined with scarce surface water, pose barriers for failing or new, poorer fermers who struggle to make ends meet and are instead induced to continue relying on water-vulnerable *tomorqa* plots to hedge losses. While even during cotton cultivation, downstream *fermers* in Uzbekistan often struggled to meet the state order, current policies pose challenges in qualitatively new and individualised ways.

8. WORK ON THE PLOT, WORK BEYOND THE PLOT[41]

Introduction

In this chapter, I look at how hydrosocial reterritorialisation and associated spatio-temporal developments under the Green Economy become internalised by smallholders. I delve into how the Green Economy hegemonic project (rooted in the New Agrarian Imaginary) 'displaces and deters [its] material and social costs beyond the social, spatial, temporal boundaries' it encompasses (Jessop, 2014e). These social and material costs are most acutely borne by a) women due to the gendered, (re)productive labour on the *tomorqa* and b) by water resources themselves, which become 'super-exploited' to meet Uzbekistan's horticultural, export-led growth, thus deferring ecological crisis to the future.

The chapter consists of four sections. The first section looks at the effect of water scarcity on women's (gendered) work on the plot: from embodied labour, to adaptations around cropping patterns or how the rental of additional *dehqon* land can place counterintuitive pressures on women's work on the *tomorqa,* highlighting its importance in stabilising rural livelihoods. The second section explores how the spatio-temporal fix extends beyond the *tomorqa*, through a web of water-related enclosures that accommodate agribusiness and produce ambiguous results. The expansion of intensive gardening into commons pastures depends on access to water resources, adversely affecting the livestock-keeping of rural inhabitants and entrenching water inequality. At the same time, it is a source of additional, much-needed work and cautious optimism for rural women, which nonetheless does not replace livelihood autonomy and thus the primacy accorded to the *tomorqa*. The third section, in turn, uncovers the anti-hegemonic narrative forms of resistance among those affected, articulated through interlocutors' references to autonomy, apprehension about food quality and pollution from agribusinesses, and regret about the scale of changes happening around them. The final section returns to policy to examine how state-led formalisation initiatives under the Green Economy – themselves contradictory efforts to sustain accumulation while maintaining legitimacy – risk deepening stratification among smallholders, and excluding women and the most resource-vulnerable.

[41] Sections of this chapter appear in an edited volume (in press).

8.1 Embodied, gendered labour and strategizing around scarcity

Work on kitchen gardens is highly gendered as it fuses productive and reproductive labour, for subsistence and for exchange for cash, and is embedded in 'domestic patriarchal domains such as the family, which exercise material exploitation of women' (Lombardozzi, 2022, p. 1873). Scholarship on rural Uzbekistan has identified the effects of agrarian change on women's ability to perform work on kitchen gardens: from missing water turns (Kim and Hornidge, 2016), to the devalorisation and informalisation of labour erroneously assumed as 'unproductive' (Lombardozzi, 2022), to the very recognition that water scarcity and limits to its access prevent women from performing (re)productive work in the first place (Galdini, 2021). At the same time, this literature does not foreground how water dispossession entrenches the reproductive burden on women and households, either because it is outdated or omits the water factor altogether. Based on interviews with representatives of smallholding households in Dostlik and Oqtepa, I found that water precarity, stemming from canal water scarcity and depleting water tables, aggravates the burden on women's embodied labour and affects how families strategise their livelihoods within and around agricultural and non-agricultural incomes. These strategies are mediated by gender and embedded in the household's various income streams. Water, as a vital input for agricultural production, is *woven* into production and social reproduction around the *tomorqa*.

In households where the *tomorqa* constitutes a significant source of livelihood, where remittances from migrant labour are low or absent, and especially, where the cultivation of the garden falls entirely under the responsibility of the woman, the burden of water scarcity is especially acute. The effect was palpable in the second case-study village I have pseudonymised as 'Oqtepa', where the inhabitants date the onset of water scarcity to 2019-2020, a period which coincides with the consolidation of agricultural diversification in the Samarkand region. Women from households that rely on smallholding plots reported having to irrigate at night when the electricity pressure is high enough to pump their motorised wells, or in sections throughout the week in the absence of shallow wells (T8: June 25, 2023, T10: June 25, 2023). Naturally, sharing *kachalkas* or artesian wells in times of scarcity between neighbours or extended family members continues to be a consistent mitigating strategy. While the pace of adaptation mirrors the incremental erosion of water security, the very requirement to adapt is a source of concern, imposing additional costs and tasks on affected households.

The experience of 23-year-old Nigora from Oqtepa, a mother of three young children aged six, three, and one, who did not face the repercussions of water depletion on their 0.15 ha tomorqa until recently, illustrates the hardship sudden water loss engenders. Until two years ago, her husband supported Nigora and the children with remittances from his construction job in Russia. However, due to a severe accident that left him disabled, he was obliged to return to the village. As a form of social support for the disability, the local government granted the family an additional small subsidised plot for 30 years, yet

the land is of poor quality with poor access to water, as 'the best lands are for large farms and private businesses'. Eventually, Nigora's husband gave this land to his uncle and instead rented a different 1-ha plot for 8 million soums/year (US$ 657)[42] inclusive of irrigation costs, from a nearby *fermer* to cultivate tomatoes. In the meantime, in addition to cooking and cleaning, she takes care of their four chickens and grows barley and alfalfa for their mother-in-law's cows, as well as tomato seedlings for her husband's rented plot. Their *tomorqa* is at the downstream end of Oqtepa's village canal, whose levels drop too low in summer, forcing Nigora to use drinking water from a tap outside her house supplied by an electricity-powered artesian well intended for the whole village. Because drinking water is delivered for only two hours a day, Nigora fills all available buckets and pans with a jug, irrigating one section at a time every day of the week, while leaving enough for household needs. The increased use of water from the artesian well results in higher electricity costs, rising from 7,000 ($0.6) to 20-30,000 (~$2) soums/month, which she tries to keep low, especially in the cash-low summer months before the returns from her husband's tomato harvest in August. Due to childcare responsibilities and work demands on the *tomorqa*, she is unable to work on the nearby intensive garden, despite the help she receives from her mother. As a result, Nigora and her husband's livelihood strategy is to intensify cultivation on the *tomorqa* by purchasing a cow and 'growing corn to feed the cow and grow tomatoes on the other land, *every day'* (T8: June 25, 2023, 'every day' was pronounced with emphasis).

Nigora's case supports not only the continued primacy of *tomorqas* as the pillar of rural households' livelihood strategizing identified by Kandiyoti in 2003, or women's exploitative and invisibilised, unpaid (re)productive labour (Lombardozzi, 2022), but also illustrates the embodied, slow violent repercussions of Uzbekistan's hydrosocial reterritorialisation. The series of varied pressures, such as her husband's disability, child-rearing, and water scarcity, and interconnected mitigating decisions described above, is what happens in that gap between the observed reality of canal depletion and proliferation of *kachalkas* or informal artesian wells in Uzbekistan's villages. As Nigora recalled, until 2020, when her in-laws lived with her and her husband, the *tomorqa* was irrigated with canal water 'without any issues'. Presently, however, water scarcity and access precarity, whose production was traced in the previous chapter, become internalised by women's labouring bodies, obliged to carry an additional physical burden just to continue performing the same tasks. By compensating for the deficiencies of water provision, the body thus *becomes* infrastructure (Truelove and Ruszczyk, 2022, p. 1), as its material work sustains production both within and beyond the kitchen garden, on additional rented land. This is where the construction of a well promises much-needed respite from back-breaking work. However, as already demonstrated, this solution is precarious as water tables are depleting rapidly. Nigora added: 'everyone in the village plans to build a *kachalka*. We are also planning to build a *kachalka,* and in the future, when we have the money, we will build an artesian well'. This is how the

[42] Based on an interview with a *tomorqa* owner in Jomboy, the land tax for the plot ranges from 300-500,000 UZS (25-41 US$)

race to the bottom described in the previous chapter unfolds: nature inadvertently bears the brunt as rural dwellers scramble to secure basic livelihoods, which a series of decisions trickling down from the top renders precarious.

In rural households where men rent additional *dehqon* land, whether from the state or as formal sublets from *fermers*, this arrangement places counterintuitive pressures on women's labour, pressures that are intensified by the need to navigate water precarity. On the one hand, as evidenced by Nigora's case, the ease with which her husband was able to sublet a 1-ha plot to continue an agricultural livelihood is a testament to the positive effects of government's support for small-scale farming. On-farm rented plots benefit from *fermer* lands' established access to irrigation, whether through artesian wells or irrigation ditches, which are paid for directly to the primary leaseholder or the district irrigation department. On the other hand, because production on this land is commercial and masculine, and subject to rent, where failure to produce a harvest incurs large losses, women's labour on the *tomorqa* offsets the risks associated with commercial rented plots. This could happen for several reasons. For example, based on interviews with *fermers* and smallholders, including those with additional rented *dehqon* lands in Dostlik and Oqtepa, the tomorqa serves not only as a site of additional subsistence-oriented production but also as a place where women first grow seedlings before transferring them to larger agricultural lands (T7, May 25, 2023). This burden is more acute in households where the additional plot is a small *dehqon* farm, where vulnerability to adverse market exposure is greater and where the *tomorqa* accounts for a larger share of income. Water scarcity in smallholding plots, in this case, can be particularly punishing as it threatens not only production for subsistence, but the ability to fulfil rent payments to landlords.

The case of Muhayo from Oqtepa is illustrative. She is in her 50s, living with her husband in his 60s, and has a 21-year-old daughter she intends to marry off imminently. She also has two sons living in Russia. However, what would have been remittance payments from her older son's construction job are channelled to sponsor the younger's studies, so she and her husband survive off agriculture. Muhayo's household's income streams include a government-supplied 1-ha plot for cultivating tomatoes, a 0.35-ha *tomorqa*, a cow, several chickens, and 15 sheep. This number of sheep is considered substantial wealth in Uzbekistan and in rural households across the Global South, where livestock is kept as a reserve 'bank' for major expenses. However, I could tell the family was struggling. During our conversation in front of her *tomorqa*, I noticed the dilapidated state of her house, likely dating to the Soviet era, devoid of a large metal door, *tapchan*[43], or paving on the front porch characteristic of the newly renovated rural houses funded by remittances.

As my key informant and relative of Muhayo later remarked, 'Muhayo's husband received the additional land because of old age and poverty', something Muhayo did not disclose during our

[43] Outdoor seating, a traditional wooden divan

conversation. Muhayo's *tomorqa* is a yellow-dry plot occupied by a thin row of feeble, barely flowering corn at one end and a small patch of tomato seedlings persevering in a shaded corner at the other. 'These two years, it has been very difficult with water. Tomatoes don't grow on this land anymore' (T7: May 23, 2023). As a result, Muhayo and her husband had to switch to the less water-intensive corn, whose stalks they now use to feed their sheep, as well as tomato seedlings to be transferred to her husband's additional plot. Their *tomorqa* is located midstream to the village canal, and directly adjacent to it. During my visit in May, the water level was already low. Because Muhayo's husband's plot is government-supplied, it is subpar and receives low average water availability. Starting tomato seedlings on the *tomorqa* is thus a priority, yet this is challenged by the onset of water scarcity. Like Nigora's household, Muhayo and her husband intend to install a *kachalka*, which they must now save up for.

In Nigora's and Muhayo's cases, switching to less water-intensive crops and orienting production towards cattle feed emerge as available adaptation strategies to water scarcity. Echoing the struggles with water access that Sultana (2011) documents in Bangladesh, Nigora and Muhayo navigate water precarity by constantly diversifying their sources, such as planning around canal availability, drawing on village drinking water, saving up for a *kachalka*, or installing the more expensive (and illegal) artesian well. This has direct implications for (gendered) (re)productive labour: from labouring to produce fruits and vegetables in times of water availability on the *tomorqa,* to, following the onset of water scarcity, labouring to produce corn to feed the cow while cultivating tomato seedlings for the rented land, to then produce dairy products at home which are finally monetised. Therefore, despite the formalisation of rentals of *dehqon* land available to rural households seeking to commercialise production, work on the *tomorqa* is not necessarily alleviated – instead, in many cases, it continues to be the pacemaker of social reproduction for a large number of rural households, often regardless of whether they receive money flows from remittances. The increasing difficulty of maintaining the reliability of the *tomorqa* through constant planning around water scarcity reflects the corrosive impact of 'produced' water scarcity in Uzbekistan and sheds light on the nature of the compromise encapsulated in the Green Economy.

Additionally, based on conversations with male heads of the household, farming on *dehqon* and *fermer* lands is not associated with stability or financial security, which also has implications for labouring on and irrigating the *tomorqa.* As explained in Chapter 6, the formalisation of subleasing, e-auctions, and the *mahalla* committee's oversight of the activities of *dehqon* farmers engenders a new tiered and more sophisticated form of agricultural coordination. Whether renting a *dehqon* or *fermer* plot, every male interlocutor admitted to being obliged to fulfil a crop placement plan, although the terms varied depending on the size of the land and its location.

Shahnoza's son from Dostlik (see previous chapter) rents 0.6 ha of *dehqon* land on a 30-year lease, acquired through the e-auction website. Under its terms, he is obliged to sow corn. As he explained, 'every farmer has a plan, a *gosplan*. If you rent on that land, you have to grow on that land' (T11: May

27, 2023). A year later, during my follow-up visit, Shahnoza elaborated that 'people make money from the second harvest – because the first is about fulfilling the plan' (T11: July 25, 2024). This exhibits continuities from the system of procurement of cotton, where access to land provided lucrative production opportunities only *after* the fulfilment of production quotas (Veldwisch and Bock, 2011). However, while today there may be more freedom to choose what to grow and where to sell, the requirement to cultivate according to guidelines still limits *dehqons'* freedom in ways that uphold the importance of productivity on the *tomorqa.*

Such unintended chain effects were palpable during my visit to a 0.1 ha *tomorqa* in Samarkand's Toylaq district, managed by a man I will call Orif. In his lush and immaculately organised plot, he grows cabbage, tomatoes, and bell peppers in three polytunnel greenhouses (igloos), irrigated with a 12 m-deep *kachalka*, built around 25 years ago. For the last 18 years, Orif has also been renting 4 ha of land from a farm manager, whom he said changes every year, obliging him to renew the lease accordingly. This parcel of *fermer* land, irrigated with artesian water, is subject to a placement plan which he says yields only twice a year. When I asked, 'Which is more profitable, the rented plot or *tomorqa?*', Orif's immediate response was '*tomorqa'*, because it yields three to four times a year and he can choose what to grow on it. The rented land accrues labour costs for 10-15 people, as well as a tax that includes irrigation costs. On the *tomorqa* in turn, it is the women who work, in fact, as Orif emphasised: across the village, on all *tomorqas* the women do the work. In his household, he tells the women what to do, while dedicating most of his time to his less profitable farm.

According to Orif, his *tomorqa* does not experience water shortages or receding water tables. However, his plot is *directly* adjacent to a District Irrigation Department (DID) ditch that supplies water to the Soviet-era Bagizagan Winery, now registered as a cluster. Bagizagan's field spreads along the length of the *mahalla* houses and their plots, separated only by the narrow, unfenced canal, which, according to Orif, the inhabitants are not permitted to use. I imagined the abundant canal, shaded by rows of alternating walnut and mulberry trees on each side and visible from Orif's rear porch, to be nothing short of a temptation. Yet, Orif reassured me that his *mahalla's* water supply is stable; the Bagizagan vineyard has been consistently irrigated with artesian water for now 20 years, and he has not yet been compelled to dig a deeper well. Until shortly after independence, canals from the Zeravshan River reached their village and supplied enough water to the entire area, but today all producers rely exclusively on groundwater at varying depths – a precarious condition. For now, Toylaq's reserves are in an advantageous position: bordered by the Zeravshan River to the North and the Dargom canal to the South, it is in proximity to shallow groundwater recharge areas and thus less vulnerable to water shortages.

Nevertheless, the spatial composition of Orif's productive plot, irrigated with his old *kachalka* and lined by a forbidden irrigation ditch supplying water to a large cluster sourced from an artesian well, serves as a microcosm of the increasing *verticalisation* of water use. There is no guarantee that recharge levels

will hold, that the day Orif must replace his *kachalka*, while Bagizagan's canals flow on undisturbed, is not imminent. All of this unfolds under a land policy that is stringent yet commercially oriented, one that inadvertently sustains and entrenches women's labour on the *tomorqa* for rural social reproduction.

8.2 Beyond the plot but entwined with water: pasture enclosures, and the ambiguous transformation of work in Oqtepa

Despite my preoccupation with the relationship between agricultural modernisation and women's ability to work on their plots, I was unable to stave off the realisation that access to water on the *tomorqa* is an integral but insufficient component of the wider picture of Uzbekistan's rural transformation. From the construction of new roads to the ever-expanding sprawl of peri-urban areas fuelled by Uzbekistan's infrastructure boom, the *context* around remote villages such as Oqtepa and Dostlik is changing more rapidly than before. Beyond water scarcity, rural inhabitants speak of pasture enclosures, the polluting effects of sand dredging, and the proliferation of produce in the bazaars with '*himikati'* (chemicals), which they see as poisonous. These concerns are articulated amidst increased employment at said agribusinesses and intensive gardens, where smallholders are incorporated into new global value chains under conditions that are precarious but considered an improvement compared to pre-agricultural diversification when labour on cotton farms was the primary source of work. These developments represent the uneven and manifold expressions of the spatio-temporal fix (Jessop, 1991) underpinning the Green Economy. It is a fix that seeks to stabilise accumulation through infrastructural expansion and agribusiness growth, yet generates new contradictions in the process. Like water access precarity, these transformations defer the social costs onto seasonal labourers and smallholders from beyond the plot, yet are still inextricably tied to issues around water provision.

8.2.1 On pastures

I was able to observe these dynamics during my research in Oqtepa, whose remote location, far from the administrative centre of Jomboy and thus work opportunities, especially for women, makes it particularly sensitive to the impact of agribusinesses. Oqtepa is located on the edges of the Northern parts of Jomboy, bordering Jizzakh district. It is downstream of a canal originating in Zeravshan and, as mentioned previously, experiences frequent water shortages that, according to its inhabitants, have become especially acute over the last four to five years. Furthermore, since 2020, a 30-ha agrocluster and a 360-ha intensive garden have been established in the vicinity of Oqtepa. The 30-ha agrocluster grows vegetables such as onions and carrots, while the intensive garden cultivates almonds, walnuts, and other horticultural products. Both agribusinesses serve as additional sources of employment for Oqtepa and neighbouring villages. Within Oqtepa's borders, two cotton farms of around 30 ha each remain, along with smaller *dehqon* and other rented farmland that grow tomatoes and mungbeans. For example, among these lands are the leased 1-ha plots of Nigora's and Muhayo's husbands, which also employ local women.

Throughout its history, Oqtepa has been subjected to waves of land redistributions and consolidations broadly consistent with national trends, but recent land concessions to agribusinesses seem to have exerted a new type of influence on smallholders' livelihoods. Based on one of my conversations with the seasonal labourer and smallholder Laylo's (40s) hazy recollections, until around 2014, Oqtepa's agro-productive landscape included several 1-2 ha fruit orchards and eight to nine cotton farms of 8-9 hectares each. Laylo's father-in-law was among the leaseholders of such an orchard, which he rented from the government in 1996, a privilege granted to him thanks to his not insignificant role in the *kolhoz.* Two years before the lease's termination, Laylo's father-in-law's orchard, along with others in Oqtepa, was confiscated and consolidated into three large cotton farms. In 2020, two cotton farms had remained while one was broken apart and joined with land from a neighbouring village to create a 30 ha agrocluster, benefitting, according to Laylo and her brigade, from investment from 'Koreans' – a claim I was not able to triangulate.

The more significant change, however, has been the advent of the 360 ha intensive garden in the hilly plains of the former commons where Oqtepa and neighbouring villages used to herd their livestock. During my research in Dostlik, I had come to realise that land transfers to agribusiness owners or managers from the 'outside' were associated with loss of grazing land, as the outer grassy boundaries of cotton, wheat, and now vegetable farms often host livestock belonging to farmers and their neighbours, as an alternative to open pastures. This was Shahnoza's husband's experience from Dostlik, covered in detail in the previous chapter: after losing his job following the confiscation of his farm, he was obliged to sell five of his six cows and, as a result, lost income from the dairy Shahnoza produced. Shahnoza's experience echoes the grievances reported following land transfers to Indorama, which:

> refused to allow residents to rent small parcels of land, as they have traditionally done, to cultivate fruit and vegetables, graze their cattle or use remaining cotton stalks for heating and cooking to supplement their incomes (Schweisfurth, 2021)

Uzbekistan's New Agrarian Imaginary not only transforms outdated and 'leaky' farms into rational, efficient, productive, and consumptive units; it also subjects previously untouched commons to the same fate. Based on the account of my research assistant's mother, Gulnora, the prohibition on the use of pasture hills near Oqtepa appears to have happened unexpectedly, as conveyed by my notes following our conversation:

> I asked about the *intensivniy sad* – to which my RA's mother replied that many people sold their cows. There was a family that sold seven cows in one day. Currently, a number of people from the *qishloq* have sold their cattle and now work on the *intensivniy sad*. It is all seasonal work. She added that her family sold their cattle way back in 2006 because her oldest son bought a car (*implying that they were able to avoid a panicked sale).* (T9: May 21, 2023)

The immediacy with which Gulnora brought up livestock sales led me to infer that this must have been a major event for the inhabitants of Oqtepa. She also highlighted that the intensive orchard is equipped with refrigerators, a laboratory, and tractors. More importantly, however, as elucidated by discussions with other inhabitants, the land reclamation for the orchard was achieved by extending canal irrigation to the pasture lands, installing water-efficient technologies that pipe water from a *hauz* directly to the nut trees, and a 300-400 m-deep artesian well[44] to safeguard against shortages. While Laylo and her colleagues assured me that the irrigation of *intensivniy sad* does not affect their village's water levels, as it is sourced from a different canal, like the berry garden described in the previous chapter, the sprawling water- and land-privileged agribusiness is emblematic of the new landscape of land and water inequality in Uzbekistan. By mediating the creation of this new landscape, water is directly imbricated in smallholders' livelihoods beyond the limits of their plots, not only through water grabs, but also by enclosing pastures. As shown in the following paragraphs, enclosures slowly replace the autonomy of smallholding formerly afforded by access to natural resources with new forms of sustenance through increased opportunities for wage labour.

8.2.2 On work

Seasonal labour in Uzbekistan and many parts of Central Asia is largely sourced from self-organised brigades or informal groups called *mardikor* (casual wage labourers). Consisting predominantly of women, they began emerging in the mid-2000s due to demand for agricultural labour, particularly in cotton and increasingly in horticulture, as men sought work opportunities in Russia[45] (ILO, 2017; Reeves, 2011). Ethnographic studies from the early 2000s found that *mardikor* brigades emerged 'where labour resources far outstrip[ped] their access to land and where opportunities for alternative earnings [were] severely limited' (Kandiyoti, 2003, p. 239). A recent study on women's self-organised brigades (SOB) in Uzbekistan's horticulture sector argues that they can serve as units of collective bargaining for wages and working conditions against commercial farm employers. Charyyeva and Herzfeld cautiously posit that increased work opportunities, daily mobility, and flexibility afforded by a diversified seasonality and range of tasks in horticultural production, coupled with SOBs' ability to overcome information asymmetry, can be empowering for women. The authors seek to demonstrate that agricultural diversification is a positive development for rural labour in Uzbekistan (Charyyeva and Herzfeld, 2024). Without directly contesting the merits of diversification, my observations below reveal that while indeed there is more work to be done and for longer periods throughout the year, the claim of SOBs' empowering potential is very shaky, because the terms of employment and women's demand for labour can subordinate them to agribusinesses.

[44] I was unable to verify this claim

[45] Labour employment dynamics in cotton and horticulture in Uzbekistan tend to differ as cotton has a different seasonality and until 2020 relied on forced labour.

Before diversification and the advent of agribusiness, female *mardikors* in Oqtepa supplied seasonal labour for small horticulture farms, but this type of work was less abundant as the majority of lands were still occupied by cotton. Cotton, in turn, has a distinct seasonality and labour regime. In and around Oqtepa, in addition to participating in *mardikor* brigades, women have separate arrangements with cotton farms to work in spring, starting from March, and again from September to November. For their spring work, which entails soil preparation, seeding, and weeding, they receive payment in cotton stalks used as fuel, after the boll harvest. Cash, in turn, is paid only for the harvest. This labour arrangement has remained virtually unchanged since decollectivisation (Kandiyoti, 1998). To this day, women from poorer households in Oqtepa work the two remaining cotton fields, including Laylo, my main interlocutor.

Consistent with findings by Charyyeva and Herzfeld, the increased availability of work throughout the year, following the establishment of the *intensivniy sad* and cluster, has been described as a positive development. However, for many otherwise unemployed women, the new terms of work are scarcely different from those of non-agribusiness employers. For example, the village of Oqtepa has three brigades of 10-12 women each, led by a brigadier, that rotate among smaller and larger farms throughout the year. The labour relations with all farms, including the intensive garden and agrocluster are not contractual; they operate on verbal agreements made between the brigadier and *fermer* or an agronomist on a needs basis, despite Uzbekistan's Labour Code stipulating contract formalisation with seasonal workers (*The Labour Code of the Republic of Uzbekistan*, 2023). Furthermore, the national minimum wage regulation does not apply to seasonal labour (ILO, 2021) meaning that women's wages in agroclusters and intensive gardens are only marginally higher than those on independent farms. During a group discussion with a brigade unit headed by Laylo, the women told me that they receive 70,000 sums/day working on a 1-hectare farm, and 80,000 sums/day from an agrocluster or intensive garden. The labour in intensive gardens is known to be the hardest, demanding a variety of tasks such as planting, pruning, fertilising, building grafts, and monitoring drip irrigation, compared to vegetable agroclusters, which require mainly sowing and harvesting. As the brigadier Laylo added, 'the agronomist at the intensive garden puts a lot of pressure on us to work very hard' (T24: October 1, 2023).

In principle, Charyyeva and Herzfeld's argument that brigades may offer scope for collective bargaining for better working conditions is entirely reasonable. However, based on my conversations with women, this probably depends on the balance between the labour supply and demand at a particular locality. Oqtepa is highly remote, and the need for labour among its inhabitants is palpable. Its brigades compete for work with neighbouring villages which also supply labour to the intensive garden. The brigadier Laylo explained that the agronomist may call upon just six or eight women from her group, leaving half waiting for their turn (T24: October 1, 2023). The women added that they try to work as much as possible, every day if needed, even during holidays and particularly before the school season to afford

school supplies for their children (FG2: September 30, 2023). The agronomist in Oqtepa's intensive garden, in turn, acts as the arbiter of the interests of the agri-firm through his involvement in the configuration of the brigades themselves, evidenced by how Laylo became a brigadier in the first place. Just two years ago, she was a 'simple worker' in a different brigade. However, due to a disagreement between the intensive garden's agronomist and the former leader of Laylo's current brigade, the agronomist appointed Laylo as the new head (T24: October 1, 2023). While this is a situated case, it reveals the limits to the empowerment potential of self-organised brigades. Instead, as argued by Hougaard (2023) in a similar dynamic between small-scale farmers and a plantation in Colombia, it contributes to political immobilisation that reproduces asymmetries between the agribusinesses and seasonal labourers in what can be described as precarity and adverse incorporation.

At the same time, depending on the availability of labour in the household, female seasonal workers constantly balance their time between commitments at home and their plots, the cotton field, and work in brigades, in survival strategies scarcely different from those described by Kandiyoti in 1998. Among these, productivity on the *tomorqa* is prioritised. The group discussion with Laylo's brigade revealed that women flag their availability to work *only* on the condition that all their duties to their *tomorqas* had been fulfilled, as explained by Laylo:

> **Q: Which one do you spend more time on?**
> A: On our own land, of course.
> **Q: Who works in your garden while you are working in the intensive garden?**
> A: No one works, I have to work myself. If there is work on the farm, I will not go to the intensive garden. When I finish working on my farm, I go to seasonal work (T24: October 1, 2023).

Such tensions are absent in larger households that are oversupplied with male and female labour which often releases the latter from the requirement to work on the *tomorqa*. In Laylo's case, however, she and her three teenage daughters share responsibilities around growing tomatoes, potatoes, onions, and carrots for sale on the market and subsistence on their 0.25-ha plot, raising her youngest son, and working in seasonal labour. Laylo's husband, in turn, works as a taxi driver and is a seasonal labourer in Russia. Despite being located upstream of the village's irrigation canal, like many in Oqtepa, Laylo's plot has been affected by increasing water shortages. As in Dostlik, the necessity to engage in water turns has arisen only recently:

> **Q: Did the system of water sharing change in 10 years?**
> A: Yes it changed, because in the past, with water there was no problem. We didn't need to take turns. Because there was so much water, and the *ariq* was so big, but now it is so small, but in the past it was big.

Q: Do you argue with neighbours about the turn?

Sometimes yes

Q: How do you find a solution?

A: When we argue, we go to the point of the *ariq*, we dam up the water for there to be more water.

Also argued by Lombardozzi (2022), many women in rural Uzbekistan continue to bear an unequal reproductive workload and *continue* to self-exploit for underpaid, informal labour. While opportunities for engaging in this work have increased, the terms have scarcely changed – instead, the beneficiaries are now (transnational) agribusiness employers who profit from the continuities of the lax labour laws, while accelerating the depletion of local water resources, on which their workers rely for continued social reproduction. Furthermore, the confidence with which the women affirmed the priority of the household plot relative to seasonal labour suggests that seasonal labour, while essential, does not replace the security, and, as argued by Hougaard (2023), the self-determination, provided by smallholding.

8.3 Narrative weapons and autonomy

Following nearly thirty years of Karimov's repressive rule, I did not expect to encounter any particular forms of resistance to either water injustice or labour conditions. As a local researcher, critical of the mode of development in Uzbekistan, acknowledged: 'these days it can't be worse, because what they did to farmers under Karimov, taking away their lands, or imprisoning them, it just can't get any worse'. (E13: October 15, 2024). I conducted my research at a time when the dust from the excitement of the 'Uzbek Spring' had settled into a lightly transmuted political atmosphere and cautious economic optimism engendered by liberalisation. As demonstrated in the previous section, there are, after all, *more* work opportunities in rural areas. Water is becoming scarcer but still accessible through pumping and canals, and the geographical and environmental conditions of my case-study villages, characterised by larger farms and dispersed kitchen gardens in less densely populated Samarkand, meant that the type of women-led contestations around water, observed by Mukhamedova (2014) in Ferghana, were less visible to me, especially considering the sort of research I was able to conduct.

At the same time, despite the caution that many interlocutors exercised in my presence, I encountered many instances of what famously qualifies as 'weapons of the weak' (Scott, 1985) – rumours, remarks and attitudes indicative of smallholders' views on the new agricultural players and associated transformation in Uzbekistan. These are combined with references to self-reliance, what Millar (2014) and, later, Hougaard (2023) would call 'autonomy', a narrative used by those subjected to multiple rounds of dispossession to construct their life-worlds. These emerged more naturally than admissions of conflict over water, within the village, between fermers and smallholders, or even livelihood

hardships, possibly because they did not threaten the community's image to someone considered an outsider.

From Jessop's perspective, 'counter-hegemonic' narratives are not a given because hegemonic projects are, by default, unstable, full of gaps between discourses and practices, and by design, exclusive of some identities and interests (Jessop, 2014b). This echoes Scott's reflections on how the dominant ideology is rarely internalised by subordinate classes, particularly one 'that rationalizes their material deprivation and low status', explaining these classes' resistance to 'symbolic incorporation' (Scott, 1985, p. 320). The paragraphs below interpret moments of friction with the prevailing order. They do not intend to contradict previous descriptions of expressions of discontent in Uzbekistan's agrarian settings (Mukhamedova and Wegerich, 2014; Trevisani, 2008), but instead, provide an up-to-date characterisation of their manifestation against the changes happening in the country. They offer a window, however small, into the contradictions and limits of Uzbekistan's New Agrarian Imaginary.

Apprehension about agrarian change has most often been expressed as distrust of the safety and nutritional value of horticultural products grown in intensive gardens and out of season in greenhouses. I have encountered such attitudes at almost every plot I visited; *tomorqa* owners, men and women alike, were almost on every occasion proud of the superior quality of their produce. The primary concern is with pollution and pesticides. For example, following my visit to the *intensivniy sad* in the piedmont of the Urgut mountains, I returned to the Samarkand State University of Agriculture with a bag of cherries to share with the AKIS office staff. They immediately remarked that they did not expect the fruit to be any good and that my stomach would get sick from all the chemicals inside it. My research assistant and her colleagues took the time to explain that it is best to eat produce from the *ogorod* (kitchen garden/smallholding plot). Similarly, in June 2022, during a lunch conversation with a soil scientist in Bukhara's Vobkent region, I was warned against ordering a tomato salad with my *shashlik*, as it was not yet the season and the produce nowadays is not trustworthy; 'this is not the way to eat', he said. I perceive these as clear, value-laden messages that echo popular, long-held, and potentially essentialist (Trevisani, 2008, p. 200) sentiments that '*dehqons* are the backbone of the economy'[46], rooted in their (troubled) historic predominance in the food sector.

In Oqtepa, this distrust acquires a particularly ambivalent quality as the benefits of employment in the *intensivniy sad* are in tension with the inhabitants' perception of the safety of the job and produce. For example, in Oqtepa, my research assistant's mother, Gulnora, who is also a distant relative of Laylo, the brigadier, was very reluctant to disclose her views on the large, intensive garden near the village.

[46] I heard this expressed many times, especially by members of the government elite. It is even cited in the following United Nations Office for Disaster Reduction article announcing insurance schemes for smallholders: 'By leveraging public-private collaboration, we are not only expanding access to insurance but also ensuring that smallholder farmers - who form the backbone of Uzbekistan's economy - have the financial protection needed to withstand climate shocks.' (UNDRR, 2025 quoting Dr. Annette Detken)

Following a short exchange with her daughter, where the latter reassured Gulnora that neither the name of the village nor any of the interlocutors would be mentioned in my study, I received the following narrative:

> According to my RA's mother, the *intensivniy sad* sold its produce in Russia but no one bought the fruits because it had too many chemicals. There is a girl from the village who died from poisoning from the fruits. The chemicals caused a lot of pollution carried by the wind. After the fruits were returned from Russia, the *intensivniy sad* started adding less chemicals. Gulnora Apa complained that you can still smell the medicine from the mountains. She warned me that my research assistant would have issues with the government for telling me the story about the *intensivniy sad* (T9: May 21, 2023)

I was unable to triangulate this story, yet for the purpose of understanding locals' attitudes towards transformation, accuracy is secondary. As in Scott's *Weapons of the Weak* (1985), this account unveils the '"backstage" where gossip, tales, slander, and anonymous sabotage mocks and negates the public ritual order, [and] elite control fall[s] away' (p. 27). Behind female seasonal labourers' assurances that the presence of the *intensivniy sad* does not affect their water resources and that the availability of work allows them to purchase school supplies is an uneasiness about the threat to the community that its pollution poses. Laylo likely did not present a full picture of the challenges brigades in Oqtepa face. However, juxtaposed against passing comments such as Nigora's 'the best lands are for large farms and private businesses', these subtle exposures of genuine sentiment reveal that *fermer-dehqon* tensions described by earlier scholars (Oberkircher, 2011; Trevisani, 2008) are increasingly transposed onto agribusinesses, albeit with new anxieties around health and economic injustice.

While in my case studies, the expectation that these narrative weapons would be anchored in water dispossession has not materialised *explicitly*, this does not negate the reality that water is by default woven into these tensions. Furthermore, for inhabitants in water-scarce localities, the contemporary promise of accessing groundwater and thus relief from conflict-ridden water sharing, coupled with the individualised experience of scarcity due to plots' differential location along the web of village canals, possibly acts as a deterrent against the expression of overt hostility towards a particular target. Again, water's 'fuzzy' (Mehta et al., 2012) materiality obscures the cause of its decline, which is indeed scalar and entwined with national and international politics and surface and groundwater sources, shallow and artesian. The direct visibility of land inequality, already experienced during decollectivisation and multiple rounds of land consolidations, and the immediate exposure to '*himikati'* through food consumption, work, and livelihood precarity, emerge as far more identifiable forms of rural injustice.

Smallholders' misgivings about agribusinesses' products are accompanied by a resolve to uphold autonomy. It is expressed through their commitment to prioritise work on the *tomorqa,* as in the

previous section, or a boycott of certain products in shops, or those sold out of season, or even *intentional* production for self-consumption. For example, during my follow-up visit to Shahnoza's plot in Dostlik in July 2024, she told me that she and her neighbour started raising chickens together as they consider that the meat sold on the markets is unhealthy and unpalatable (T11: July 25, 2024). This constituted a novel attitude in which reproductive concerns attain a new, agential dimension, rooted in the mistrust of the agribusiness-other. While such views are held by men and women alike, the latter's role in social reproduction through household food production (and for sale) marks them as active agents in constructing the moral landscape around what constitutes good and bad food – itself a political act.

Finally, this sense of autonomy is articulated through regret: as in Nigora's case, regret that, in the past, when water was abundant, there was no need to spend money at the market. This was echoed by other women in Oqtepa, especially Surayyo, now in her 60s, with a 1-ha *tomorqa* and a household of five: herself, her husband, her youngest son, daughter-in-law, and granddaughter. Surayyo's description of the present, as paraphrased in my notes, exemplifies the contradictory feelings around change and dispossession:

> In the past, Surayyo and her family grew sunflower seeds and mungbeans (among others). The main reason they switched to alfa-alfa is because of water. They tried growing different types of fruits and vegetables but to no avail due to the lack of water. At the time, as she explained, they did not have to buy vegetables from the market but now it is a necessity. I commented that maybe it's not that good that they have to buy everything from the market, and she agreed, but later added that now there are *intensivnie sadi* and clusters, and people have more work and now they have good salaries. Living is less difficult because there are other employment options (T10: June 25, 2023).

Surayyo may have feared being overly critical and felt the need to sugarcoat her regret with an optimistic statement about development in Oqtepa, something I have frequently encountered in my research. Moreover, she has a son, an academic in Tashkent, who, despite earning a salary that is by no means high for the city, regularly sends money back. However, this regret, coupled with scattered comments I had noted throughout my research across Uzbekistan's various districts and regions, hints at an emerging consensus among those excluded from the spoils of the Green Economy. They reflect the widening ideological gap already rooted in Uzbekistan's historical agrarian class relations, exemplified by Rasanayagam's (2002) quote: 'There are no medium-sized firms in Uzbekistan, only large and small ones' (p. 55). I do not challenge his argument for the necessity of transcending dual-economy narratives, in which the state and the formal economy should not be seen as opposed to the household and the informal economy. In this particular case, however, narrative weapons, autonomy, and caution around disclosure are signs that it is received that the state mediates rural transformation, and thus sides with this other, the agribusiness.

8.4 So what now? Mapping dynamics of stratification in the smallholding sector

Whereas the lens of precarious water access and its increasing verticalisation paints a pessimistic picture of the state of smallholding in Uzbekistan, from the perspective of government ambition, small-farm cultivation is only in its nascence. The sector is highly variegated, and its members have an uneven relationship with the market in Uzbekistan. At the same time, as already explained, produce on the *tomorqa* has rarely *not* been commercial. Presently, as part of the Green Economy strategy, the government of Uzbekistan is taking initiatives to formalise and streamline production on both the *tomorqa* and rented *dehqon* plots using various policy measures, some of which are interrogated below. Considering the diversity of livelihoods that depend on smallholding in Uzbekistan, fieldwork findings and theory suggest that the outcomes of these initiatives will face ecological and path-dependent challenges and unravel along gendered lines. This is in part because ecologically, water access for smallholders, as demonstrated in Chapter 7, has not undergone significant reform. Combined with district administrators' preference for agribusiness, this lack of reform risks undermining smallholder formalisation efforts. The effects will also run along gendered lines. Because the *tomorqa* has historically served a reproductive function worked by women, intensification of the *dehqon* sector is most likely to take hold where a male household member manages it. The benefits of formalisation, on both tomorqa and *dehqon* plots, will therefore tend to accrue to men.

As explained in Chapter 6, as part of agricultural modernisation within the Green Economy, the Government of Uzbekistan has adopted a number of policies to stimulate the smallholding sector to encourage horticultural production and formalising export. They are aimed at mobilising the productive power of small farms – both *tomorqa* and *dehqon* lands by facilitating linkages with processing companies and stimulating local wholesale production through policies such as 'One Mahalla One Product' (OMOP) based on the 'One Village One Product' (OVOP) movement promoted globally by JICA (FAO, 2022; Presidential Decree No.5853, 2019; ZARNEWS.UZ, 2025). Dating to 1979, the OVOP scheme was developed in Japan by a local governor as a community revitalisation project and involved diversification away from stagnant rice cultivation towards a product 'that local people can be proud of, especially a product that can be marketed both domestically and internationally' (FAO, 2022, p. 4). It aims to harness the 'wisdom' and 'creativity' of locals and 'empower local leaders who can motivate and encourage the local community to cultivate their potentials and creative thinking' (p. 4). Conceptually adjacent to Geographical Indication, the language employed by proponents of OVOP, such as the FAO, draws on utopian notions of community harmony and a village's unique ecological qualities to encourage the production of local goods (not limited to agriculture) for the world market. OMOP, as a variant of OVOP to stimulate small-farm production in Uzbekistan, appears to be an Uzbek government-led extension of its Japanese predecessor, 'already proposed by the President Shavkat

Mirziyoyev 7-8 years ago' (Gazeta.Uz, 2025). JICA's original OVOP, in turn, operates in parallel in cooperation with UNDP to encourage grassroots entrepreneurship in Karakalpakstan (UNDP, 2025).

I came across two official explanations for the formalisation of smallholder production. The first is national – to contain food price inflation, meet the demand for food, and increase the population's income (Gazeta.Uz, 2020). The second, as explained to me in an informal conversation with representatives of the Ministry of Agriculture at an FAO conference, is to serve Russian supermarket chains, which have high standards and are experiencing increasing demand, spurred by Russian sanctions against the West. The usual exporters are informal 'middlemen' registered as 'logistics companies' who do not pay taxes and whose lack of access to storage and packaging facilities renders their goods less profitable due to high losses (PO: March 2, 2023). At the same time, international donors argue that Russia's war-induced decline in purchasing power is pushing Uzbekistan to diversify its export destinations. The share of the domestic market still predominates at 80%; however, exports have been rising nearly 20% year-on-year, and could in reality be higher as statistics tend to omit data from *tomorqa* and *dehqon* lands (Bubnys et al., 2024). OMOP thus becomes a way to rein in the unmet commercial potential of *tomorqa* and *dehqon* plots and to shed informal and inefficient wholesale buyers and exporters. From a metagovernance perspective, symbolically drawing on an internationally approved framework (OVOP) is a legitimation strategy enacted through networked coordination with international donors, aligning hierarchical state control and market mechanisms. It aims to absorb the smallholding sector into horticultural, export-led accumulation integral to Uzbekistan's New Agrarian Imaginary.

Essentially, OMOP, launched in 2019, transforms into another top-down crop placement system with patronising motives, now legitimised by the Green Economy. For example, the following excerpt, which I translated from Russian, is taken from the government press release for the revitalisation of the initiative in 2025:

> Our people have mastered the secrets of agriculture and gardening since ancient times. Today, many effectively use their garden plots and reap up to three harvests a year. However, in some areas, there are cases of neglect of garden plots. Yet a garden plot is a source of additional income and an effective means of ensuring employment and abundance.[…]. People themselves are not averse to earning income by growing crops, but they don't know what to plant, where to get seeds and seedlings, and they are concerned about whether they will be able to sell their produce (President of the Republic of Uzbekistan, 2025)

According to the above, traditional and backward smallholders are positioned as needing to be steered towards efficiency and productivity, which they have historically lacked. While the Ministry of Agriculture assures that OMOP is not another crop placement system (Gazeta.Uz, 2019), the

programme nonetheless proposes a wide range of measures, breaches of which are subject to sanctions. For example, it assigns a particular range of crops with specific varieties to be grown on *tomorqas* and *dehqon* plots to attract local and international wholesale buyers to the *mahallas* (ZARNEWS.UZ, 2025). Thousands of hectares of unused *dehqon* lands are to be leased through an auction system, confirming the *expansion* of the *dehqon* plot sector. Owners of subsidiary plots and leaseholders of *dehqon* lands will benefit from subsidised credit and be subjected to training from a 'separate council', which in turn will facilitate seed supply, cultivation, and export. '*Entrepreneurs*' who succeed in establishing export links for *tomorqa* plots, will qualify for seven-year subsidised credit of 17.5%, as well as other grants and support for a range of successful initiatives. Relevant to the Green Economy, the government intends to facilitate the import of 'modern agrotechnologies' and set up ''green' greenhouses'[47] in pilot regions. In particularly water-scarce districts, the government will cover half the costs of constructing rainwater-collection reservoirs. Finally, a key water-relevant component is the additional transfer of 3,300 ha of unused land in Karakalpakstan, Andijan, and Jizzakh, where 3-50 ha will be auctioned off for leases of up to 49 years, with minimum and maximum water supply limits. (President of the Republic of Uzbekistan, 2025). A 2020 activation of the initiative additionally announced that *mahallas* with poor water access are to be equipped with artesian wells, coordinated by the *hokimyat* and the Fermer and Dehqon Farm Association. According to the same announcement, failure to use private plots accordingly will be penalised by a warning and eventually, by an increased land tax. Finally, monitoring of these activities is to be conducted by drones (Gazeta.Uz, 2020).

In this non-exhaustive list of (threatening) policy promises, *tomorqa* and *dehqon* lands are homogenised into one, commensurable producer group, organised into *mahalla* units, whose productive capacities, until now apparently lying dormant, can be evenly activated to streamline the supply to an emerging exporter class. However, as demonstrated in previous paragraphs, the *tomorqa* plot is a basic source of livelihood and autonomy, often commercialised, around which households strategise water access precarity, crop type, labour, time, and various sources of employment. Efforts to institute OMOP in the above manner will inadvertently clash with the role of *tomorqas* in rural inhabitants' coordination of their survival strategies, where the material and social costs are even further displaced onto the reproductive burden on women and 'the super-exploitation of nature' (Jessop, 2014e). As demonstrated in previous paragraphs, commercial production on rented *dehqon* plots risks placing contradictory pressures on the *tomorqa* as a safety net against the risk of default or profit losses, thus exerting more pressure on women's labour. Water supply for *tomorqa* plots, in turn, has not undergone complementary reform, only permissions to drill shallow wells. A widespread, institutionalised encouragement of smallholder commercialisation risks accelerating groundwater withdrawals and thus ecological crisis.

[47] Translated from Russian

My research indicates that *tomorqa* plots are most likely to be *export*-oriented when a male head of household manages said plot. This is because women's capacity to scale up production is constrained by their socially assigned reproductive responsibilities, time poverty, and limited access to land, credit, and market networks. In the Samarkand region, men managed export-oriented household production by renting additional *dehqon* lands either from the government or, now, through a formal sublease from a *fermer*; however, this need seems to vary by region, *tomorqa* size, and crop type. For example, following my notes from my conversation with Orif from Toylaq, with a 0.1 ha *tomorqa* and 4 ha rented plot, who confirmed he has been consistently exporting his produce:

> The *dehqon* farmer sells his produce for export, which is his primary outlet. A car drives by and collects the products, after which they are sent to Kazakhstan, Afghanistan, Russia, Belarus, or Ukraine. 90% of *dehqons* first sell for export. Many houses have smaller *tomorqa* of 2-3 sotih, where they produce for subsistence or sell locally (T1: May 1, 2023)

This export-oriented arrangement was reported by Shahnoza's son from Dostlik and by Nigora's husband from Oqtepa, who cultivates tomatoes. Furthermore, during my research in 2023/2024, I did not encounter an active OMOP programme. Eventually, in a follow-up visit to Dostlik in Summer 2024, I inquired with Shahnoza's son about whether he was aware of it, to which he responded that the OMOP 'exists only on paper, it's just in newspapers. There is no one to develop it properly' (T11: July 10, 2024). He explained that the village has been specialising in kidney beans on rented *dehqon* plots because it was profitable and that decisions over what to grow were made autonomously, without interference. Moreover, the village has been working with a buyer for the last ten to fifteen years, specifically for the commercial sale of kidney beans. While Shahnoza's son confirmed that the beans are exported, I was unable to triangulate this information. However, this resonates with Orif's experience in Toylaq, where an 'exporter' picked up his produce in a van.

In other parts of Uzbekistan, where *tomorqa* plots can be larger, smallholders often export without renting additional *dehqon* land. However, the increased availability of *dehqon* plots following formalisation initiatives itself stimulates an expansion of production, in what tends to be a masculine endeavour. For example, Sharif from the Shahrisabz region had been exporting lemons grown on his *tomorqa* of around 0.2 ha after his return from labour migration in Irkutsk, Russia, in 2014. While he was away, his wife and children lived off his remittances and a subsistence plot of fruit and vegetables. Upon his return, he began cultivating lemons for export and has recently begun specialising in lemon cultivation 'as the roots of the plant take too much space' (T15: July 18, 2023). In recent years, he rented additional land from a neighbouring *fermer* to expand production and now grows more lemons under a greenhouse. Both plots are irrigated using a 15 m *kachalka*, and while its depth has not yet changed, Sharif noted that there are now five artesian wells scattered around the village, supplying

water to 150-200 families. He added that the exporting company he called the 'truck' had changed, but again he provided little detail, leading me to assume this is an informal operation.

While it has been challenging to find export data on small producers, evidence from official export companies' online accounts and blogs points to emerging friction between informal 'trucks' and privately registered export companies. Serving as the interface between the local and international markets beyond Central Asia and Russia, formal exporters are committed to maintaining internationally approved quality standards, certifications such as the Global Good Agricultural Practice, and all their corresponding implications, such as cold storage and packaging units, sorting and transportation, as well as linkages with banks through debt for wholesale purchase and demand for insurance products in case of losses due to poor electricity, for example.

According to my conversation with Dalatek's founder, pomegranates, walnuts, persimmons, and lemons are still primarily produced on *tomorqa* plots (B2, June 14, 2023). Other horticultural products are spread across various producer types – *tomorqa, dehqon, fermer* and intensive gardens and agroclusters, the latter of which tend to have their own export networks. The role of Dalatek and its affiliated Teodora Goods is to 'elbow out the middleman' – the 'logistics companies' and 'trucks' whose export methods lead to high levels of spoilage (Lillis, 2021). In a lengthy Facebook blog post, the entrepreneur laments the 'unfair' monopolistic middlemen pomegranate buyers whose negotiating tactics are inflating wholesale prices, preventing exports to prestigious markets such as Korea, and contributing to food wastage due to subpar storage practices (Atadjanova, 2024).

Such developments point to a new consolidating, 'entrepreneur'-branded exporting class whose members become nodal actors within the government's sanctioned narrative around efficiency, standards, and productivity, yet serve as a distinct driver of agricultural change. Indeed, within the metagovernance logic of the Green Economy, actors like the founder of Dalatek are an extension of the values already endorsed by OMOP and, in tandem with it, mediate the horticultural accumulation strategy by operationalising the Green Economy. They discipline smallholders into value chains while excluding those without capital, access to water, or time – especially women. Whether OMOP, as a top-down, national manifestation of accumulation in the horticultural sector, with potentially repressive elements, will materialise as a successful movement is yet to be seen; however, based on the progress made by private export companies, formalisation efforts are already bearing fruit for smallholder absorption into the horticultural accumulation strategy. Formalised integration with its international standards risks intensifying class differentiation of small producers already prevalent during the system of the state order for cotton, but this time, under new, 'green' rationalities. In conjunction with the New Agrarian Imaginary's pressure on water resources, this risks accelerating water dispossession and entrenching the ecological exposure of more vulnerable rural households.

8.5 Conclusion

This chapter builds on Chapter 7 by tracing how the metagovernance selectivities of Uzbekistan's Green Economy, designed to operationalise an export-led horticultural accumulation strategy, are internalised by rural inhabitants. It examines how the Green Economy's spatio-temporal fix, manifesting as hydrosocial reterritorialisation, displaces its social and ecological costs onto women's labouring bodies and the environment, as households confront the contradictions of water scarcity and livelihood reproduction. The goal is to further demystify Uzbekistan's water 'crisis' by exposing its lived experience and its entanglement with broader questions of agrarian development in Uzbekistan. Subsequent sections build on these entanglements by examining the ambiguous outcomes of water and agricultural transformation beyond the *tomorqa* – how increased work opportunities on the very farms that entrench water inequality are perceived by those subjected to water dispossession. Seasonal workers recognise the benefits of increased availability of work yet nonetheless, as the chapter argues, anchor their livelihoods on the autonomy afforded by the *tomorqa*. The chapter then ties this sense of autonomy to a cautious apprehension about rapid transformation in rural Uzbekistan, filtered through ambivalent sentiments: distrust of agribusinesses and their polluting chemicals, a subtle recognition of land inequality, and regret that water is no longer abundant. The final section revisits Uzbekistan's (Green Economic) attempts to absorb smallholders into the new export-led horticultural growth and reflects on their stratifying effects.

Thematically, this chapter connects social reproduction to the environmental toll of capitalist expansion. As Katz emphasises: 'social reproduction always takes place somewhere, and the environments for its enactment are integral to its outcomes' (Katz, 2001, p. 716). By entrenching water scarcity, the environment in rural Uzbekistan is making it increasingly difficult, and possibly unprofitable, for rural dwellers to continue anchoring livelihood strategies around the *tomorqa*. However, these difficulties are alleviated by a simultaneous replenishment of sources of livelihood through precarious, seasonal labour opportunities available under Uzbekistan's Green Economic transformation. The use of space in and around the village is also changing, propelled by the simultaneous processes of individualisation of water use and pasture enclosures by agribusiness. At the same time, it is unclear whether these work opportunities are sufficient to ease rural social reproduction or merely entrench rural precarity by accelerating water depletion. This requires further research into the amount and type of job opportunities available to rural dwellers, particularly to women – whether the promises of growth under the Green Economy will help alleviate their reproductive burden by offering attractive jobs, or, on the contrary, further confine them to continued difficult labour on their plots.

Considering the gendered division of labour on and between the *tomorqa* and *dehqon* plot, and smallholding formalisation efforts by the government and private sector alike, engendered by the horticultural accumulation strategy under the Green Economy imaginary, the odds point to the latter.

Programmes like OMOP, whether or not holistically applied, are likely to intensify rather than alleviate rural stratification. In other words, there is a risk that intensification of smallholding production in rural Uzbekistan to service the national and export sectors will put additional pressures on women to support male-dominated commercial production, and the manner in which this will unfold is likely to be highly uneven, mediated by institutional, gendered, and spatial asymmetries.

CONCLUSION[48]

Introduction

From an *aerial* view, notwithstanding its apparent theoretical and conceptual density, the chapters of this thesis cumulatively trace how agricultural decentralisation and privatisation in Uzbekistan, however gradual and mediated by post-socialist and other historically specific conditions, produce dispersion, stratification, and scarcity. In this sense, the findings of this research do not contradict the tenets of critical rural studies as posited by its scholars, such as Bernstein and Akram-Lodhi – that rural resource concentration under contemporary globalisation contributes to differentiation and heterogeneity without truly resolving the agrarian question (Akram-Lodhi et al., 2021). However, in the context of climate-alarmism-driven resource appropriation by agribusiness, this differentiation takes on a particularly acute, slow-violent form. Whereas before, land and water grabs were legitimised by 'responsible investment' for economic growth (Borras Jr and Franco, 2013), currently, they are subjected to a new layer of legitimation under the Green Economy.

At the same time, context *does* matter, because it is the lens through which effective policy interventions must be filtered. The Strategic-Relational Approach (SRA) was adopted to highlight this very reality, to account for the simultaneous specificity of Uzbekistan's agricultural transformation, while foregrounding the synchronisation of its outcomes with global trends. By combining SRA with the literature on the political ecology of water and social reproduction, I was able to shed light on the contradictory process of agricultural consolidation of land and water by agribusiness, one that has uneven spatialised and embodied effects on rural dwellers. Water, as an indispensable input for agricultural production, becomes a valuable entry point for interrogating these developments. The intensifying competition for water among households with *tomorqa* plots, an expanding commercial small-farm sector, and now-dominating agribusinesses cherished in 'Green' Uzbekistan, offers a window into how new water scarcities are actively produced through asymmetrical socio-ecological relations.

9.1 Research questions and approach

To reiterate, the research questions motivating this thesis are:

1) Why were Water User Associations dismantled?
2) How does Uzbekistan's agricultural modernisation reconfigure water access relations?

[48] Sections of this conclusion will appear in an edited volume (in print)

3) Impact on smallholders: How is the reconfiguration of water access relations affecting small farmers in Uzbekistan? How are these new relations experienced? How does this affect the continuity of smallholding in Uzbekistan?

As mentioned in the introductory chapter, my fixation with getting to the bottom of why WUAs were dismantled has led me to investigate the trajectory of Uzbekistan's agricultural change. The dismantling of WUAs, a Western-endorsed institutional import that had the peculiar role of upholding socially mediated water access relations centred on the priority of production for the state order in Uzbekistan, suggested the possibility of a significant transformation of these relations. The questions above, therefore, combined with a Critical Realist (CR) ontological and epistemological lens, guided my inquiry into the mechanisms, causes, and articulations of this transformation, and its impacts on smallholders' water access experience.

Analytically, CR's ontological and epistemological foundation, its intrinsic scepticism and valorisation of theory, allowed me to bridge the role of development interventions with the materiality of water and the historically produced social relations that shape access to it. Drawing on CR's stratified ontology, I interpreted empirical patterns, such as WUA dissolution, uneven water scarcity, and the rise of agribusiness, as surface-level manifestations of deeper generative mechanisms operating at the real level. These generative mechanisms include the interaction between structural biases and path-shaping forces engendered by international development interventions, which produce hegemonic projects, with new selectivities (in a dialectical/strategic-relational manner). To identify these mechanisms, my research design relied on retroduction. I moved iteratively between field observations and theoretical abstraction to infer causal structures not directly observable. This retroductive process unfolded through cycles of fieldwork, reviewing literature, and re-theorisation, during which unanticipated empirical findings (the first being the dissolution of WUAs), such as the increasing reliance on groundwater and the rapid expansion of horticultural agribusiness, prompted shifts in my theoretical framework toward hydrosocial territories, social reproduction, and SRA. CR and retroduction thus enabled me to transcend neo-institutional accounts of water governance failure in Uzbekistan, and to explain how underlying causal mechanisms, rooted in political economy, state selectivities, and the metagovernance of development aid, produce new water inequalities experienced by smallholders today.

9.2 Main arguments

Firstly, this thesis elucidates how development interventions, namely institutionalisation of WUAs and agricultural diversification, acquire a particular, nationally mediated, localised form through their interaction with structural selectivities of Uzbekistan's political economy of agricultural production. Through the government's metagovernance practices, or collibration, understood as purposive steering, occurring within a structurally biased context, WUAs were folded into the prevailing agricultural system, to support a horizontalised modality of hydrosocial territorialisation that was underpinned by

production for the state order. Within this modality, smallholders' access to water was socially embedded within patronage networks with larger farmers, mediated by surface-water interdependencies, while their contributions to food production, at least within the bimodal agricultural structure, externally legitimised their water claims. These water claims were in constant tension with *fermers'* responsibility to the state order, yet nonetheless can be argued to have constituted an avenue for negotiation, however conflictual.

Agricultural modernisation, legitimated by the Green Economy hegemonic project, in turn, redefined these relations. This thesis finds that the manner in which agricultural diversification has unfolded was strongly influenced by international development organisations' interventions. International development organisations initially sought to reform the cotton sector directly; however, due to Uzbekistan's resistance and, again, metagovernance practices, they were compelled to recalibrate their interventions to remain compatible with local constraints. For example, despite development projects' commitments to support smallholders and large farmers through sub-loan programmes distributed initially through the involvement of WUAs, the combination of the 'ineffectiveness' of WUAs, and Uzbekistan's Rural Restructuring Agency's channelling of sub-loans to large farmers, undermined these efforts. Furthermore, as contextualised by the literature review, at the global level, this occurred at a time when participatory governance was giving way to a newfound commitment to techno-managerialism, rooted in the new Green Economic paradigm. From this perspective, waning support for WUAs in Uzbekistan likely resulted from a combination of local failures and (ever)-shifting dogmas at the global scale. The cumulative result of agricultural diversification efforts was the emergence of an agribusiness class poised to compete with smallholders in food production, rendering their former economic role increasingly irrelevant.

Under Uzbekistan's Green Economy, the new *hegemonic project,* the pattern of contingency launched during agricultural diversification efforts formed the basis for a new strategy of agricultural accumulation of export-led horticultural growth. Climate adaptation, rationality, modernity, and water-use efficiency serve as discursive anchors to create a new, preferred agricultural subject – a rational 'businessman', with the capacity to invest in 'water-saving technologies' and who epitomises Uzbekistan's New Agrarian Imaginary. Water governance institutions were, as a result, reformed to serve this new agricultural actor: through the dissolution of WUAs and the recentralisation of water management, state water institutions can now deliver water directly to new, large farms, without the guise of 'participation'.

The New Agrarian Imaginary, rooted in Green Economic ideals in agricultural modernisation, becomes a new metagovernance device that steers state structures and actors at the regional and district levels. However, this new device inadvertently interacts with path dependencies. For example, the path-dependent role of district and provincial *hokims* in delivering agricultural targets, now geared towards increased exports rather than mere cotton targets, encourages them to continue deploying the same

hydro-authoritarian modes of intervention in water distribution, but towards new recipients – agribusinesses with the capital to install water-efficient technologies. This feeds back into water allocation, as water limits are adjusted to meet an expected reduction in water demand resulting from the efficiency of these technologies. However, when these policies interact with materialities of Uzbekistan's water supply (such as high sedimentation and inconsistent flows) and requirements of irrigation technology, they inadvertently encourage agribusinesses to engage in practices that hedge against water shortage risks, such as water hoarding and groundwater supplementation, to ensure the continued operation of their farms. In this thesis, these processes are identified as (some) of the causal mechanisms that produce Uzbekistan's new hydraulic territories and scarcities.

At the same time, the expression of these causal mechanisms varies across contexts. In the case study of Dostlik, they are experiencing reduced availability of surface-level water, which encourages *fermers* and smallholders to extract groundwater as well. The obligation to rely on groundwater resources dis-embeds the previously socially-mediated strategies of water access and reflects the process of hydrosocial *re*territorialisation, characterised by the verticalisation and individualisation of water use, and concomitant anxieties about gradually depleting water tables. This dis-embedding is further entrenched by the non-local identities of new agribusiness managers, who are not bound by social obligations to village communities. The transition to this new modality of hydrosocial territorialisation is also gradual; as the case of Dostlik demonstrated, new and old forms coexist, as smallholders located near large farms continue sharing water with them, while those less privileged have switched to pumping.

Finally, hydrosocial reterritorialisation produces ambiguous effects. In remote villages, downstream of irrigation canals where water scarcity is particularly acute, shortages entrench the burden on women's labour. Unfortunately, this burden does not seem to be alleviated by households' option to rent additional *dehqon* plots from the government, in part because of the continued, superior profitability of *tomorqas,* and the gendered division of labour within the household. The commercial orientation of production on *dehqon* plots, carried out by men, means households still rely on *tomorqas* as a livelihood crutch, as well as for productive purposes such as seedling cultivation, which is carried out by women. Uzbekistan's spatio-temporal fix, engendered by the New Agrarian Imaginary, thus displaces its contradictions not only onto nature, by depleting groundwater resources, but also onto women's labouring bodies.

Furthermore, increased availability of employment opportunities in new agri-firms, particularly in more remote localities, is the development that taints Uzbekistan's agricultural liberalisation with ambiguity. Women's increasing reliance on wage labour and the gradually diminishing role of smallholding plots, although entrenching precarity, benefits female seasonal labourers despite failing to alleviate their unequal social reproductive burden. At the same time, the patterns of labour and financial adaptations required to accommodate increasing water precarity, may risk offsetting the economic opportunities

offered by intensive gardens and agroclusters, especially in water-vulnerable localities. Agri-firms, in turn, benefit from an unenforced regulatory labour landscape that allows them to continue informalised labour relations prevalent before their arrival, to the detriment of seasonal labourers. Presently, from the perspective of female labourers and smallholders, irregular precarious work does not replace the security offered by their increasingly irrelevant plots.

Finally, it remains to be seen whether the government's efforts to commercialise *dehqon* production will bear fruit. Because it is primarily a masculine undertaking, it risks reproducing women's exclusion from commercial production, although this is not set in stone. Based on the evidence so far, small farm commercialisation is likely to entail further fragmentation along class and gendered lines as the market entrenches its penetration into the fabric of rural life.

9.3 Avenues for further research

From an empirical perspective, due to my failed concerted and multiple attempts to engage more deeply with the 'field' or local-level dynamics, this thesis remains rather 'broad-brush'. It touches on a range of theoretical and empirical topics but falls short of providing a comprehensive investigation of any particular one. In this sense, an ethnographic immersion, to understand the relationships between water scarcity, state power, labour (including social reproduction), and fragmentation, particularly their implications for women in contemporary Uzbekistan, to tie the plethora of 'loose ends' left in this research, is highly warranted. On a more concrete thematic level, I suggest three additional avenues to achieve a more comprehensive understanding of the processes addressed in this research.

The first is on groundwater extraction in Uzbekistan. As we have seen, the proliferation of groundwater extraction is increasingly shaping rural livelihoods, yet its *governance* is severely underexplored. So far, I have come across only one non-technical research article on the topic, by Knorr, Theesfeld, and Soliev (2022) cited in Chapter 7, that examines groundwater regulation practices. However, more research is needed on emerging inequalities in groundwater access and the economics of pump acquisition. For example, during my research, I learned that rural inhabitants have 'contacts' and 'know a guy' who installs artesian wells, which, if not registered with authorities, are considered illegal. Furthermore, groundwater is considered 'drinking' water, and is thus inter-sectoral, serving both agricultural and municipal purposes. It constitutes a new 'hydrosocial space' that warrants further examination.

Second, more national and international research could examine the Green Economy in Uzbekistan and Central Asia. Donald Trump's Presidency has shaken the foundations upon which the Green Economy was built, diluted some of the ambition around climate mitigation, and propelled support for renewed fossil fuel extraction. At the same time, something I have not addressed in this thesis is that countries like China and the United Arab Emirates (UAE) have emerged as leaders in this new, 'Green Economic'

space. In 2020, Yifei Li and Judith Shapiro published the book *China Goes Green: Coercive Environmentalism for a Troubled Planet*. While I do not draw directly on this book, I find that the developments it describes are highly relevant to Uzbekistan, where ecological imaginaries become intertwined with civilisational and developmental ambitions, enabling environmental governance to serve as a source of political legitimacy while risking further constraints on individual freedoms. This touches on questions of new articulations of 'globalisation', 'neoliberal authoritarianism' and 'environmental authoritarianism', where capitalism, developmentalism and ecology converge to fuel authoritarian practices with new momentum.

Finally, a third key avenue requiring further research (although this is not an exhaustive list) is an in-depth investigation into agribusinesses, cotton *and* horticultural, and how they interact with resource grabbing and state power. Chapters 7 and 8 have shed some light on how agribusinesses support and constrain the power of district and regional authorities; however, much more work is needed in this area. Because they comprise national and international actors and capital, they internationalise Uzbekistan's state elites. Agribusinesses from South Korea, the UAE, the US, Russia, among others, are now among some of the largest recipients of land and resource concessions. Unlike unitary commercial fruit and vegetable fermers, their farms are not, *arguably*, under immediate threat of having their leases suddenly terminated and redistributed to a more profitable investor, as this would risk damaging Uzbekistan's international relations. Understanding the political and ecological articulations and implications of this requires further investigation.

References

Abdullaev, I., Akhmedov, I., Ghoyipnazarov, N., Henkel, C., Majidov, T., Rashidov, O., Thurman, M., Ul Hassan, M., & Yakubov, M. (2006). *Guidebooks for water users' associations in Uzbekistan* (Project No. 30502) [Technical assistance consultant's report]. Asian Development Bank, Manila.

Abdullaev, I., & Mollinga, P. P. (2010). The socio-technical aspects of water management: Emerging trends at grass roots level in Uzbekistan. *Water*, *2*(1), 85–100.

Abidkhadjaev, U., Proskuryakova, T., Leow, W., & Melecky, M. (2025). Uzbekistan's green leap. *World Bank Blogs*. https://blogs.worldbank.org/en/climatechange/uzbekistan-s-green-leap

Adylbekova, K. (2023, July 22). *Water crisis looming: Uzbekistan and Turkmenistan's imperative for the grand Afghan canal*. CABAR.Asia. https://cabar.asia/en/water-crisis-looming-uzbekistan-and-turkmenistan-s-imperative-for-the-grand-afghan-canal

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

Agro.uz. (2023, May 17). *Unique cultivation methods in an intensive garden in Jomboy*. Ministry of Agriculture. https://www.agro.uz/ru/17052023-1/

Ahlers, R. (2010). Fixing and nixing: The politics of water privatisation. *Review of Radical Political Economics*, *42*(2), 213–230.

Ahlers, R., & Zwarteveen, M. (2009). The water question in feminism: Water control and gender inequities in a neo-liberal era. *Gender, Place & Culture*, *16*(4), 409–426.

Ahmed, I. I., & Lipton, M. (1997). *Impact of structural adjustment on sustainable rural livelihoods: A review of the literature* (IDS Working Paper No. 62). Institute of Development Studies and Poverty Research Unit, University of Sussex, Brighton.

Akram-Lodhi, A. H. (2007). Land, markets and neoliberal enclosure: An agrarian political economy perspective. *Third World Quarterly*, *28*(8), 1437–1456.

Akram-Lodhi, A. H., Dietz, K., Engels, B., & McKay, B. M. (Eds.). (2021). *Handbook of critical agrarian studies*. Edward Elgar Publishing, Cheltenham.

Akram-Lodhi, A. H., & Kay, C. (Eds.). (2009). *Peasants and globalisation: Political economy, rural transformation and the agrarian question*. Routledge, London.

Al Jazeera. (2025, November 12). *As the dams feeding Tehran run dry, Iran struggles with a dire water crisis*. https://www.aljazeera.com/news/2025/11/12/as-the-dams-feeding-tehran-run-dry-iran-struggles-with-a-dire-water-crisis

Ali, S. M., & Acquaye, A. (2024). An examination of water-energy-food nexus: From theory to application. *Renewable and Sustainable Energy Reviews*, *202*, 114669.

Allan, J. A. (2004). Virtual water: Part of an invisible synergy that ameliorates water scarcity. In P. Rogers, R. Llamas, & L. Martinez-Cortina (Eds.), *Water crisis: Myth or reality?* (pp. 1–16). Taylor & Francis/Balkema, London.

Anceschi, L. (2019). Regime-building through controlled opening: New authoritarianism in post-Karimov Uzbekistan. In C. Frappi & F. Indeo (Eds.), *Eurasiatica* (Vol. 13). Edizioni Ca' Foscari, Venice.

Amnesty International. (2015, July 2). *The Andijan massacre remembered*. https://www.amnesty.org/en/latest/news/2015/07/the-andijan-massacre-remembered/

Aronowitz, S., & Bratsis, P. (2002). State power, global power. In S. Aronowitz & P. Bratsis (Eds.), *Paradigm lost: State theory reconsidered* (pp. xi–xxvii). University of Minnesota Press, Minneapolis.

Arrighi, G. (2004). Spatial and other fixes of historical capitalism. *Journal of World-Systems Research*, *10*(2), 527–539.

Asfaw, E. (2020). "Dehqan" farms: Uzbekistan's underserved 70 percent (CPRO Policy Brief No. 2000-08) [Policy brief]. Westminster International University, Tashkent.

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

Asian Development Bank. (2006). *Uzbekistan (2006–2010)* (Country strategy and programme) [Environment and Natural Resources Division]. Asian Development Bank, Manila.

Asian Development Bank. (2012). *Uzbekistan: Country partnership strategy (2012–2016)*. https://www.adb.org/documents/uzbekistan-country-partnership-strategy-2012-2016

Asian Development Bank. (2013). *Uzbekistan: Innovations for agriculture modernisation*. https://policycommons.net/artifacts/387858/uzbekistan/1352377/

Asian Development Bank. (2016a). *Detailed sector assessment: Agriculture, natural resources, and rural development* (Horticulture Value Chain Development Project, Supplementary Document 15, RRP UZB 47305). Asian Development Bank, Manila.

Asian Development Bank. (2016b). *Lessons & synergies* (Horticulture Value Chain Development Project, Supplementary Document 18, RRP UZB 47305). Asian Development Bank, Manila.

Asian Development Bank. (2016c). *Proposed loan republic of Uzbekistan: Horticulture value chain development project* (Report and Recommendation of the President to the Board of Directors, No. 47305-002). Asian Development Bank, Manila.

Asian Development Bank. (2018, May 31). *Horticulture value chain development project (additional financing): Report and recommendation of the President*. https://www.adb.org/projects/documents/uzb-47305-004-47305-002-rrp

Asian Development Bank. (2023a). *Projects and tenders: Uzbekistan, agriculture*. https://www.adb.org/projects/country/uzbekistan/sector/agriculture-natural-resources-and-rural-development-1057

Asian Development Bank. (2023b). *Uzbekistan: Horticulture value chain development project* (Completion Report, Project Nos. 47305-002 & 47305-004). Asian Development Bank, Manila.

Asian Development Bank. (2024). *Uzbekistan: Country partnership strategy (2024–2028)*. https://www.adb.org/documents/uzbekistan-country-partnership-strategy-2024-2028

Asthana, A. N. (2010). Is participatory water management effective? Evidence from Cambodia. *Water Policy*, *12*(2), 149–164.

Atadjanova, D. (2024, December 2). *The story of how Uzbekistan will lose tens of millions of dollars on fresh pomegranates* [Status update]. Facebook. https://www.facebook.com/share/p/1V7D1g8K5p/

Babadjanov, J., & Petrick, M. (2023). Uzbekistan's cotton clusters in the context of the industrial policy debate. *Eurasian Geography and Economics*, *64*(7–8), 1–30.

Babasyan, D. (2024). The financial system. In B. Mirkasimov & R. Pomfret (Eds.), *New Uzbekistan: The third renaissance* (1st ed., pp. 80–111). Routledge, London.

Baglioni, E., & Gibbon, P. (2013). Land grabbing, large- and small-scale farming: What can evidence and policy from 20th century Africa contribute to the debate? *Third World Quarterly*, *34*(9), 1558–1581.

Baumann, M. D. (2023). Examining land rental markets' linkages to land and water control in Colombia's irrigation megaprojects: Integrating the political economy of agrarian change and the political ecology of vulnerability. *The Journal of Peasant Studies*, *50*(5), 1975–2001.

Banfield, G. (2019). Critical realism for ethnography. In *Oxford research encyclopedia of education*. Oxford University Press, Oxford.

Bankwatch. (2023). *Indorama Agro: Uzbekistan's infamous cotton producer*. Bankwatch. https://bankwatch.org/project/indorama-agro-uzbekistan-s-infamous-cotton-producer

Baranski, M. R. (2022). *The globalisation of wheat: A critical history of the green revolution*. University of Pittsburgh Press, Pittsburgh, PA.

Barnes, J. (2015). Who is a water user? The politics of gender in Egypt's water user associations. In L. M. Harris, J. A. Goldin, & C. Sneddon (Eds.), *Contemporary water governance in the global south: Scarcity, marketisation and participation* (1st ed., pp. 185–199). Routledge, London.

Barrow, C. W. (2005). The return of the state: Globalisation, state theory, and the new imperialism. *New Political Science*, *27*(2), 123–145.

Bauer, C. J. (1997). Bringing water markets down to earth: The political economy of water rights in Chile, 1976–1995. *World Development*, *25*(5), 639–656.

Benson, D., Gain, A., & Rouillard, J. (2015). Water governance in a comparative perspective: From IWRM to a "nexus" approach? *Water Alternatives*, *8*(1), 756–773.

Berbel, J., Gutiérrez-Martín, C., & Expósito, A. (2018). Impacts of irrigation efficiency improvement on water use, water consumption and response to water price at field level. *Agricultural Water Management*, *203*, 423–429.

Besky, S. (2014). *The Darjeeling distinction: Labor and justice on fair-trade tea plantations in India*. University of California Press, Berkeley.

Bhaskar, R. (1978). On the possibility of social scientific knowledge and the limits of naturalism. *Journal for the Theory of Social Behaviour*, *8*(1), 1–28.

Bhaskar, R. (1998). *The possibility of naturalism: A philosophical critique of the contemporary human sciences* (3rd ed.). Routledge, London.

Bhattacharya, T. (2020, January). Liberating women from "political economy." *Monthly Review*, *71*(8), 1–13.

Bichsel, C. (2012). "The drought does not cause fear": Irrigation history in Central Asia through James C. Scott's lenses. *Revue d'études Comparatives Est-Ouest*, *43*(1–2), 73–108.

Bina, O., & La Camera, F. (2011). Promise and shortcomings of a green turn in recent policy responses to the "double crisis." *Ecological Economics*, *70*(12), 2308–2316.

Biswas, A. K. (2008). Integrated water resources management: Is it working? *International Journal of Water Resources Development*, *24*(1), 5–22.

Blaikie, P. (1999). A review of political ecology: Issues, epistemology and analytical narratives. *Zeitschrift für Wirtschaftsgeographie*, *43*(1), 131–147.

Blazquez, J., Galeotti, M., & Martin-Moreno, J. M. (2021). Green recovery packages for a post-Covid-19 world: A lesson from the collapse of Spanish wind farms in the past financial crisis. *Renewable and Sustainable Energy Reviews*, *151*, 111570.

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

Borchardt, D., Bogardi, J. J., & Ibisch, R. B. (Eds.). (2016). *Integrated water resources management: Concept, research and implementation*. Springer International Publishing, Cham.

Borras, S. M., Jr., & Franco, J. C. (2013). Global land grabbing and political reactions 'from below.' *Third World Quarterly*, *34*(9), 1723–1747.

Boukalas, C. (2014). No exceptions: Authoritarian statism. Agamben, Poulantzas and homeland security. *Critical Studies on Terrorism*, *7*(1), 112–130.

Boussard, J.-M. (1992). *The impact of structural adjustment on smallholders*. Food and Agriculture Organisation of the United Nations, Rome.

Boyce, J. K. (2011). Keith Griffin. *Development and Change*, *42*(1), 262–283.

Brears, R. (2015). *The circular economy and the water-energy-food nexus* (NFG Policy Paper No. 7). Freie Universität Berlin, Berlin.

Brears, R. (2022, November 30). Green economy and the water-energy-food nexus. *Mark and Focus*. https://medium.com/mark-and-focus/green-economy-and-the-water-energy-food-nexus-a35f467c6f54

Brinkerhoff, D. W., & Brinkerhoff, J. M. (2011). Public–private partnerships: Perspectives on purposes, publicness, and good governance. *Public Administration and Development*, *31*(1), 2–14.

Bubnys, S., Buschmeier, J., Faryniarz, S., & Arndt, C. (2024). *Market research for horticulture products grown in Uzbekistan 2024* (The Horticultural Value Chain Development Project). JICA ISCAD, GOPA AFC, & Eurasian Consulting and Engineering Services. https://issuu.com/afc-agriculture_finance/docs/24-04-30_horticulture_market_research_uzbekistan

Bunce, B., Hornby, D., & Cousins, B. (2024). Navigating the contradictory dynamics of production and social reproduction in collectively owned agricultural enterprises in South Africa's land reform. *Journal of Agrarian Change*, *24*(3), e12585.

Burkett, P. (1999). *Marx and nature: A red and green perspective*. St. Martin's Press, New York.

CABAR. (2021, February 11). *Uzbekistan: Government debt almost doubled in two years*. Central Asia Bureau for Analytical Reporting. https://cabar.asia/en/uzbekistan-government-debt-almost-doubled-in-two-years

Caprotti, F., & Bailey, I. (2014). Making sense of the green economy. *Geografiska Annaler: Series B, Human Geography*, *96*(3), 195–200.

CAREC. (2023, October 30). *36% of water in Uzbekistan's agriculture is lost in earthen canals – CACIP Central Asia Climate Information Portal*. Regional Environmental Centre for Central Asia. https://centralasiaclimateportal.org/36-of-water-in-uzbekistans-agriculture-is-lost-in-earthen-canals/

CAREC. (2024, January 25). *"It's time to change the stereotype that water is free" – Shavkat Mirziyoyev – CACIP Central Asia Climate Information Portal*. https://centralasiaclimateportal.org/its-time-to-change-the-stereotype-that-water-is-free-shavkat-mirziyoyev/

Castells, M. (2023). The network society revisited. *American Behavioral Scientist*, *67*(7), 940–946.

Castillo, N. (2024, November 14). *Caspian green energy corridor moves forward*. Caspian Policy Center. https://www.caspianpolicy.org/research/environment/caspian-green-energy-corridor-moves-forward

CAREC. (2024, January 25). *"It's time to change the stereotype that water is free" – Shavkat Mirziyoyev – CACIP Central Asia Climate Information Portal*. https://centralasiaclimateportal.org/its-time-to-change-the-stereotype-that-water-is-free-shavkat-mirziyoyev/

Castells, M. (2023). The network society revisited. *American Behavioral Scientist*, *67*(7), 940–946.

Castillo, N. (2024, November 14). *Caspian green energy corridor moves forward*. Caspian Policy Center. https://www.caspianpolicy.org/research/environment/caspian-green-energy-corridor-moves-forward

Castro, J. E. (2007). Water governance in the twentieth-first century. *Ambiente & Sociedade*, *10*(2), 97–118.

Çelik, C. (2024). The social reproduction of natural resource extraction and gendered labour regimes in rural Turkey. *Journal of Agrarian Change*, *24*(3), e12535.

Charyyeva, S., & Herzfeld, T. (2024). *The transition from cotton to horticulture in Uzbekistan: Effects on women's empowerment* [Conference paper]. Allied Social Science Association (ASSA) 2024 Annual Meeting.

Chowns, E. (2015). Is community management an efficient and effective model of public service delivery? Lessons from the rural water supply sector in Malawi. *Public Administration and Development*, *35*(4), 263–276.

Christodoulou, M. (2024). The four C's model of thematic analysis: A critical realist perspective. *Journal of Critical Realism*, *23*(1), 33–52.

Chuan, L. (2010). Social participation in the irrigation sector in Yunnan, China: Roles of the state, water user associations and communities. In K. A. Berry, E. Mollard, & Y. Chaoyun (Eds.), *Social participation in water governance and management: Critical and global perspectives* (pp. 163–182). Earthscan, London.

Cleaver, F. (2012). *Development through bricolage: Rethinking institutions for natural resource management*. Routledge, London.

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.

Cruz-Del Rosario, T., & Rigg, J. (2019). Living in an age of precarity in 21st century Asia. *Journal of Contemporary Asia*, *49*(4), 517–527.

Cucciolla, R. M. (2017a). Legitimation through self-victimisation: The Uzbek cotton affair and its repression narrative (1989–1991). *Cahiers du Monde Russe*, *58*(3), 639–668.

Cucciolla, R. M. (2017b). *The crisis of Soviet power in Central Asia: The 'Uzbek cotton affair' (1975–1991)* [PhD thesis, IMT School for Advanced Studies].

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

Dall'Agnola, J., & Sharshenova, A. (2024). The Central Asian research setting: An introduction. In J. Dall'Agnola & A. Sharshenova (Eds.), *Researching Central Asia: Navigating positionality in the field* (pp. 1–8). Springer Nature, Cham.

Daloz, A. S. (2023). Climate change: A growing threat for Central Asia. In R. Sabyrbekov, I. Overland, & R. Vakulchuk (Eds.), *Climate change in Central Asia: Decarbonisation, energy transition and climate policy* (pp. 15–21). Springer Nature, Cham.

Damonte, G., & 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.

Danermark, B., Ekström, M., & Karlsson, J. C. (2019). *Explaining society: Critical realism in the social sciences* (2nd ed.). Routledge, London.

Djalalov, S., & Babu, S. C. (2006). The sustainable development of water users' associations in Uzbekistan. In S. C. Babu & S. Djalalov (Eds.), *Policy reforms and agriculture development in Central Asia* (pp. 371–393). Springer, New York.

Djanibekov, N., Herzfeld, T., & Petrick, M. (2024). Agriculture and rural development reforms. In *New Uzbekistan*. Routledge, London.

Djanibekov, N., van Assche, K., Bobojonov, I., & Lamers, J. P. A. (2012). Farm restructuring and land consolidation in Uzbekistan: New farms with old barriers. *Europe-Asia Studies*, *64*(6), 1101–1126.

Djanibekov, N., Van Assche, K., & Valentinov, V. (2016). Water governance in Central Asia: A Luhmannian perspective. *Society & Natural Resources*, *29*(7), 822–835.

Djanibekov, U., Van Assche, K., Boezeman, D., Villamor, G. B., & Djanibekov, N. (2015). Revealing the role of agricultural contracts in rural livelihoods in Uzbekistan. In A. Kimhi & Z. Lerman (Eds.), *Agricultural transition in post-Soviet Europe and Central Asia after 25 years: International workshop in honor of Professor Zvi Lerman* (pp. 141–158). Studies on the Agricultural and Food Sector in Transition Economies (Vol. 79). IAMO Eigenverlag, Halle.

Djumaboev, K., Anarbekov, O., Holmatov, B., & Hamidov, A. (2017). *Overview of water-related programmes in Uzbekistan* [Project report of the Sustainable Management of Water Resources in Rural Areas in Uzbekistan, Component 1: National policy framework for water governance and integrated water resources management and supply part]. International Water Management Institute.

D'Odorico, P., Chiarelli, D. D., Rosa, L., Bini, A., Zilberman, D., & Rulli, M. C. (2020). The global value of water in agriculture. *Proceedings of the National Academy of Sciences*, *117*(36), 21985–21993.

Dorner, P. (1975). International assistance for the small farmer. *Challenge*, *18*(2), 62–64.

Dukhovnyĭ, V. A., & Schutter, J. de. (2011). *Water in Central Asia: Past, present, future*. CRC Press/Balkema, Leiden.

Dwight, L. (2024). Economic reforms and macroeconomic developments. In B. Mirkasimov & R. Pomfret (Eds.), *New Uzbekistan: The third renaissance* (1st ed., pp. 25–42). Routledge, London.

EastFruit. (2022a, January 22). *467 hectares of orchards will be replaced by modern plantations in the Samarkand region (Uzbekistan)*. EastFruit. https://east-fruit.com/en/trending/467-hectares-of-orchards-will-be-replaced-by-modern-plantations-in-the-samarkand-region-uzbekistan/

EastFruit. (2022b, August 22). *In-vitro laboratory for growing rootstocks and seedlings from Samarkand region (Uzbekistan) will reach full capacity in 2024*. https://east-fruit.com/plodoovoshchnoy-biznes/tekhnologii/laboratoriya-in-vitro-po-vyrashchivaniyu-podvoev-i-sazhentsev-iz-samarkandskoy-oblasti-uzbekistan-vyydet-na-polnuyu-moshchnost-v-2024-godu-foto/

EastFruit. (2023, July 13). *Sag Gardens – the largest walnut project in Central Asia*. EastFruit. https://east-fruit.com/plodoovoshchnoy-biznes/intervyu/sag-gardens-krupneyshiy-orekhovyy-proekt-v-tsentralnoy-azii-istoriya-i-perspektivy/

Easton, G. (2010). Critical realism in case study research. *Industrial Marketing Management*, *39*(1), 118–128.

EBRD. (2002). *Transition report 2002: Agriculture and rural transition* (Economic Transition in Central and Eastern Europe and the CIS, pp. 215–217). European Bank for Reconstruction and Development, London.

EBRD. (2021, May 27). *EBRD helps Indorama introduce advanced cotton farming technologies in Uzbekistan*. European Bank for Reconstruction and Development. https://www.ebrd.com/home/news-and-events/news/2021/ebrd-helps-indorama-introduce-advanced-cotton-farming-technologies-in-uzbekistan.html

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

Fafchamps, M. (1992). Cash crop production, food price volatility, and rural market integration in the third world. *American Journal of Agricultural Economics*, *74*(1), 90–99.

Fair Labor Association. (2024, April 16). *Grievance mechanisms in cotton-textile clusters in Uzbekistan*. Fair Labor Association. https://www.fairlabor.org/projects/strengthening-grievance-mechanisms-in-uzbekistans-cotton-textile-clusters/

Fairhead, J., Leach, M., & Scoones, I. (2012). Green grabbing: A new appropriation of nature? *The Journal of Peasant Studies*, *39*(2), 237–261.

FAO. (2001). Chapter 6. Drip irrigation. In *Irrigation water management: Irrigation methods*. Food and Agriculture Organisation of the United Nations. https://www.fao.org/4/s8684e/s8684e07.htm

FAO. (2022). *Global application of the One Village One Product movement concept*. Food and Agriculture Organisation.

Fazendeiro, B. T. (2017). Uzbekistan's defensive self-reliance: Karimov's foreign policy legacy. *International Affairs*, *93*(2), 409–427.

Feder, E. (1976). McNamara's little green revolution: World Bank scheme for self-liquidation of third world peasantry. *Economic and Political Weekly*, *11*(14), 532–541.

Ferghana News. (2025, January 16). *Mirziyoyev dismisses Syrdarya region governor over neglect in attracting investments*. https://en.fergana.news/news/136242/

Ferguson, J. (1990). *The anti-politics machine: "Development," depoliticisation, and bureaucratic power in Lesotho*. Cambridge University Press, Cambridge.

Fitzpatrick, C. (2011, January 24). *EBRD in Tashkent not closing*. Eurasianet. https://eurasianet.org/ebrd-in-tashkent-not-closing-official

Flaminio, S., Rouillé-Kielo, G., & Le Visage, S. (2022). Waterscapes and hydrosocial territories: Thinking space in political ecologies of water. *Progress in Environmental Geography*, *1*(1–4), 33–57.

Fletcher, A. J. (2017). Applying critical realism in qualitative research: Methodology meets method. *International Journal of Social Research Methodology*, *20*(2), 181–194.

Foreign, Commonwealth & Development Office. (2004). *Implementation of poverty reduction strategies in the NIS desk study: Uzbekistan (no PRSP)* (Implementation of Poverty Reduction Strategies in the NIS). United Kingdom Foreign, Commonwealth & Development Office.

Frödin, O. (2013). Modernisation, neo-liberal globalisation, or variegated development: The Indian food system transformation in comparative perspective. *International Review of Sociology*, *23*(1), 221–242.

Fryer, T. (2022). A critical realist approach to thematic analysis: Producing causal explanations. *Journal of Critical Realism*, *21*(4), 365–384.

Funder, M., Zenteno, R. R. B., Rojas, V. C., Huong, P., Koppen, B., Mweemba, C., Nyambe, L., Phuong, L., & Skielboe, T. (2012). Strategies of the poorest in local water conflict and cooperation—Evidence from Vietnam, Bolivia and Zambia. *Water Alternatives*, *5*(1), 20–36.

Galdini, F. (2021). *The post-Soviet space and Uzbekistan in the international division of labour: From transition to capital accumulation* [Doctoral dissertation, University of Manchester]. https://research.manchester.ac.uk/en/studentTheses/the-post-soviet-space-and-uzbekistan-in-the-international-divisio

Galdini, F. (2023). Rise of the surplus population? Land decollectivisation, class stratification, and labor precarisation in Uzbekistan. *International Labor and Working-Class History*, *103*, 147–161.

Gazeta.Uz. (2018, September 12). *K 2020 godu khlopok budet polnost'yu pererabatyvat'sya* [By 2020 cotton will be fully processed]. Gazeta.uz. https://www.gazeta.uz/ru/2018/09/12/meeting/

Gazeta.Uz. (2019, April 27). *The Ministry of Agriculture explained the meaning behind the concept "One Mahalla One Product."* https://www.gazeta.uz/ru/2019/04/27/growing/

Gazeta.Uz. (2020, April 8). *Household plots will be used to supply markets with food*. https://www.gazeta.uz/ru/2020/04/08/lands/

Gazeta.Uz. (2025, October 3). *"In the fight against poverty in Uzbekistan, much attention is being paid to China's experience," says Deputy Prime Minister*. https://www.gazeta.uz/ru/2025/10/03/poverty-reduction/

Gazieva, M. (2023, December 18). *'I hate myself when I remember those times.'* openDemocracy. https://www.opendemocracy.net/en/odr/uzbekistan-forced-labour-youth-cotton/

GGGI. (2020). *Green growth index 2020* (GGGI Technical Report No. 16). Global Green Growth Institute. https://greengrowthindex.gggi.org/

Ghosh, A., & Nelson, J. (2025, July 22). *How we tackle the energy, food and water nexus*. World Economic Forum. https://www.weforum.org/stories/2025/07/energy-food-and-water-nexus/

Ghosh, S., & Meer, A. (2021). Extended urbanisation and the agrarian question: Convergences, divergences and openings. *Urban Studies*, *58*(6), 1097–1119.

Gleason, G. (1993). *A collective action analysis of land and water policies in the new states of Central Asia*. University of New Mexico.

Gleeson, T. (2016, June 15). *Protecting springs from groundwater extraction: Is a 'drawdown trigger' a sensible strategy?* Water Underground. https://blogs.agu.org/waterunderground/2016/06/15/protecting-springs-from-groundwater-extraction-is-a-drawdown-trigger-a-sensible-strategy-2/

Goldin, J. A., Sneddon, C., & Harris, L. M. (2013). Introduction: Interrogating hegemonic discourses in water governance. In L. M. Harris, J. A. Goldin, & C. Sneddon (Eds.), *Contemporary water governance in the global south* (1st ed., pp. 1–10). Routledge, London.

Goldin, J. A. (2015). The participatory paradigm: Anathema, praise and confusion. In L. M. Harris, J. A. Goldin, & C. Sneddon (Eds.), *Contemporary water governance in the global south: Scarcity, marketisation and participation* (pp. 13–24). Routledge, London.

Goldman, M. (2007). How "Water for All!" policy became hegemonic: The power of the World Bank and its transnational policy networks. *Geoforum*, *38*(5), 786–800.

Gómez y Paloma, S., Riesgo, L., & Louhichi, K. (2020). Introduction. In S. Gómez y Paloma, L. Riesgo, & K. Louhichi (Eds.), *The role of smallholder farms in food and nutrition security* (pp. 1–12). Springer, Cham.

Gosovic, B. (2000). Global intellectual hegemony and the international development agenda. *International Social Science Journal*, *52*(166), 447–456.

Government of Uzbekistan. (2023a). *Milliy "yashil" iqtisodiyot taksonomiyasini tasdiqlash to'g'risida* [On the approval of the national green taxonomy]. https://static.norma.uz/doc/doc_9/561.pdf

Government of Uzbekistan. (2023b, November 30). *Transition to emergency mode of operation to save water*. Embassy of Uzbekistan in the United States. https://uzbekistan.org/transition-to-emergency-mode-of-operation-to-save-water/4069/

Grafton, R. Q., Williams, J., Perry, C. J., Molle, F., Ringler, C., Steduto, P., Udall, B., Wheeler, S. A., Wang, Y., Garrick, D., & Allen, R. G. (2018). The paradox of irrigation efficiency. *Science*, *361*(6404), 748–750.

Greve, C. (2015). *International public-private partnership policies: Convergence in themes from ASEAN, the European Union, IMF, OECD, the UN, and the World Bank* [Paper presentation]. Fourth Annual International Public-Private Partnership (P3) Symposium, New York, NY, United States.

Griffin, K. (1979). *The political economy of agrarian change: An essay on the green revolution*. Macmillan Press, London.

Global Water Partnership. (2011, December 7). *What is IWRM?* GWP. https://www.gwp.org/en/gwp-cee/about/why/what-is-iwrm/

Global Water Partnership. (2012). *Water in the green economy* (Perspectives Paper). GWP.

Hamidov, A., Kasymov, U., Allahverdiyeva, N., & Schleyer, C. (2024). Governance of technological innovations in water and energy use in Uzbekistan. *International Journal of Water Resources Development*, *40*(1), 123–139.

Hamidov, A., Kasymov, U., Djumaboev, K., & Paul, C. (2022). Rebound effects in irrigated agriculture in Uzbekistan: A stakeholder-based assessment. *Sustainability*, *14*(14), 8375.

Hamilton, S. H., Merritt, W. S., Das, M., Rahman, M. W., Bhuiya, S. S., Carter, L., Cosijn, M., Roth, C. H., Singha, S., & Syme, G. J. (2020). Integrated assessment—How does it help unpack water access by marginalized farmers? *Water*, *12*(12), 3444.

Hammarlund, P. A. (2005). Introduction. In P. A. Hammarlund (Ed.), *Liberal internationalism and the decline of the state* (pp. 1–10). Palgrave Macmillan, New York.

Harris, L. M. (2009). Gender and emergent water governance: Comparative overview of neoliberalized natures and gender dimensions of privatisation, devolution and marketisation. *Gender, Place & Culture*, *16*(4), 387–408.

Harris, L. M. (2015a). Framing the debate on marketisation. In L. M. Harris, J. A. Goldin, & C. Sneddon (Eds.), *Contemporary water governance in the global south: Scarcity, marketisation and participation* (pp. 13–24). Routledge, London.

Harris, L. M. (2015b). Variable histories and geographies of marketisation and privatisation. In L. M. Harris, J. A. Goldin, & C. Sneddon (Eds.), *Contemporary water governance in the global south: Scarcity, marketisation and participation* (pp. 118–132). Routledge, London.

Harrison, G. (2004). Introduction: Globalisation, governance and development. *New Political Economy*, *9*(2), 155–162.

Harvey, D. (2004). The "new" imperialism: Accumulation by dispossession. *Socialist Register*, *40*. https://socialistregister.com/index.php/srv/article/view/5811

Harvey, P. A., & Reed, R. A. (2007). Community-managed water supplies in Africa: Sustainable or dispensable? *Community Development Journal*, *42*(3), 365–378.

Harwood, J. (2009). *Why have green revolutions so often failed to help peasant-farmers?* (Colloquium of the Agrarian Studies programme). University of Manchester.

Hashimova, U. (2018, August 6). *Hokim hubbub: Making sense of local government shuffles in Uzbekistan*. The Diplomat. https://thediplomat.com/2018/08/hokim-hubbub-making-sense-of-local-government-shuffles-in-uzbekistan/

Heidhues, F., & Obare, G. A. (2011). Lessons from structural adjustment programmes and their effects in Africa. *Quarterly Journal of International Agriculture*, *50*(1), 55–64.

Hickel, J., & Kallis, G. (2020). Is green growth possible? *New Political Economy*, *25*(4), 469–486.

Holt-Giménez, E., & Kerssen, T. (2015, May 14). *The World Bank's long war on peasants*. CADTM. https://www.cadtm.org/The-World-Bank-s-Long-War-on

Holt-Giménez, E., & Patel, R. (with Shattuck, A.). (2009). *Food rebellions! Crisis and the hunger for justice*. Food First Books, Oakland, CA.

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

Hoogesteger, J. (2017). An elite technology? Drip irrigation, agro-export and agricultural policies in Guanajuato, Mexico. In J.-P. Venot, M. Kuper, & M. Zwarteveen (Eds.), *Drip irrigation for agriculture: Untold stories of efficiency, innovation and development* (1st ed., pp. 151–166). Routledge, London.

Hornidge, A.-K., Oberkircher, L., Tischbein, B., Schorcht, G., Bhaduri, A., & Manschadi, A. M. (2011). Reconceptualizing water management in Khorezm, Uzbekistan. *Natural Resources Forum*, *35*(4), 251–268.

Hosseini, H. S. A., & Gills, B. K. (2018). Critical globalisation studies and development. In H. Veltmeyer & P. Bowles (Eds.), *The essential guide to critical development studies* (pp. 138–152). Routledge, London.

Hougaard, I.-M. (2023). Rural precarity: Relational autonomy, ecological dependence and political immobilisation in the agro-industrial margin. *The Journal of Peasant Studies*, *50*(6), 2437–2456.

Huggins, C. (2017). *Agricultural reform in Rwanda: Authoritarianism, markets and zones of governance*. Bloomsbury Publishing, London.

IEG. (2016). *Rural enterprise support project II (P109126): Implementation completion report (ICR) review* (No. ICRR0020843). World Bank: Independent Evaluation Group.

Ilkhamov, A. (1998). Shirkats, dekhqon farmers and others: Farm restructuring in Uzbekistan. *Central Asian Survey*, *17*(4), 539–560.

Ilkhamov, A. (2004). The limits of centralisation: Regional challenges in Uzbekistan. In P. Jones Luong (Ed.), *The transformation of Central Asia: States and societies from Soviet rule to independence* (pp. 159–181). Cornell University Press, Ithaca, NY.

Ilkhamov, A. (2023, November 14). *Implications for Uzbekistan's water supply of Qosh Tepa Canal construction in Afghanistan*. Central Asia Due Diligence. https://cenasiaduediligence.uk/implications-for-uzbekistans-water-supply-of-qosh-tepa-canal-construction-in-afghanistan/

ILO. (2017). *Recruitment practices and seasonal employment in agriculture in Uzbekistan 2014–15*. International Labour Office, Fundamental Principles and Rights at Work Branch (FUNDAMENTALS).

ILO. (2021). *Decent work country programme for the republic of Uzbekistan 2021–25*. International Labour Organisation.

Independent Office of Evaluation. (2021). *Republic of Uzbekistan horticultural support project: Project performance evaluation* (Report No. 6097-UZ). International Fund for Agricultural Development.

International Fund for Agricultural Development. (2012). *Republic of Uzbekistan: Horticultural support project* [Project final design report: Volume I: Main report and annexes]. IFAD.

International Fund for Agricultural Development. (2022). *Republic of Uzbekistan country strategy and programme evaluation* (No. EC 2022/117/W.P.4; Evaluation Committee). IFAD.

International Labour Organisation. (2022, March 1). *Uzbek cotton is free from systemic child labour and forced labour*. http://www.ilo.org/global/about-the-ilo/newsroom/news/WCMS_838396/lang--en/index.htm

International Labour Organisation. (2022, March 14). *ILO welcomes lifting of Cotton Campaign boycott of Uzbekistan*. https://www.ilo.org/resource/news/ilo-welcomes-lifting-cotton-campaign-boycott-uzbekistan

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.

Ioris, A. A. R. (2016). The politico-ecological economy of neoliberal agribusiness: Displacement, financialisation and mystification. *Area*, *48*(1), 84–91.

Ismatova, N. R. (2022). Natural geographical features of Jamboy district. *Journal of Geography and Natural Resources*, 34–38.

IWMI. (2024, September 16). *IWMI and GIZ offer insights on water-energy-food-ecosystems nexus for transboundary water management*. International Water Management Institute. https://www.iwmi.org/blogs/iwmi-and-giz-offer-insights-on-water-energy-food-ecosystems-nexus-for-transboundary-water-management/

Jasanoff, S. (2015). Future imperfect: Science, technology, and the imaginations of modernity. In S. Jasanoff & S.-H. Kim (Eds.), *Dreamscapes of modernity: Sociotechnical imaginaries and the fabrication of power* (pp. 1–33). University of Chicago Press, Chicago.

Jeffrey, P., & Gearey, M. (2006). Integrated water resources management: Lost on the road from ambition to realisation? *Water Science and Technology*, *53*(1), 1–8.

Jessop, B. (1991). Accumulation strategies, state forms and hegemonic projects. In S. Clarke (Ed.), *The state debate* (pp. 157–182). Palgrave Macmillan, London.

Jessop, B. (1998). The rise of governance and the risks of failure: The case of economic development. *International Social Science Journal*, *50*(155), 29–45.

Jessop, B. (2001). *Good governance and the urban question: On managing the contradictions of neo-liberalism*. Department of Sociology, Lancaster University. https://www.lancaster.ac.uk/fass/resources/sociology-online-papers/papers/jessop-good-governance-and-the-urban-question.pdf

Jessop, B. (2002). *The future of the capitalist state*. Polity, Cambridge.

Jessop, B. (2004). Critical semiotic analysis and cultural political economy. *Critical Discourse Studies*, *1*(2), 159–174.

Jessop, B. (2005). Critical realism and the strategic-relational approach. *New Formations*, *56*, 40–53.

Jessop, B. (2007a). *State power: A strategic-relational approach*. Polity, Cambridge.

Jessop, B. (2007b). States, state power, and state theory. In J. Bidet & S. Kouvelakis (Eds.), *Critical companion to contemporary Marxism* (pp. 413–430). Brill, Leiden.

Jessop, B. (2013). *State theory: Putting the capitalist state in its place*. Polity Press, Cambridge.

Jessop, B. (2014a, January 10). *Towards a cultural international political economy: Post-structuralism and the Italian school*. Bob Jessop. https://bobjessop.wordpress.com/2014/01/10/towards-a-cultural-international-political-economy-post-structuralism-and-the-italian-school/

Jessop, B. (2014b, January 16). *Spatial fixes, temporal fixes, and spatio-temporal fixes*. Bob Jessop. https://bobjessop.wordpress.com/2014/01/16/spatial-fixes-temporal-fixes-and-spatio-temporal-fixes/

Jessop, B. (2014c, June 12). *The crisis of the national spatio-temporal fix and the ecological dominance of globalizing capitalism*. Bob Jessop. https://bobjessop.wordpress.com/2014/06/12/the-crisis-of-the-national-spatio-temporal-fix-and-the-ecological-dominance-of-globalizing-capitalism/

Jobbins, G., Kalpakian, J., Chriyaa, A., Legrouri, A., & El Mzouri, E. H. (2015). To what end? Drip irrigation and the water–energy–food nexus in Morocco. *International Journal of Water Resources Development*, *31*(3), 393–406.

Jomboy district: Investment opportunities. (2019). Samarkand Regional Government. https://samarkand.uz/uploads/news_foto/2019/10/4.-Zomboj-t-257-MB.pdf

Jørgensen, M., & Phillips, L. (2011). *Discourse analysis as theory and method*. Sage, London.

Kalyvas, A. (2002). The stateless theory. In S. Aronowitz & P. Bratsis (Eds.), *Paradigm lost: State theory reconsidered* (pp. 105–136). University of Minnesota Press, Minneapolis.

Kamp, M. (2016). The Soviet legacy and women's rights in Central Asia. *Current History*, *115*(783), 270–276.

Kamp, M., & Pianciola, N. (2021). Collectivisation, sedentarisation and famine in Central Asia. In R. Isaacs & M. Erica (Eds.), *Routledge handbook of contemporary Central Asia* (pp. 41–55). Routledge, London.

Kandiyoti, D. (1998). Rural livelihoods and social networks in Uzbekistan: Perspectives from Andijan. *Central Asian Survey*, *17*(4), 561–578.

Kandiyoti, D. (2003). The cry for land: Agrarian reform, gender and land rights in Uzbekistan. *Journal of Agrarian Change*, *3*(1–2), 225–256.

Kandiyoti, D. (2007). The politics of gender and the Soviet paradox: Neither colonized, nor modern? *Central Asian Survey*, *26*(4), 601–623.

Kapiszewski, D., MacLean, L. M., & Read, B. L. (2022). Dynamic research design: Iteration in field-based inquiry. *Comparative Politics*, *54*(4), 645–670.

Karimov, I. (1998). *On the path to security and stable development* [Po puti bezopasnosti i stabil'nogo razvitiya] (Vol. 413). Uzbekiston [Uzbekistan], Tashkent.

Karimov, I. (1999). *We build our future with our own hands* [Svoe budushchee my stroim svoimi rukami] (Vol. 381). Uzbekiston [Uzbekistan], Tashkent.

Karimov, I. (2002). *We must fight for security and peace* [Za bezopasnost' i mir nado borot'sya] (Vol. 414). Uzbekiston [Uzbekistan], Tashkent.

Karimov, I. (2003). *The path we have chosen is the path of democratic development and cooperation with the progressive world* (Vol. 292). Uzbekiston [Uzbekistan], Tashkent.

Karshiev, R. (2024, May 19). *Thanks to comprehensive measures, Uzbekistan saves about 7 billion cubic meters of water annually*. Embassy of Uzbekistan in the United States. https://uzbekistan.org/ru/за-счет-принимаемых-комплексных-мер-у/4555/

Katz, C. (2001). Vagabond capitalism and the necessity of social reproduction. *Antipode*, *33*(4), 709–728.

Kawulich, B. (2005). Participant observation as a data collection method. *Forum for Qualitative Research*, *6*(2).

Kennedy, E., & Von Braun, J. (1986). *Commercialisation of subsistence agriculture: Income and nutritional effects in developing countries*. International Food Policy Research Institute. https://www.researchgate.net/publication/265433645_Commercialisation_of_Subsistence_Agriculture_Income_and_Nutritional_Effects_in_Developing_Countries

Kidane, T. T., Wei, S., & Sibhatu, K. T. (2019). Smallholder farmers' willingness to pay for irrigation water: Insights from Eritrea. *Agricultural Water Management*, *222*, 30–37.

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

Knorr, H., Theesfeld, I., & 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.

Kobilov, F. (2025). In the corridors of officialdom: How patience and flexibility unlock elite interviews in Uzbekistan. *Central Asian Survey*, *44*(3), 457–464.

Koehler, G. (2015). Seven decades of 'development', and now what? *Journal of International Development*, *27*(6), 733–751.

Köhler, G. (1995). The UN and development thinking: From optimism to agnosticism and back again. *IDS Bulletin*, *26*(4), 54–63.

Koriyev, M., Mirzahmedov, I., Boymirzaev, K., & Juraev, Z. (2025). Effects of mulching, terracing, and efficient irrigation on soil salinity reduction in Uzbekistan's Fergana Valley. *Cogent Food & Agriculture*, *11*(1), 2449201.

Kovach, H. (2020). *External finance for rural development*. Overseas Development Institute.

Kreutzmann, H. (2016). From upscaling to rescaling: Transforming the Fergana Basin from tsarist irrigation to water management for an independent Uzbekistan. In R. F. Hüttl, O. Bens, C. Bismuth, & S. Hoechstetter (Eds.), *Society–water–technology: A critical appraisal of major water engineering projects* (pp. 113–127). Springer International Publishing, Cham.

Kumar, C. (2005). Revisiting "community" in community-based natural resource management. *Community Development Journal*, *40*(3), 275–285.

Kun.Uz. (2021, February 11). *Uzbekistan to plant 200 million saplings a year to increase green spaces in cities*. Kun.uz. https://kun.uz/en/news/2021/11/02/uzbekistan-to-plant-200-million-saplings-a-year-to-increase-green-spaces-in-cities

Kun.Uz. (2023, March 31). *Historical record: Uzbekistan's state debt exceeds $29 billion*. https://kun.uz/en/news/2023/03/31/historical-record-uzbekistans-state-debt-exceeds-29-billion

Kusakabe, K., & Myae, A. C. (2019). Precarity and vulnerability: Rubber plantations in northern Laos and northern Shan State, Myanmar. *Journal of Contemporary Asia*, *49*(4), 586–601.

Kuvandikov, O. H. (2017). *Perspectives on the development of intensive gardening in the Samarkand region*. The Geographical Society of Uzbekistan. https://uzbgeo.uz/f/uzgzh_51-zhild.pdf

Lasslet, C. (2020). *Out of the cauldron, into the fire? Risk and privatisation of Uzbekistan's cotton sector* (Uzinvestigations) [Power briefs | Central Asia]. Uzbek Forum for Human Rights.

Leavy, J., & Poulton, C. (2007). *Commercialisations in agriculture* (Future Agricultures). Institute of Development Studies, Brighton; School of Oriental and African Studies, University of London.

Lemon, E. (2019). *Mirziyoyev's Uzbekistan: Democratisation of authoritarian upgrading?* Central Asia Initiative.

Lerman, Z. (2008). Agricultural development in Central Asia: A survey of Uzbekistan, 2007–2008. *Eurasian Geography and Economics*, *49*(4), 481–505.

Lesikhina, N. (2021, January 26). *Pulling the 'cotton' over Uzbek eyes at latest EBRD investment*. Bankwatch. https://bankwatch.org/blog/pulling-the-cotton-over-uzbek-eyes-at-latest-ebrd-investment

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

Lillis, J. (2017, October 3). *Are decades of political repression making way for an "Uzbek spring"?* The Guardian. https://www.theguardian.com/world/2017/oct/03/are-decades-of-political-repression-making-way-for-an-uzbek-spring

Lillis, J. (2021, December 13). *Uzbekistan: Female tech entrepreneur cuts out the middleman*. Eurasianet. https://eurasianet.org/uzbekistan-female-tech-entrepreneur-cuts-out-the-middleman

Linton, J. (2010). *What is water? The history of a modern abstraction*. UBC Press, Vancouver.

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

Loftus, A. (2009). Rethinking political ecologies of water. *Third World Quarterly*, *30*(5), 953–968.

Loftus, A. (2017). Production of nature. In D. Richardson, N. Castree, M. F. Goodchild, A. Kobayashi, W. Liu, & R. A. Marston (Eds.), *International encyclopedia of geography* (pp. 1–6). John Wiley & Sons, Hoboken, NJ.

Loiseau, E., Saikku, L., Antikainen, R., Droste, N., Hansjürgens, B., Pitkänen, K., Leskinen, P., Kuikman, P., & Thomsen, M. (2016). Green economy and related concepts: An overview. *Journal of Cleaner Production*, *139*, 361–371.

Lombardozzi, L. (2018). *The nexus between the role of the state, market transition and food consumption: The case of Samarkand, Uzbekistan* [Doctoral dissertation, SOAS University of London]. http://eprints.soas.ac.uk/32802

Lombardozzi, L. (2019). Can distortions in agriculture support structural transformation? The case of Uzbekistan. Post-Communist Economies, 31(1), 52–74.

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. (2021). Unpacking state-led upgrading: Empirical evidence from Uzbek horticulture value chain governance. Review of International Political Economy, 28(4), 947–973.

Lombardozzi, L. (2022). The marketisation of life: Entangling social reproduction theory and regimes of patriarchy through women's work in post-Soviet Uzbekistan. Review of International Political Economy, 29(6), 1870–1893.

Luper, S. (2004). Epistemic relativism. Philosophical Issues, 14, 271–295.

Mahayni, B. (2013a). Producing crisis: Hegemonic debates, mediations and representations of water scarcity. In L. M. Harris, J. A. Goldin, & C. Sneddon (Eds.), Contemporary water governance in the global south (1st ed., pp. 35–44). Routledge, London.

Mahayni, B. (2013b). Tensions in narratives and lived realities of water crisis in Damascus. In L. M. Harris, J. A. Goldin, & C. Sneddon (Eds.), Contemporary water governance in the global south (pp. 45–60). Routledge, London.

Mayntz, R. (1998). New challenges to governance theory (Jean Monnet Chair Papers). https://cadmus.eui.eu/handle/1814/23653

McGuire, D., & Laaser, K. (2021). 'You have to pick': Cotton and state-organized forced labour in Uzbekistan. Economic and Industrial Democracy, 42(3), 552–572.

McNamara, R. S. (1973, September 24). Address to the Board of Governors by Robert S. McNamara. World Bank. https://documents.worldbank.org/en/publication/documents-reports/documentdetail/930801468315304694

Mehta, L. (2003). Contexts and constructions of water scarcity. Economic and Political Weekly, 38(48), 5066–5072.

Mehta, L. (2007). Whose scarcity? Whose property? The case of water in western India. Land Use Policy, 24(4), 654–663.

Mehta, L. (Ed.). (2010). The limits to scarcity: Contesting the politics of allocation. Earthscan, London.

Mehta, L. (2018). Taking the scare out of scarcity. In M. C. Dawson, C. Rosin, & N. Wald (Eds.), Global resource scarcity: Catalyst for conflict or cooperation? (pp. 21–38). Routledge, New York.

Mehta, L., Veldwisch, G. J., & 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.

Melnikovová, L., & Havrland, B. (2016). State ownership of land in Uzbekistan – an impediment to further agricultural growth? *Agricultura Tropica et Subtropica*, *49*(1–4), 5–11.

Menga, F. (2018). *Power and water in Central Asia*. Routledge, London.

Menzel, C. (1990). Actualism, ontological commitment, and possible world semantics. *Synthese*, *85*(3), 355–389.

Millar, K. M. (2014). The precarious present: Wageless labor and disrupted life in Rio de Janeiro, Brazil. *Cultural Anthropology*, *29*(1), 32–53.

Ministry of Agriculture. (2024, December 5). *Digitalisation of agriculture in Uzbekistan increases industrial competitiveness*. Aldiplomasy. https://www.aldiplomasy.com/en/?p=34708

Ministry of Ecology. (2024, November 20). *2025 has been declared the "Year of Environmental Protection and a 'Green' Economy."* Ministry of Ecology, Environmental Protection and Climate Change of the Republic of Uzbekistan. https://gov.uz/eco/news/view/28064

Mirkasimov, B., & Pomfret, R. (Eds.). (2024). *New Uzbekistan: The third renaissance* (1st ed.). Routledge, London.

Mirziyoyev, S. (2018a, January 1). *The President of the Republic of Uzbekistan Shavkat Mirziyoyev addressed the parliament of the country – the Oliy Majlis*. Embassy of Uzbekistan in New Delhi. https://www.uzbekembassy.in/the-president-of-the-republic-of-uzbekistan-shavkat-mirziyoyev-addressed-the-parliament-of-the-country-the-oliy-majlis/

Mirziyoyev, S. (2018b, December 28). *Address by the President of the Republic of Uzbekistan Shavkat Mirziyoyev to Oliy Majlis* [Speech]. https://www.un.int/uzbekistan/news/address-president-republic-uzbekistan-shavkat-mirziyoyev-oliy-majlis

Mirziyoyev, S. (2021, September 21). *Speech by President Shavkat Mirziyoyev at the 76th session of the United Nations General Assembly*. Permanent Mission of the Republic of Uzbekistan to the United Nations, New York. https://www.un.int/uzbekistan/fr/statements_speeches/speech-president-shavkat-mirziyoyev-76th-session-united-nations-general-assembly

Mirziyoyev, S. (2023, September 20). *Address by the President of the Republic of Uzbekistan Shavkat Mirziyoyev at the 78th session of the UN General Assembly*. Press Service of the President of the Republic of Uzbekistan, Tashkent. https://www.president.uz/en/lists/view/6677

Mirziyoyev, S. (2024, February 28). *Green energy becomes one of the drivers of our economy and a truly national movement*. President.uz. https://www.president.uz/en/lists/view/7055

Mirziyoyev, S. (2025a, March 17). *Tasks in utilities and agriculture determined* [Video press meeting]. https://president.uz/en/lists/view/7947

Mirziyoyev, S. (2025b, September 23). *Address by the President of the Republic of Uzbekistan Shavkat Mirziyoyev at the 80th session of the United Nations General Assembly*. Press Service of the President of the Republic of Uzbekistan, Tashkent. https://www.president.uz/en/lists/view/8525

Mitchell, D., Williams, R. B., Hudson, D., & Johnson, P. (2017). A Monte Carlo analysis on the impact of climate change on future crop choice and water use in Uzbekistan. *Food Security*, *9*(4), 697–709.

Molajou, A., Afshar, A., Khosravi, M., Soleimanian, E., Vahabzadeh, M., & Variani, H. A. (2023). A new paradigm of water, food, and energy nexus. *Environmental Science and Pollution Research*, *30*(49), 107487–107497.

Mollard, E., & Berry, K. A. (2010). Conclusions: Politicizing social participation. In K. A. Berry & E. Mollard (Eds.), *Social participation in water governance and management: Critical and global perspectives* (pp. 309–318). Earthscan, London.

Mollard, E., Vargas, S., & Wester, P. (2010). Social participation in Mexican river basin organisations: The resilience of coalitions. In K. A. Berry & E. Mollard (Eds.), *Social participation in water governance and management: Critical and global perspectives* (pp. 115–136). Earthscan, London.

Molle, F. (2008). Nirvana concepts, narratives and policy models: Insights from the water sector. *Water Alternatives*, *1*(1), 131–156.

Molle, F., & Berkoff, J. (2007). *Irrigation water pricing: The gap between theory and practice*. CABI, Wallingford.

Mollinga, P. P., Meinzen-Dick, R. S., & Merrey, D. J. (2007). Politics, plurality and problemsheds: A strategic approach for reform of agricultural water resources management. *Development Policy Review*, *25*(6), 699–719.

Montiel, H. (2007). Critical realism and the strategic-relational approach: Comments on a non-typical KWNS-SWPR experience. *Journal of Critical Realism*, *6*(1), 84–110.

Moore, A. R., & Kelly, D. M. (2024). Getting real about critical realist interviewing: Five principles to guide practice. *International Journal of Qualitative Methods*, *23*, 16094069241299311.

Morrison, A. (2021). *The Russian conquest of Central Asia: A study in imperial expansion, 1814–1914*. Cambridge University Press, Cambridge.

Moseley, W. G. (2015). Food security and 'green revolution.' In J. D. Wright (Ed.), *International encyclopedia of the social & behavioral sciences* (2nd ed., pp. 307–310). Elsevier, Amsterdam.

Moss, T., & Hamidov, A. (2016). Where water meets agriculture: The ambivalent role of water users associations. In R. F. Hüttl, O. Bens, C. Bismuth, & S. Hoechstetter (Eds.), *Society–water–technology: A critical appraisal of major water engineering projects* (pp. 149–167). Springer Open, Cham.

Muckenhuber, D. (2013, February 14). *Breaking the dam: Water politics in Central Asia*. IPI Global Observatory. https://theglobalobservatory.org/2013/02/breaking-the-dam-water-politics-in-central-asia/

Mueller, T. B. (2013). The Rockefeller Foundation, the social sciences, and the humanities in the Cold War. *Journal of Cold War Studies*, *15*(3), 108–135.

Mukhamedova, N., & Wegerich, K. (2014). Integration of villages into WUAs—The rising challenge for local water management in Uzbekistan. *International Journal of Water Governance*, *2014*(2–3), 153–170.

Muller, M. (2015). The "nexus" as a step back towards a more coherent water resource management paradigm. *Water Alternatives*, *8*(1), 675–694.

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

Musemwa, M. (2013). Water scarcity and the colonial state: The emergence of a hydraulic bureaucracy in south-western Matabeleland, Zimbabwe, 1964–1972. In L. M. Harris, J. A. Goldin, & C. Sneddon (Eds.), *Contemporary water governance in the global south* (pp. 79–94). Routledge, London.

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

Norma.uz. (2024, January 9). *The adoption of water-saving technologies is encouraged by the government*. https://www.norma.uz/novoe_v_zakonodatelstve/vnedrenie_vodosberegayushchih_tehnologiy_ooshchryaetsya_gosudarstvom

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

OECD. (2022). *CRS: Creditor reporting system* [Dataset]. OECD Data Explorer.

OECD. (2023). *Financing Uzbekistan's green transition: Capital market development and opportunities for green bond issuance*. OECD.

O'Hara, S. (2000). Lessons from the past: Water management in Central Asia. *Water Policy*, *2*(4–5), 365–384.

Open Dialogue Foundation. (2022, August 3). *The shooting of peaceful protesters in Karakalpakstan*. https://en.odfoundation.eu/a/333165,the-shooting-of-peaceful-protesters-in-karakalpakstan/

Ostrom, E. (2015). *Governing the commons: The evolution of institutions for collective action*. Cambridge University Press, Cambridge.

Paddock, W. C. (1970). How green is the green revolution? *BioScience*, *20*(16), 897–902.

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

Palinkas, L. A., Horwitz, S. M., Green, C. A., Wisdom, J. P., Duan, N., & Hoagwood, K. (2015). Purposeful sampling for qualitative data collection and analysis in mixed method implementation research. *Administration and Policy in Mental Health*, *42*(5), 533–544.

Panez, A., & 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), 1164–1184.

Panitch, L. (1994). Globalisation and the state. *Socialist Register*, *30*. https://socialistregister.com/index.php/srv/article/view/5637

Parayil, G. (2003). Mapping technological trajectories of the green revolution and the gene revolution from modernisation to globalisation. *Research Policy*, *32*(6), 971–990.

Patel, R. (2013). The long green revolution. *The Journal of Peasant Studies*, *40*(1), 1–63.

Patnaik, A. (1995). Agriculture and rural out-migration in Central Asia, 1960–91. *Europe-Asia Studies*, *47*(1), 147–169.

Peterson, M. K. (2019). *Pipe dreams: Water and empire in Central Asia's Aral Sea Basin*. Cambridge University Press, Cambridge.

Pinstrup-Andersen, P., & Hazell, P. B. R. (1985). The impact of the green revolution and prospects for the future. *Food Reviews International*, *1*(1), 1–25.

Pomfret, R. (2000). Agrarian reform in Uzbekistan: Why has the Chinese model failed to deliver? *Economic Development and Cultural Change*, *48*(2), 269–284.

Poulton, C. (2017). *What is agricultural commercialisation, why is it important, and how do we measure it?* (Working Paper No. 06). Agricultural Policy Research in Africa.

Poulton, C., & Macartney, J. (2012). Can public–private partnerships leverage private investment in agricultural value chains in Africa? A preliminary review. *World Development*, *40*(1), 96–109.

President of the Republic of Uzbekistan. (2025, January 30). *New initiatives have been put forward for growing produce on private and farmland plots*. https://president.uz/ru/lists/view/7845

Presidential Decree No. 60. (2022, January 28). *On the development strategy of the new Uzbekistan for 2022–2026*.

Presidential Decree No. RP-4499. (2019, October 25). *On measures to expand the mechanisms for stimulating the introduction of water saving technologies in the agriculture sector*. https://lex.uz/docs/4568386

Presidential Decree No. RP-4477. (2019, October 5). *On the approval of the strategy for the transition of the Republic of Uzbekistan to a green economy for the period 2019–2030*. https://lex.uz/ru/docs/4539506

Presidential Decree No. RP-5853. (2019, October 23). *Validating agriculture development strategy of Uzbekistan for 2020–2030*. https://www.fao.org/faolex/results/details/en/c/LEX-FAOC197241/

Presidential Decree No. RP-107. (2023, January 4). *On urgent measures to improve the efficiency of water resources use*. https://lex.uz/ru/docs/6420842

Presidential Decree No. RP-18. (2025, February 4). *About the next measures for increase in fertility of agricultural acreage and creating favorable conditions for investment attraction in industry*. https://lex.uz/ru/docs/7360209

Presidential Decree No. 5635. (2019, January 18). *On the state programme for the implementation of the action strategy for five priority areas of development of the Republic of Uzbekistan in 2017–2021 in the "Year of Active Investments and Social Development."* https://lex.uz/docs/4168757

Presidential Decree No. 5853. (2019, October 24). *Presidential Decree No. UP-5853 validating the agriculture development strategy of Uzbekistan for 2020–2030*. Ministry of Justice. https://www.fao.org/faolex/results/details/en/c/LEX-FAOC197241/

Presidential Decree No. 6024. (2020, July 23). *On approval the water sector development concept of Uzbekistan for 2020–2030*. Agency of IFAS. https://aral.uz/en/blog/2020/07/23/decree-of-the-president-no-up-6024-on-approval-the-water-sector-development-concept-of-uzbekistan-for-2020-2030/

Presidential Decree No. 6243. (2021, June 8). *On measures to ensure equality and transparency in land relations, reliable protection of land rights and their transformation into a market asset*. https://lex.uz/ru/docs/5450181

Quastel, N. (2016). Ecological political economy: Towards a strategic-relational approach. *Review of Political Economy*, *28*(3), 336–353.

Radio Liberty. (2015, January 21). *Gardening in Uzbekistan is becoming Mirziyoyev's monopoly*. Radio Ozodi. https://rus.ozodi.org/a/26804949.html

Rana, S., & Kelly, L. (2004). *The Global Water Partnership addressing challenges of globalisation: An independent evaluation of the World Bank's approach to global programmes*. The World Bank Operations Evaluation Department.

Rasanayagam, J. (2002). Spheres of communal participation: Placing the state within local modes of interaction in rural Uzbekistan. *Central Asian Survey*, *21*(1), 55–70.

Rasanayagam, J. (2011). Informal economy, informal state: The case of Uzbekistan. *International Journal of Sociology and Social Policy*, *31*(11/12), 681–696.

Rayner, S. (2010). Foreword. In L. Mehta (Ed.), *The limits to scarcity: Contesting the politics of allocation* (pp. xvii–xx). Earthscan, London.

Reeves, M. (2011). Staying put? Towards a relational politics of mobility at a time of migration. *Central Asian Survey*, *30*(3–4), 555–576.

Resolution of the Cabinet of Ministers No. RP-982. (2019, December 12). *Resolution No. 982: On the optimisation of the activities of water consumer associations*. https://lex.uz/ru/docs/4640131

Reuters. (2025, March 30). *Martinique's water woes drive anger at French rule*. Reuters. https://www.reuters.com/world/europe/martiniques-water-woes-drive-anger-french-rule-2025-03-30/

Rigg, J., Oven, K. J., Basyal, G. K., & Lamichhane, R. (2016). Between a rock and a hard place: Vulnerability and precarity in rural Nepal. *Geoforum*, *76*, 63–74.

Ringler, C., Bhaduri, A., & Lawford, R. (2013). The nexus across water, energy, land and food (WELF): Potential for improved resource use efficiency? *Current Opinion in Environmental Sustainability*, *5*(6), 617–624.

Roberts, A. (2008). Privatizing social reproduction: The primitive accumulation of water in an era of neoliberalism. *Antipode*, *40*(4), 535–560.

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

Roidt, M., & Avellán, T. (2019). Learning from integrated management approaches to implement the nexus. *Journal of Environmental Management*, *237*, 609–616.

Romanova, E., Swinkels, R., & Kochkin, E. (2016). *Exploratory assessment of factors that influence quality of local irrigation water governance in Uzbekistan* (No. 25178). The World Bank Group.

Rothbauer, P. M. (2008). Triangulation. In L. M. Given (Ed.), *The Sage encyclopedia of qualitative research methods* (pp. 892–894). Sage, Thousand Oaks, CA.

Rowe, W. C. (2009). "Kitchen gardens" in Tajikistan: The economic and cultural importance of small-scale private property in a post-Soviet society. *Human Ecology*, *37*(6), 691–703.

Rustamov, E. (2023, July 28). *Jomboy—Renewing and blooming*. The Samarkand Herald. https://sv.zarnews.uz/post/djambay-effekt-obnovleniya-i-procvetaniya

Ruziev, K., Ghosh, D., & Dow, S. C. (2007). The Uzbek puzzle revisited: An analysis of economic performance in Uzbekistan since 1991. *Central Asian Survey*, *26*(1), 7–30.

Sakketa, T. G. (2018). Institutional bricolage as a new perspective to analyse institutions of communal irrigation: Implications towards meeting the water needs of the poor communities. *World Development Perspectives*, *9*, 1–11.

Saravanan, V. S., McDonald, G. T., & Mollinga, P. P. (2009). Critical review of integrated water resources management: Moving beyond polarised discourse. *Natural Resources Forum, 33*(1), 76–86.

Savva, P. A., & Frenken, K. (2002). *Irrigation manual: Planning, development, monitoring and evaluation of irrigated agriculture with farmer participation*. Food and Agriculture Organisation.

Schiek, S. (2018). Uzbekistan's transformation from an "old" to an "upgraded" autocracy. *L'Europe en Formation*, *385*(1), 87–103.

Schmidt, S., Hamidov, A., & Kasymov, U. (2024). Analysing groundwater governance in Uzbekistan through the lenses of social-ecological systems and informational governance. *International Journal of the Commons*, *18*(1), 203–217.

Schmitz, A. (2020). *Uzbekistan's transformation: Strategies and perspectives* (Vol. 12/2020). Stiftung Wissenschaft und Politik -SWP- Deutsches Institut für Internationale Politik und Sicherheit.

Schweisfurth, L. (2021, February 19). *Land-grabs – the new red flag for Uzbek cotton sector*. Uzbek Forum for Human Rights. https://www.uzbekforum.org/land-grabs-the-new-red-flag-for-uzbek-cotton-sector/

Scott, J. C. (1985). *Weapons of the weak: Everyday forms of peasant resistance*. Yale University Press, New Haven, CT.

Sehring, J. (2009). *The politics of water institutional reform in neopatrimonial states: A comparative analysis of Kyrgyzstan and Tajikistan*. VS Verlag für Sozialwissenschaften, Wiesbaden.

Shah, T., Makin, I., & Sakthivadivel, R. (2001). Limits to leapfrogging: Issues in transposing successful river basin management institutions in the developing world. In *Conference papers* (No. h029115). International Water Management Institute. https://ideas.repec.org/p/iwt/conppr/h029115.html

Shiva, V. (2016). *The violence of the green revolution: Third world agriculture, ecology, and politics*. The University Press of Kentucky, Lexington, KY.

Siankwilimba, E., Mumba, C., Hang'ombe, B. M., Faccia, A., Sizyoongo, M., Dzvimbo, M. A., Chilmboyi, K., & Chanda, M. (2025). Green banking innovation for smallholder farmers: A commentary on financial accessibility and sustainability. *International Journal of Agricultural Sustainability*, *23*(1), 2553957.

Silvester, B. R., & Fisker, J. K. (2023). A relational approach to the role of the state in societal transitions and transformations towards sustainability. *Environmental Innovation and Societal Transitions*, *47*, 100717.

Sinan, E. (2013). Abundance and scarcity amidst the crisis of 'modern water': The changing water–energy nexus in Turkey. In L. M. Harris, J. A. Goldin, & C. Sneddon (Eds.), *Contemporary water governance in the global south* (pp. 61–78). Routledge, London.

Smith, A. (2015). The state, institutional frameworks and the dynamics of capital in global production networks. *Progress in Human Geography*, *39*(3), 290–315.

Smith, C., & Elger, T. (2012). *Critical realism and interviewing subjects* (Working Paper Series No. SoMWP–1208). School of Management, Royal Holloway University of London.

Smith, N. (1984). *Uneven development: Nature, capital, and the production of space*. Blackwell, Oxford.

Smith, N. (2007). Nature as accumulation strategy. *Socialist Register*, *43*, 16–36. https://socialistregister.com/index.php/srv/article/view/5856

Sneddon, C. (2013). Water, governance and hegemony. In L. M. Harris, J. A. Goldin, & C. Sneddon (Eds.), *Contemporary water governance in the global south* (1st ed., pp. 13–24). Routledge, London.

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

Spoor, M. (1993). Transition to market economies in former Soviet Central Asia: Dependency, cotton and water. *The European Journal of Development Research*, *5*(2), 142–158.

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

Statistics Agency Under the President of the Republic of Uzbekistan. (2022). *Structure of agricultural production* [Dataset].

Stern, P. C. (2011). Design principles for global commons: Natural resources and emerging technologies. *International Journal of the Commons*, *5*(2), 213–232.

Sturgiss, E. A., & Clark, A. M. (2020). Using critical realism in primary care research: An overview of methods. *Family Practice*, *37*(1), 143–145.

Stutchbury, K. (2022). Critical realism: An explanatory framework for small-scale qualitative studies or an 'unhelpful edifice'? *International Journal of Research & Method in Education*, *45*(2), 113–128.

Sultana, F. (2011). Suffering for water, suffering from water: Emotional geographies of resource access, control and conflict. *Geoforum*, *42*(2), 163–172.

Sum, N. L., & Jessop, B. (2013). *Towards a cultural political economy: Putting culture in its place in political economy*. Edward Elgar Publishing, Cheltenham.

Swyngedouw, E. (1999). Modernity and hybridity: Nature, regeneracionismo, and the production of the Spanish waterscape, 1890–1930. *Annals of the Association of American Geographers*, *89*(3), 443–465.

Swyngedouw, E. (2009). The political economy and political ecology of the hydro-social cycle. *Journal of Contemporary Water Research & Education*, *142*(1), 56–60.

Swyngedouw, E. (2015). *Liquid power: Water and contested modernities in Spain, 1898–2010*. MIT Press, Cambridge, MA.

Swyngedouw, E., & Boelens, R. (2018). "…and not a single injustice remains": Hydro-territorial colonisation and techno-political transformations in Spain. In J. Vos, R. Boelens, & T. Perreault (Eds.), *Water justice* (pp. 115–133). Cambridge University Press, Cambridge.

Teichmann, C. (2007). Canals, cotton, and the limits of de-colonisation in Soviet Uzbekistan, 1924–1941. *Central Asian Survey*, *26*(4), 499–519.

The Guardian. (2018, May 4). *How Cape Town was saved from running out of water*. https://www.theguardian.com/world/2018/may/04/back-from-the-brink-how-cape-town-cracked-its-water-crisis

The Guardian. (2022, July 28). *'It's plunder': Mexico desperate for water while drinks companies use billions of litres*. https://www.theguardian.com/global-development/2022/jul/28/water-is-the-real-thing-but-millions-of-mexicans-are-struggling-without-it

The Guardian. (2024, November 23). *'It's not drought - it's looting': The Spanish villages where people are forced to buy back their own drinking water*.

https://www.theguardian.com/lifeandstyle/2024/nov/23/spanish-villages-people-forced-to-buy-back-own-drinking-water-drought-flood

The Labour Code of the Republic of Uzbekistan. (2023, April 30). https://lex.uz/ru/docs/6257291#6267943

The Tashkent Times. (2021, January 23). *If they fail, they will be sacked. Shavkat Mirziyoyev warned Jamshid Khodjaev and Shukhrat Ganiev*. https://www.tashkenttimes.uz/national/6285-if-they-fail-they-will-be-sacked-shavkat-mirziyoyev-warned-jamshid-khodjaev-and-shukhrat-ganiev

Trevisani, T. (2007). After the kolkhoz: Rural elites in competition. *Central Asian Survey*, *26*(1), 85–104.

Trevisani, T. (2008). *Land and power in Khorezm: Farmers, communities, and the state in Uzbekistan's decollectivisation*. LIT Verlag, Münster.

Truelove, Y., & Ruszczyk, H. A. (2022). Bodies as urban infrastructure: Gender, intimate infrastructures and slow infrastructural violence. *Political Geography*, *92*, 102492.

UNDP. (2007). *Water critical resource for Uzbekistan's future* (Publication in Support of the Millennium Development Goals 7: Ensure Environmental Sustainability, p. 124). United Nations Development Programme.

UNDP. (2020). *Citizens' budget 2020* (Financing for Sustainable Development in Uzbekistan). United Nations Development Programme. https://www.undp.org/uzbekistan/publications/budget-citizens

UNDP. (2021). *Green recovery and transition to a green economy in Uzbekistan* [Policy brief]. United Nations Development Programme.

UNDP. (2024). *Agricultural financing in Uzbekistan: Analysis and recommendations for alternative financial mechanisms*. United Nations Development Programme and the Government of Uzbekistan.

UNDP. (2025, January 27). *"One Village–One Product"–Transforming local resources into economic opportunities in the Aral Sea Region*. https://www.undp.org/uzbekistan/press-releases/one-village-one-product-transforming-local-resources-economic-opportunities-aral-sea-region

UNDRR. (2025, April 4). *Uzbekistan: Key smallholder farmer public-private insurance scheme*. PreventionWeb. https://www.preventionweb.net/news/implementation-update-landmark-public-private-insurance-scheme-smallholder-horticulture

UNECE. (2022, June 22). *UNECE and UNDP support Uzbekistan's Yashil Makon/Green Nation initiative to fight against climate change*. https://unece.org/media/press/368739

UNECE. (2025, November 26). *Uzbekistan advances water, health and industrial safety with UNECE support*. United Nations Economic Commission for Europe. https://unece.org/media/press/409881

UNESCAP. (2008). *Greening growth in Asia and the Pacific*. Department of Economic and Social Affairs. https://sdgs.un.org/publications/greening-growth-asia-and-pacific-17607

Usov, A. (2017, November 8). *EBRD enters new stage of engagement with Uzbekistan*. https://www.ebrd.com/home/news-and-events/news/2017/ebrd-enters-new-stage-of-engagement-with-uzbekistan.html

UzDaily. (2012, March 9). *Uzbekistan adopts programme on deepening agriculture goods processing*. UzDaily.uz. https://www.uzdaily.uz/en/post/19970

UzDaily. (2017, September 26). *President of Uzbekistan receives Minister of Agriculture of Russia*. UzDaily.uz. https://www.uzdaily.uz/en/president-of-uzbekistan-receives-minister-of-agriculture-of-russia/

UzDaily. (2018, January 15). *Kholmurodov: Uzbekistan abandons practice of developing annual investment programmes*. UzDaily.uz. https://www.uzdaily.uz/en/kholmurodov-uzbekistan-abandons-practice-of-developing-annual-investment-programmes/

UzDaily. (2023, October 27). *A national "green" taxonomy is being implemented in Uzbekistan*. UzDaily.uz. https://www.uzdaily.uz/en/a-national-green-taxonomy-is-being-implemented-in-uzbekistan/

Van der Kooij, S., Zwarteveen, M., Boesveld, H., & Kuper, M. (2013). The efficiency of drip irrigation unpacked. *Agricultural Water Management*, *123*, 103–110.

Veldwisch, G. J. (2008). *Cotton, rice & water: The transformation of agrarian relations, irrigation technology and water distribution in Khorezm, Uzbekistan*. [Doctoral dissertation, Rheinischen Friedrich-Wilhelms-Universität zu Bonn].

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

Veldwisch, G. J., & Mollinga, P. P. (2013). Lost in transition? The introduction of water users associations in Uzbekistan. *Water International*, *38*(6), 758–773.

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

Veltmeyer, H. (2005). Development and globalisation as imperialism. *Canadian Journal of Development Studies/Revue Canadienne d'études du Développement*, *26*(1), 89–106.

Vogel, L. (2000). Domestic labor revisited. *Science & Society*, *64*(2), 151–170.

Von Braun, J. (1995). Agricultural commercialisation: Impacts on income and nutrition and implications for policy. *Food Policy*, *20*(3), 187–202.

Von Braun, J., & Kennedy, E. T. (Eds.). (1994). *Agricultural commercialisation, economic development, and nutrition*. Johns Hopkins University Press, Baltimore, MD.

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

Walker, G. (2014). *An uncooperative community: Revisiting water privatisation and commoditisation in England and Wales* [Doctoral dissertation, University of Oxford].

Watts, M. (2003). Political ecology. In E. Sheppard & T. J. Barnes (Eds.), *A companion to economic geography* (pp. 257–274). Blackwell Publishing, Oxford.

Watts, M. (2021). The agrarian question. In A. H. Akram-Lodhi, K. Dietz, B. Engels, & B. M. McKay (Eds.), *Handbook of critical agrarian studies* (pp. 53–66). Edward Elgar Publishing, Cheltenham.

Wegerich, K. (2000). *Water user associations in Uzbekistan and Kyrgyzstan: Study on conditions for sustainable development* (Water Issues Study Group, Occasional Paper No. 32). School of Oriental and African Studies.

Weinthal, E. (2001). Sins of omission: Constructing negotiating sets in the Aral Sea basin. *The Journal of Environment & Development*, *10*(1), 50–79.

Weinthal, E. (2002). *State making and environmental cooperation: Linking domestic and international politics in Central Asia*. MIT Press, Cambridge, MA.

Welfare improvement strategy of the Republic of Uzbekistan for the period of 2013–2015. (2013). Republic of Uzbekistan. https://www.fao.org/faolex/results/details/en/c/LEX-FAOC191013/

Welfare improvement strategy of Uzbekistan 2008–2010. (2007). Republic of Uzbekistan. https://www.fao.org/faolex/results/details/es/c/LEX-FAOC170269/

Whaley, L., & Cleaver, F. (2017). Can 'functionality' save the community management model of rural water supply? *Water Resources and Rural Development*, *9*, 56–66.

White, B., Borras, S. M., Jr., Hall, R., Scoones, I., & Wolford, W. (2012). The new enclosures: Critical perspectives on corporate land deals. *The Journal of Peasant Studies*, *39*(3–4), 619–647.

Whitehead, M. (2003). "In the shadow of hierarchy": Meta-governance, policy reform and urban regeneration in the West Midlands. *Area*, *35*(1), 6–14.

Whitman, J. (1956). Turkestan cotton in imperial Russia. *American Slavic and East European Review*, *15*(2), 190-205.

Wichelns, D. (2017). The water-energy-food nexus: Is the increasing attention warranted, from either a research or policy perspective? *Environmental Science & Policy*, *69*, 113–123.

Wink, M. (2011). *Integrated water resource management (IWRM): Exploring the gap between expectations and outcomes* (Master's research paper). International Institute of Social Studies, The Hague.

World Bank. (2001). *Uzbekistan—Rural enterprise support project* (No. 21075; Project Appraisal Document). World Bank Group. https://documents.worldbank.org/en/publication/documents-reports/documentdetail/en/315731468761958772

World Bank. (2006). *Reengaging in agricultural water management: Challenges and options*. World Bank Publications.

World Bank. (2009). *Uzbekistan—Rural enterprise support project* (Implementation Completion and Results Report No. ICR711). World Bank. https://documents.worldbank.org/en/publication/documents-reports/documentdetail/en/881381468125066078

World Bank. (2012a). *Uzbekistan strengthening the horticulture value chain* (Background Paper Series - Uzbekistan Vision 2030). The World Bank.

World Bank. (2012b). *Uzbekistan—Second phase rural enterprise support project* (No. 67598-UZ; Project Paper on a Proposed Additional Credit). https://documents.worldbank.org/en/publication/documents-reports/documentdetail/en/151051468132900427

World Bank. (2014). *Uzbekistan—Horticulture development project* (Project Appraisal Document No. PAD774). World Bank. https://documents.worldbank.org/en/publication/documents-reports/documentdetail/en/099122324115520516

World Bank. (2017). *Restructuring paper on a proposed project restructuring of Horticulture Development Project approved on June 12, 2014 to the Republic of Uzbekistan* (No. RES29436; Horticulture Development Project (P133703)). The World Bank.

World Bank. (2022). *Uzbekistan: Review of agriculture strategy implementation 2020/2021* (Policy Dialogue on Agriculture Modernisation in Uzbekistan).

World Bank. (2023a). *Guidance note on Uzbekistan green taxonomy* (No. 187726). World Bank Group.

World Bank. (2023b). *Project list: Uzbekistan*. https://projects.worldbank.org/en/projects-operations/projects-list

World Bank. (2023c). *Uzbekistan—First inclusive and resilient market economy development policy operation programme* (No. PD000033). World Bank Group. https://documents.worldbank.org/en/publication/documents-reports/documentdetail/en/099111323165528759

World Bank. (2024). *Prime picks for a green pivot: Uzbekistan state funds for climate action*. World Bank Group. https://openknowledge.worldbank.org/entities/publication/9508a5b9-d302-4906-b4b9-212741d93f42

World Bank. (2025a, May 21). *Uzbekistan to modernize its irrigation infrastructure with World Bank support*. World Bank. https://www.worldbank.org/en/news/press-release/2025/05/21/uzbekistan-to-modernize-its-irrigation-infrastructure-with-world-bank-support

World Bank. (2025b, May 27). *Weaving a new future in Uzbekistan's cotton sector*. World Bank Group. https://www.worldbank.org/en/news/feature/2025/05/27/weaving-a-new-future-in-uzbekistan-s-cotton-sector

World Bank Group. (2019). *Uzbekistan public expenditure review* (No. 146409).

Yalcin, R., & Mollinga, P. P. (2007a). *Institutional transformation in Uzbekistan's agricultural and water resources administration: The creation of a new bureaucracy*. Zentrum für Entwicklungsforschung / Center for Development Research (ZEF), University of Bonn, Bonn.

Yalcin, R., & Mollinga, P. (2010). Water users associations in Uzbekistan: The introduction of a new institutional arrangement for local water management. In P. Mollinga, A. Bhat, & V. S. Saravanan (Eds.), *When policy meets reality: Political dynamics and the practice of integration in water resources management reform* (pp. 97–126). LIT Verlag, Münster.

Yeung, H. W. (1997). Critical realism and realist research in human geography: A method or a philosophy in search of a method? *Progress in Human Geography*, *21*(1), 51–74.

YUZ.uz. (2024, November 20). *ADB approved a $250 million loan to support Uzbekistan's green economic growth*. "Yangi O'zbekiston" [New Uzbekistan News]. https://yuz.uz/en/news/abr–odobril–zaem–v–razmere–250–mln–dollarov–dlya–podderjki–zelenogo–ekonomicheskogo–rosta–uzbekistana

ZARNEWS.uz. (2025, January 28). *Sources of income – Private subsidiary plots* [Istochniki dokhoda priusadebnye khozyaystva]. https://sv.zarnews.uz/post/istochniki–doxoda–priusadebne–xozyaystva

Zavgorodnyaya, D. (2006). *Water users association in the Republic of Uzbekistan: Theory and practice*. Rheinischen Friedrich–Wilhelms–Universität zu Bonn; Cuvillier Verlag, Göttingen.

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

Zorya, S., Djanibekov, N., Petrick, M., Hasanov, S., Mukhamedova, N., Durand, O., & Khidirov, D. (2019). *Farm restructuring in Uzbekistan: How did it go and what is next?* [ASA "Support to Agricultural Modernisation in Uzbekistan"]. World Bank Group.

Zorya, S., Htenas, A., Babaev, S., Illina, D., Nazarov, P., Kurbanov, Z., & Tojiyev, A. (2020). *Uzbekistan agrifood job diagnostic* (Europe and Central Asian Region). World Bank Group.