

# Imperial Desert Dreams

Cotton Growing and Irrigation in Central Asia,  
1860-1991



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Titelbild: On a road near Urgench in April 2008. © Julia Obertreis.

*To Bea*



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Along the way, I’ve met different kinds of people, among them many who encouraged and supported me. My beloved, charming spouse Bea Trogand is the most important of them, and that’s why the book is dedicated to her. She found the subject I worked on interesting – something you cannot always expect from your partner – and advised me to think big, to write the book in English, and not to get discouraged by challenging situations. I guess she will be happy to finally see the book.

In the beginning Christoph Bernhardt, for whom I worked at the IRS (Institute for Research on Society and Space) in Erkner, introduced me to the field of water history. Finding his work on the Rhine very stimulating, I decided to work on water history in Eastern Europe. Klaus Gestwa (University of Tübingen) directed me to the idea of examining irrigation in Central Asia. As I had been to Central Asia on a prolonged trip through the Soviet Union just after its collapse in 1992 with my friend Barbara Kettnaker, I was immediately interested and worked out a project design. Sitting in the ZBW library in Kiel with its superb selection of journals and a useful thematic catalogue and enjoying the view from the readers’ rooms onto much water, I became excited about the idea of analyzing the somewhat dry literature on irrigation and cotton growing in Russian-language journals by using James C. Scott’s *high modernism*.

After a visit to the Uzbek Embassy in Berlin, I found the uneasy way into the Tashkent archives. I remember the excitement of my first visit to the Central State Archive in 2007 and my relief when I was granted permission to use it for one year. One of the highlights of my time at the archive was being invited to the

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Berlin, in August 2017



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## Introduction

On July 25, 1848, Captain Aleksei Ivanovich Butakov and his men left the Russian port of Raim on two schooners. The governor general of Orenburg had founded the port on the Syr Darya River in modern Kazakhstan just a year earlier.

Butakov's undertaking was to explore the enormous lake the boats were now heading towards. The body of water was so big that the Russians called it a sea – the Aral Sea (*Aral'skoe more*). It was situated in a transit zone between the Russian forts at the Syr Darya River and the Khanate of Khiva. South of the Aral Sea began the world of the Muslim khanates, which remained largely unknown to the Russians. The rest of the summer and again the following year, Butakov sailed the lake in order to survey its western shores and to explore its hitherto unknown waters. One of the aims of the expedition was to draw a precise map of the Aral Sea. The going was not always easy, such as when the crew ran out of fresh water and was forced to drink the salty water of the lake. Because of heavy wind fluctuations and the strong motion of the sea, measuring the western shores proved to be a real adventure. At the end of the first trip, Butakov noted in his diary that the lake was one of the “most uncalm of waters that offers to sailors no secure and comfortable haven”.<sup>1</sup> Despite these adverse conditions, geological and botanical studies were conducted. In the delta of the Amu Darya River, Butakov and his crew carried out soundings und assessed characteristic points in the landscape. Sometimes they had to stand in the water up to their chests until they managed to determine the eleven points that formed the basis for the first “scientific” map of the lake. The military researchers were not permitted to go further into the delta of the Amu Darya for fear of being attacked by the inhabitants of the Khanate of Khiva. The Russian exploration zone was therefore clearly delineated up to this point.<sup>2</sup>

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1 M.-R. Uhrig, ‘Einleitung’, in M.-R. Uhrig (ed.), *Butakov, Aleksei Ivanovich: Tagebuch der Aralsee-Expedition 1848/49* (Zell 2008), pp. 7–23, citation p. 16.

2 Ibid., pp. 12, 13, 18. On board the schooner “Konstantin” was Taras Shevchenko, one of Ukraine's most famous poets. He had been arrested for his membership in the Society of



As we know from the Baltic German Theodor Basiner, Butakov's contemporary, the Aral Sea was strikingly blue at that time and the Russians sometimes called it the "Blue Sea" (*Sinoe more*).<sup>3</sup> There were countless sea birds such as gulls, sea ravens and pelicans. Butakov described the little pelicans he saw with great sensitivity. He also closely observed the flora and gathered minerals and algae. What he collected was later sent to various institutions in St. Petersburg or to leading specialists.<sup>4</sup>

Despite his tender feelings towards small wildlife, Butakov presented himself as a hard-nosed tiger hunter in a letter to his parents dated November 24, 1848. During their winter stay in a camp near the lake, 45 men had been hunting a Caspian tiger (*dzhulbars*) on one of the islands near the coast. Butakov noted, "Not long ago we had an amusing experience that doesn't exist in Europe: It was nothing less than a tiger hunt!" He described the hunt in some detail until the climax, when one of the soldiers finally shot the tiger:

... but the soldier was quicker than the tiger and just when it was about to jump at him, from a distance of two sazhen<sup>5</sup> he shot a bullet into its forehead. [...] In a triumphal march, we carried it to the fort; the pelt was handed over to me, of course. I had it tanned by a Kyrgyz friend, and the head of the *dzhulbars* (that is to say, just the skull) now hangs above my bed.<sup>6</sup>

In the colonies, tiger, lion and other forms of hunting were a typical pastime of European officers and officials. The British are best known for having had a "special hunting relationship" with the tiger with which they "seemed in some ways to be locked in conflict for command of the Indian environment".<sup>7</sup> In his

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Saints Cyril and Methodius, and because of his critical poems he was exiled as ordinary soldier to the Orenburg special corps. Butakov had heard of him being stationed there and had called on him to serve the expedition as painter. This special position allowed Shevchenko to share the captain's cabin with Butakov. During the trip, he painted pictures that give us an idea of what Butakov's crew saw: the endless shores of the lake and the appearance of the Kazakhs they met. After the expedition, Butakov sent these paintings to St. Petersburg, which had negative consequences for both himself and Shevshchenko: Butakov was not allowed to publish the results of his expedition for several years; and Shevshchenko was imprisoned again and freed only in 1857. Ibid., pp. 17, 19, 20.

3 T.F.J. Basiner, 'Appendix, Text 1, 1842', in M.-R. Uhrig (ed.), *Butakov, Aleksei Ivanovich: Tagebuch der Aralsee-Expedition 1848/49* (Zell 2008), pp. 103–105, here p. 104.

4 While scientific aims were a clear priority in his exploration of the Aral Sea, Butakov didn't forget to make military observations as well. For example, in July 1849 he discovered a small bay named Chubar-Tarauz in the north-west of the lake that he praised as a natural port and an ideal starting point for military expeditions. Uhrig 2008, pp. 15, 18.

5 1 sazhen equals 2.133 m.

6 A.I. Butakov, 'Appendix, Text 2, 1848', in M.-R. Uhrig (ed.), *Butakov, Aleksei Ivanovich: Tagebuch der Aralsee-Expedition 1848/49* (Zell 2008), pp. 105–107, citation pp. 105, 106.

7 J.M. MacKenzie, *The Empire of Nature. Hunting, Conservation and British Imperialism* (Manchester, New York 1988), p. 179. See also: E. Haschemi Yekani, *The Privilege of Crisis*.

free time, Butakov actively adopted the role of a European colonizer and the tiger's pelt and skull were proud colonial trophies. Even though the area belonged to the Russian Empire already, the expedition to the Aral Sea can be generally interpreted as a colonizer's exploration into unknown territories and waters. It was also part of the modern era's scientific appropriation of the world. Indeed, the work of Butakov and his men is consistent with the process of "measuring the world" that German novelist Daniel Kehlmann has impressively described in his eponymously entitled book.<sup>8</sup>

In 1988, 140 years later, another expedition was made to the Aral Sea that was called "Aral-88". The group of reporters and scientists, led by journalist Grigorii Reznichenko, wanted to document the damage that had been done to the enormous lake and the surrounding region by irrigation. Considerable water had been diverted in the previous decades from the rivers that fed the Aral Sea, the Amu Darya and the Syr Darya. Consequently, the level of the lake had shrunk drastically. At the same time, however, other lakes had emerged nearby. By all appearances, the natural balance between water, land and vegetation had been seriously disrupted. In comparison to the 19<sup>th</sup> century, the fauna, flora, and landscape had changed markedly. By the beginning of the 20<sup>th</sup> century, for instance, Slav and Kazakh colonists had fully extinguished the tigers that had lived along the upper reaches of the rivers and in the delta of the Aral Sea.<sup>9</sup> The journalist Grigorii Reznichenko wrote on October 3, 1988:

Central Asia from the plane is a terrible sight! The Aral Sea has not disappeared without a trace; it is rather poured out into the whole region. Wild lakes have emerged. We were at the Sarakamysh depression, which is west of the Aral; 5 billion cubic meters of dead water pour off into it per year. [...] We tried to approach the water when landing, but it was impossible – it's a swampy salty marsh. And there is no vegetation anywhere – the land is soaked with poisons. [...] Central Asia is a sponge soaked with salty moisture.<sup>10</sup>

During the roughly 120 years of tsarist and Soviet rule, processes of modernization and intensification significantly changed the region's surface and landscape. This was now being addressed by critics who directed their accusations at the Soviet regime. It was not only the new, "wild" lakes that had emerged out of drainage water and the imminent problems relating to rising groundwater and salinization. These changes also had multiple repercussions for the region's

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*Narratives of Masculinities in Colonial and Postcolonial Literature, Photography, and Film* (Frankfurt am Main, New York 2011), pp. 87–97.

8 D. Kehlmann, *Measuring the World*. Translated by Carol Brown Janeway (Oxford 2006); D. Kehlmann, *Die Vermessung der Welt* (Reinbek 2005).

9 On the fate of the tiger: R. Létolle and M. Mainguet, *Der Aralsee. Eine ökologische Katastrophe* (Berlin et al. 1996), pp. 181–182.

10 G. Reznichenko, *Aral'skaia katastrofa. Dnevnik ekspeditsii (s otstupleniiami i kommentariiami)* (Moscow 1992), pp. 61–62.

inhabitants. The most prominent issue was the siltation of the Aral Sea, which was widely recognized as an “ecological catastrophe”.<sup>11</sup>

The tsarist era began in the early 1860s, when a succession of military campaigns was initiated east and south of the Aral Sea that would last for more than two decades. As a result, the Russian Empire came to dominate southern Central Asia.<sup>12</sup> Tsarist officers and officials were succeeded by the communists after the October Revolution of 1917, when Central Asia became a part of the emerging Soviet Union. Aiming to bring their own peculiar kind of modernity to a region they perceived as backward, the Tsarist colonizers and Soviet communists developed plans to improve the economy, to make agriculture more productive, and to modernize local societies. Central issues were cotton growing and the expansion of irrigation areas to produce verdant fields and new oases. These IMPERIAL DESERT DREAMS and their deeper exploration constitute the primary focus of the present study. They will be traced in the following through the late imperial and all of the Soviet period until the demise of the Soviet Union, with particular attention directed specifically to today’s Uzbekistan and Turkmenistan.

In most parts of southern Central Asia, irrigation is a precondition for growing cotton, thus explaining the close connection between the two topics. Although the pursuit of cotton was not the conquest’s decisive impulse – as has been wrongly stated in historiographic literature – the cash crop became a highly desirable good for the imperial elites from the 1860s onward. In the Soviet period, a real cult emerged centering around the production of the “white gold”. Uzbekistan was by far the largest cotton-producing republic in the Soviet Union. In the post-war period, cotton sowing areas made up more than two thirds of all irrigated areas in the republic.<sup>13</sup> For the kolkhoz farms in Turkmenistan, cotton production was an important source of revenue as well, even if the republic delivered much less than Uzbekistan.<sup>14</sup>

In the post-war period, irrigation systems were widely expanded and huge

11 “The ecological catastrophe” is the subtitle of the most comprehensive book on this phenomenon: Létolle and Mainguet 1996. Reznichenko and others speak of the “Aral Sea Catastrophe”. Reznichenko 1992.

12 I use the term “southern Central Asia” to denote roughly the territory of the later Soviet republics Uzbekistan, Kyrgyzstan, Tajikistan, and Turkmenistan.

13 See production figures of the Uzbek Republic for different years in: *Narodnoe khoziaistvo Uzbekskoi SSR. Statisticheskii ezhegodnik*. Data on production and sowing areas can also be found in: G. Hodnett, ‘Technology and Social Change in Soviet Central Asia: The Politics of Growing Cotton’, in H.W. Morton and R.L. Tökes (eds.), *Soviet Politics and Society in the 1970’s* (New York 1974), pp. 60–117.

14 Data on Turkmenistan from: *Narodnoe khoziaistvo Turkmenskoi SSR za 70 let. Iubileinyi statisticheskii sbornik* (Ashgabat 1987), and A. Dzhumamuradov, ‘Razvitie khlopkovodstva v Turkmenistan za 50 let’, in A. Karryev et al. (eds.), *50 pobednykh let* (Ashgabat 1974), pp. 121–141.

construction projects were undertaken, including the Karakum Canal which was built in the Karakum desert from 1954 until the beginning of the 1970s. Similar to other irrigation installations, it was loudly praised by experts and journalists in propaganda articles as “the river of happy life” and the fulfillment of a long-standing dream of the people. The reorganization of the irrigation systems included reservoir construction and the straightening, shortening and lining of existing canals. In agriculture, major transformation projects included the collectivization of farms, the enlarging and straightening of fields and the introduction of machinery. Political cadres, scientists and technical elites were greatly committed to the realization of their goal to achieve modernity through redesigning of agriculture and irrigation.

These programs represent the broader ideas and visions for the region’s transformation. They are connected in a variety of ways to the exploration of Central Asia and the development of modern scientific and technical schemes. Drawing from concepts of modernity, infrastructural history, environmental history, and the history of technology, this study aims to examine the substance of these schemes, their objectives and how they took shape. It will look closely at the basic ideas and visions that were widely shared by administrators, engineers, and scientists alike.

Though a large portion of Central Asia’s population was and in fact still is engaged in agriculture, this subject has been little studied from a historical point of view. The socioeconomic and cultural history of rural societies in Central Asia is in need of more in-depth research.<sup>15</sup> As a main economic sector, cotton production certainly has been a subject of study in reference to both the tsarist and Soviet periods, and the key significance of Central Asian cotton for the Russian and Soviet economy has been well known for some time. The research has remained fragmentary, however. This state of affairs was humorously touched upon in 2006 by Adeeb Khalid, who noted young researchers’ preference for “the cultural work of Soviet power, a much sexier topic than the history of cotton.”<sup>16</sup> Authors from Central Asia also seem to have done little work on these issues in

15 See as recent exceptions from this rule several chapters in: S.A. Dudoignon and C. Noack (eds.), *Allah’s Kolkhozes. Migration, De-Stalinisation, Privatisation and the New Muslim Congregations in the Soviet Realm (1950s–2000s)* (Berlin 2014).

16 A. Khalid, ‘Backwardness and the Quest for Civilization. Early Soviet Central Asia in Comparative Perspective’, *Slavic Review* 65, 2 (2006), pp. 231–251, p. 232, fn. 3. See on cotton mostly from an economic perspective: M.O. Gately, *The Development of the Russian Cotton Textile Industry in the Pre-Revolutionary Years, 1861–1913*, PhD diss., Lawrence, Kansas, 1968 (UMI 1969); J. Whitman, ‘Turkestan Cotton in Imperial Russia’, *American Slavic and East European Review* 15, 2 (1956), pp. 190–205; B.Z. Rumer, *Soviet Central Asia. “A Tragic Experiment”* (Boston 1989); St. Tompston (ed.), *Rossiiskaia tekstil’naia promyshlennost’. Tekhnologicheskii transfert, syr’e, finansy* (St. Petersburg 2006); and some articles that will be referred to in the chapters of this study.

recent years. A doctoral thesis on cotton production in Karakalpakistan in the Soviet period by M.K. Sarybaev is characteristic for the general treatment of Russian and Soviet rule in modern Uzbekistan as “colonial” and exploitative.<sup>17</sup>

Sven Beckert’s global history of cotton growing and trade puts the Central Asian case in a broader perspective, making it possible to connect it to the much discussed “great divergence” between Europe and Asia. Characteristically, Central Asia transformed from an exporter of cotton textiles to an exporter of raw cotton when the great production boom began in the 19<sup>th</sup> century while Europe began to dominate the manufacturing process.<sup>18</sup> The depiction of Russia as a European imperial power and Central Asia as a colony conforms well to Beckert’s larger picture.

The subject of irrigation has attracted a great deal of scholarly attention in recent decades. The most prominent work on the history of irrigation in the Orient, a work that is cited in most Western contributions to Central Asia’s irrigation history, is Karl August Wittfogel’s “Oriental Despotism”.<sup>19</sup> As the author’s concept of the “hydraulic society” has been rightly criticized by many authors, it will only be briefly treated here. Wittfogel contends that the construction and usage of large irrigation systems inevitably leads to and supports despotic rule because only a strong central power can guarantee the functioning of these systems. This thesis has proved productive and continues to stimulate thought about the nexus between irrigation infrastructure and political rule. Nevertheless, Wittfogel’s study of Indian, Chinese and other irrigation systems is based on Western language sources only. It thus remains very much on the surface of things and is deeply grounded in a model of totalitarian rule (in Nazi Germany or Stalinist Soviet Russia) that was fashionable in the 1950s, when the study first appeared. The author’s conception of oriental despotic rule is not historically documented for the Asian societies in question and it is not consistent with the rule of Central Asian khans and emirs in the 19<sup>th</sup> century. While Wittfogel does treat the Soviet Union, he does so in a superficial manner and in an overtly anti-communist vein.<sup>20</sup>

17 M.K. Sarybaev, *Politika khlopkovoi monokul’tury Sovetskoi vlasti v Karakalpakstane i ee posledstviia (1917–1990 gg.)*. Avtoreferat dissertatsii na soiskanie uchenoi stepeni doktora istoricheskikh nauk (Tashkent 2008). To be sure, this interpretation fits Karakalpakistan more than some other regions as it suffered most from the darker consequences of Soviet modernity.

18 S. Beckert, *Empire of Cotton. A Global History* (New York 2014), pp. vix–xv.

19 K.A. Wittfogel, *Oriental Despotism. A Comparative Study of Total Power* (New Haven, Conn. 1957).

20 See as an example J. Paul, *Herrscher, Gemeinwesen, Vermittler: Ostiran und Transoxanien in vormongolischer Zeit* (Stuttgart 1996), pp. 43–65, who shows in detail that Wittfogel’s assumptions largely do not hold true for Iran and Transoxania. Joachim Radkau has dealt intensely with Wittfogel. See, among other contributions, his early article: J. Radkau, ‘Der

Since the publication of Wittfogel's study, a broad specter of research on irrigation, both on contemporary developments and with historical perspectives, has emerged, especially in the last 30 years or so. Important work has been done, for example, in the field of "water history".<sup>21</sup> Central Asia's irrigation past and present has also received some scholarly attention, with the pioneering study by Michael Thurman on irrigation in the Ferghana Valley covering the period from 1876 to the present (1999). Thurman's study contains valuable information on the functioning of irrigation and the attendant political transformation efforts.<sup>22</sup> One of its great advantages is that it introduces a historical perspective into irrigation research, while taking into account ecological factors. On the other hand, he aims to confirm the implications of his political studies model, which posits a state administration in opposition to the irrigation community.<sup>23</sup> Thurman sees Central Asia as an extreme example of the transformation process triggered by the advance of European colonial powers.<sup>24</sup> He concludes that the failed policies of the Russian administration led to more inequity and less sustainability than had existed before the Russian conquest.<sup>25</sup> While these points have their validity, Thurman's findings must be judged with some care: He tends, for example, toward a certain idealization of the khanate period and appears to view all negative phenomena, most notably corruption, as being a consequence of Russian rule. At the same time, he characterizes this rule as inefficient and not coercive.<sup>26</sup> Finally, while his account on the tsarist and early Soviet period is very comprehensive, the post-war period is treated in only cursory fashion.

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Emigrant als Warner und Renegat: K.A. Wittfogels Dämonisierung der "asiatischen Produktionsweise", *Exilforschung. Internationales Jahrbuch*, vol. 1 (1983), pp. 73–94. Cf. J. Radkau, *Natur und Macht. Eine Weltgeschichte der Umwelt* (Munich 2002), pp. 112–114.

21 See for the current state of the interdisciplinary fields of water studies and water history the online journal "Water Alternatives" ([www.water-alternatives.org](http://www.water-alternatives.org), accessed May 8, 2017) and the online and print journal "Water History". A milestone in this process was surely "Rivers of Empire" by one of the founders of environmental history in the US, Donald Worster. The book is a leftist, Marxist-inspired and Neo-Wittfogelian study on river usage and irrigation in the American West in the 19th and 20th centuries which criticizes Wittfogel but also continues his approach to the modern era. Worster speaks of the "capitalist state mode" as a development stage in irrigation history. While his study has pointed to the importance of irrigation for the new era and the intertwining of politics, planning, and the transformation of nature, its perspectives on nature and society seem one-sided and it does not try to explain the relation between irrigation and power in non-capitalist societies. D. Worster, *Rivers of Empire. Water, Aridity, and the Growth of the American West* (New York, Oxford 1985), p. 50.

22 J.M. Thurman, *Modes of Organization in Central Asian Irrigation: The Ferghana Valley, 1876 to Present* (doctoral thesis, Indiana University, December 1999, UMI).

23 On this model and others that the author works with: *Ibid.*, pp. 4–9.

24 *Ibid.*, p. 13.

25 *Ibid.*, p. 117.

26 *Ibid.*, especially pp. 248–249.

Alexander Morrison devotes one chapter of his study on Russian tsarist rule in Samarkand to irrigation. Similar to Thurman, he concludes that the tsarist regime had failed to govern in Ferghana, and that its lack of influence resulted in widespread corruption.<sup>27</sup> Morrison's study compares Russian rule in Samarkand to British rule in India. When comparing both colonial regimes, Morrison states that the Russian administration, in contrast to that of the British, failed in its modernization efforts and should be recognized as having been ineffective and corrupt. He explains that this was mainly due to a lack of money, power, and expertise. For Central Asian peasants, however, Russian governance turned out to be more "humane" than British rule in India, where, among other things, there was much heavier taxation. Impoverishment and the loss of land were undoubtedly present in Turkestan, too, yet to a much lesser degree.

Two points of criticism about Thurman's and Morrison's evaluations of Russian rule in Turkestan seem justified. First, they use "corruption" as a normative concept, whereas the term needs to be historicized and questioned.<sup>28</sup> Second, their view of Russian rule and administration is too static. In fact, the nature of Russian rule was not unchanged during the five decades between the establishment of the general-governorship and the end of tsarist rule. Moreover, rule on the peripheries was complex, with multiple dimensions and layers. In the words of Paul Werth, the tsarist empire "simultaneously drew on several models of state organization: a traditional, dynastic, composite state; an emerging (incomplete) national state; and a modern colonial empire."<sup>29</sup> The traditional imperial policies, which included the hierarchical status and privileges of different groups and considerable leeway for non-Russian cultures and non-Orthodox religions, gradually gave way to the elements of a modern, homogenizing state, both with and without a colonial context.<sup>30</sup> This study, by contrast, at-

27 A.S. Morrison, *Russian Rule in Samarkand 1868–1910. A Comparison with British India* (Oxford et al. 2008), p. 237.

28 Judgments about "corrupt" officials do not explain much, whether in regard to how administration work actually proceeded or which guidelines and values were applied by certain individuals. The concept of "corruption" requires further scrutiny. It has been separated in recent Western historiography from its normative political core and regarded as rather a functioning, instead of malfunctioning, system. Cf. the criticism of "corruption" in Morrison's work by: J. Sahadeo, 'Russia's Place in an Imperial World', *Kritika* 11, 2 (2010), pp. 381–409, p. 399. New approaches to the subject of corruption: S. Schattenberg, *Die korrupte Provinz? Russische Beamte im 19. Jahrhundert* (Frankfurt a.M. 2008), pp. 53–56; J.I. Engels, 'Politische Korruption in der Moderne. Debatten und Praktiken in Großbritannien und Deutschland im 19. Jahrhundert', *Historische Zeitschrift* 282 (2006), pp. 313–349.

29 P. Werth, 'Changing Conceptions of Difference, Assimilation, and Faith in the Volga-Kama Region, 1740–1870', in J. Burbank, M. von Hagen, and A.V. Remnev (eds.), *Russian Empire. Space, People, Power, 1700–1930* (Bloomington 2007), pp. 169–195, p. 170.

30 On the tension between traditional empire and modern nation-state in the Russian Empire, compared with the British Empire, the Habsburg Monarchy, and the Ottoman Empire: J.

tempts to differentiate more precisely between the various periods in this process.

Other historians' contributions have treated irrigation construction as political and economic projects in an imperial context, focusing on engineers, entrepreneurs, and/or the tsarist and communist rulers.<sup>31</sup> These studies treat different periods leading up to the Second World War. They also represent very different approaches, including environmental history. The most elaborate work is the still unpublished PhD thesis by Maya Peterson, which is concerned, among other things, with the contribution of foreign experts to Central Asian irrigation and is attentive to regional developments transcending the Russian/Soviet borders.<sup>32</sup> Christian Teichmann has viewed irrigation and cotton growing in Uzbekistan from a political-history angle, embedding it into the history of pre-war Stalinism and Soviet nationality politics.<sup>33</sup>

Geographers, ethnographers, and others have concentrated on irrigation in Central Asia after the collapse of the Soviet Union. Some of them have critically evaluated Western development aid. Local studies of irrigation shed light on irrigation practice and its social implications.<sup>34</sup> The evaluation of agrarian policies, water resources and their uses in post-Soviet Central Asia illuminate the economic, political, and ecological problems that are partly a legacy of the Soviet period.<sup>35</sup>

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Leonhard and U. von Hirschhausen, *Empires und Nationalstaaten im 19. Jahrhundert* (Göttingen 2009).

31 E. Pravilova, 'River of Empire: Geopolitics, Irrigation, and the Amu Darya in the Late XIXth Century', *Cahiers d'Asie Central* 17–18 (2009), pp. 255–287; M. Joffe, 'Autocracy, Capitalism and Empire: The Politics of Irrigation', *The Russian Review* 54, 3 (1995), pp. 365–388.

32 M. Peterson, *Technologies of Rule: Empire, Water, and the Modernization of Central Asia, 1867–1941*. PhD Diss. (Harvard University 2011).

33 C. Teichmann, *Macht der Unordnung. Stalins Herrschaft in Zentralasien 1920–1950* (Hamburg 2016). See among his contributions on the subject also: C. Teichmann, 'Cultivating the Periphery. Bolshevik Civilizing Missions and 'Colonialism' in Soviet Central Asia', in S. Conrad, N. Heé, and U. Schaper (eds.), *Ordering the Colonial World Around the 20th Century. Global and Comparative Perspectives = Comparativ. Zeitschrift für Globalgeschichte und vergleichende Gesellschaftsforschung* 19, 1 (2009): 34–52 and C. Teichmann, 'Canals, Cotton, and the Limits of De-Colonization in Soviet Uzbekistan, 1924–1941', *Central Asian Survey* 26, 4 (2007), pp. 499–519.

34 See on both aspects the instructive study by: C. Bichsel, *Conflict Transformation in Central Asia. Irrigation Disputes in the Fergana Valley* (London 2009). Bichsel criticizes the overly simple and non-proven theories popular in development aid, like e.g. that ethnic groups equal conflict parties and tend to fight each other. *Ibid.*, pp. 34–37. She also stresses the importance of the upstream-downstream users' constellation for water distribution. *Ibid.*, pp. 49–52.

35 See among other publications by these authors: K. Wegerich, 'Water: The Difficult Path to a Sustainable Future for Central Asia', in T. Everett-Heath (ed.), *Central Asia. Aspects of Transition* (London 2003), pp. 244–263; E. Giese and J. Sehring, 'Konflikte ums Wasser. Nutzungskonkurrenz in Zentralasien', *Machtmosaik Zentralasien. Traditionen, Restrikti-*



The present study not only draws on existing (Western) research literature, but also on Soviet literature. In the 1970s, the four-volume “Irrigation of Uzbekistan” was published, a lavish series containing many maps and pictures that became the “bible” of Uzbek Soviet irrigators.<sup>36</sup> As with most other publications on irrigation and agriculture, the work is mainly an enumeration of successful Soviet construction projects with numerous figures and the names of scholars, engineers and shock workers. In Soviet literature, the tsarist period is largely depicted as having seen some promising beginnings but little in the way of results. It is often compared to the Soviet period, where mechanization and modern construction projects had finally become reality. The books by A. Mamedov on Russian and Central Asian irrigation experts before and after 1917 proved very useful for this study.<sup>37</sup> These and other Soviet publications contain essential information that cannot be easily gathered from sources. Indeed, when reading between the lines, it is possible to detect information about failures and grievances.

Another interesting type of Soviet literature is devoted to pre-revolutionary irrigation and deals with the practices of the indigenous population on the ground. Besides the works of Soviet ethnographers, there are contributions by Central Asian scholars that are ostensibly harmless short little publications of an ethnographic type yet contain important information on how irrigation actually worked before Soviet engineers started to build their canals and transform irrigation.<sup>38</sup>

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onen, *Aspirationen = Osteuropa* 57, 8–9 (2007, pp. 483–496; E. Giese, J. Sehring, and A. Trouchine, ‘Zwischenstaatliche Wassernutzungskonflikte in Zentralasien’, *Giessener Elektronische Bibliothek*, October 26, 2004, <http://geb.uni-giessen.de/geb/volltexte/2004/1823/> (accessed July 27, 2017) [2004b]; J. Sehring, *Kooperation bei Wasserkonflikten: die Bemühungen um nachhaltiges Wassermanagement in Zentralasien* (Mainz 2002); J. Sehring, ‘Die Aralsee-Katastrophe. Ein Nachruf auf das multilaterale Krisenmanagement’, *Machtmosaik Zentralasien. Traditionen, Restriktionen, Aspirationen = Osteuropa* 57, 8–9 (2007), pp. 497–510.

36 *Irrigatsiia Uzbekistana: v chetyrekh tomakh* (Tashkent, 1975–1981). Cf. Thurman 1999, p. 24.

37 A. Mamedov, *Russkie uchenye i razvitie irrigatsii Srednei Azii* (Tashkent 1968); A. Mamedov, *Irrigatsiia i irrigatory Uzbekistana* (Tashkent 1971).

38 As one example for the latter: G.J. Astanova, ‘Iz istorii vodopol’zovaniia v Karakul’skom tumane bukharskogo emirata vtoroi poloviny XIX – nachala XX veka’, *Obshchestvennye Nauki Uzbekistana* [in the following: ONU], 8 (1979), pp. 27–29. As an example for relevant ethnographic studies: M.V. Sazonova, *Traditsionnoe khoziaistvo uzbekov iuzhnogo Khozstva* (Leningrad 1978).

## People, Geography, and Agriculture

In view of the fact that agriculture, rural societies, and natural conditions of Central Asia are underrepresented in our historical understanding and gaps have necessarily emerged in the scholarship of various fields of study, the following introduction to Central Asia's population and geography, and to the subjects of irrigation and cotton growing in particular, is essentially interdisciplinary in nature.

The imperial desert dreams of tsarist and Soviet rulers and scholars concerned an area that is certainly rich in deserts and steppes. Geographically, the territory extends from the mountains. Turkmenistan and Uzbekistan belong to the wider region of Turan, bounded in the south and east by several high mountain ranges. The Hindukush forms the border to Afghanistan. The Tien Shan mountain system extends west to east. Between its ranges, there are mountain basins which are generally flat and characterized by steppe or desert conditions. The largest is the Fergana Valley, one of the most densely settled areas in Central Asia.

As with the Tien Shan, the Pamirs have numerous glaciers. Together they form the basis of the water source for Central Asia. The Kopet Dag Mountains in southern Turkmenistan are isolated from the other mountain systems. Their foothills contain rich wind-swept loess soils, while the base of the mountains is occupied by a strip of clayey desert.<sup>39</sup>

In the north, the basin of Turan is open to Siberia. Departing from the foothills of the mountains in the south, the area gradually and almost imperceptibly declines over hundreds of kilometers to the centre of the Aral Sea basin. The lowest point is not the Aral Sea, but the bottom of the Caspian Sea. There are other depressions that are below sea level, e.g. the Sarykamysh Lake at -42 m. In general, these lowlands of Turan are plains.<sup>40</sup>

About 80 % of the territory of modern Turkmenistan (488,100 km<sup>2</sup>) consists of desert. The desert Karakum (Turkic for: "black sand") is the biggest desert in Central Asia and covers about 350,000 to 380,000 km<sup>2</sup>.<sup>41</sup> It mostly consists of ridge sand. There are sand dunes that are held in place by psammophilic (sand-loving) vegetation and stretch longitudinally in the direction of the wind. Stretching in a nearly meridional direction, they once facilitated the movement

39 P. Sinnott, 'The Physical Geography of Soviet Central Asia and the Aral Sea Problem', in R. A. Lewis (ed.), *Geographic Perspectives on Soviet Central Asia* (London 1992), pp. 74–97, pp. 79–81; J. Stadelbauer, 'Zwischen Hochgebirge und Wüste. Der Naturraum Zentralasien', *Osteuropa* 57, 8–9 (2007), pp. 9–26, p. 9.

40 Létolle and Mainguet 1996, pp. 5–6.

41 Article "Garagum Desert" in: R.F. Abazov, *Historical Dictionary of Turkmenistan* (Lanham, MD 2005), pp. 65–66.

of the caravans. Crescent-shaped and mobile sand dunes called “barchans” are also typical for the Karakum and were feared by the indigenous population and the Russian colonizers alike. They form when sand-fixing vegetation is absent or damaged.<sup>42</sup>

With a territory of 447,400 km<sup>2</sup>, the largest desert in modern Uzbekistan is the Kyzylkum, which literally means “red sand”. It extends from the Aral Sea to the Tien-Shan over an area of about 250,000 km<sup>2</sup> in Uzbekistan and Kazakhstan. It, too, is a sandy desert that has ridge sand and sandy hills, but no mobile barchans.<sup>43</sup> Among the several other deserts and steppe areas of Uzbekistan, one deserves particular mention because of its central importance to this study: the Hungry Steppe situated southwest of Tashkent.<sup>44</sup>

Piedmont plains and loess foothills form a transitional area between the desert lowlands and mountains. They are found in an irregular belt adjacent to the mountains’ base. This area is divided into two parts: the first contains well-defined and dissected loess-covered foothills and low uplands as well as mountain spurs. The second, lower part of the Piedmont consists of a gradually sloping alluvial plain that eventually merges with the desert lowlands. Both are traditional areas of settlement.<sup>45</sup>

Central Asia’s geographical isolation to the south strongly influences its climate and natural conditions. The region’s climate is continental and continental-sub-tropical in the south.<sup>46</sup> Temperatures can rise to over 50° Celsius in the desert Kyzylkum.<sup>47</sup> In winter, temperatures can drop to minus 38° Celsius in the north-west of Uzbekistan.<sup>48</sup> In most parts of Uzbekistan and Turkmenistan, precipitation is low, accumulating between around 30 mm per year in the Hungry Steppe in certain years and 200 mm in the northern lowlands of Turan. In Ashgabat, precipitation reached an average of 230 mm per year in the first half of the 20<sup>th</sup> century.<sup>49</sup> Air humidity is generally very low.<sup>50</sup> Strong winds in the Aral Sea basin come from westerly and northerly directions, and low air pressure leads to heavy storms from January to April, mostly south and southeast of the Aral Sea.<sup>51</sup>

42 Sinnott 1992, p. 82.

43 Létolle and Mainguet 1996, p. 11; Sinnott 1992, p. 82.

44 See more detailed information on the Hungry Steppe in Chapter Three.

45 Ibid., p. 81.

46 Stadelbauer 2007, p. 16.

47 Létolle and Mainguet 1996, p. 42.

48 The winter temperature is from: *Usbekistan. Fünfzehn Jahre Unabhängigkeit*, ed. by Botschaft der Republik Usbekistan in der Bundesrepublik Deutschland (Berlin 2006), p. 8.

49 Just as a rough comparison: nowadays, Germany and the USA have around 500 to 1,000 mm of precipitation annually in most parts. Uzbekistan has between 100 and 330 mm, Turkmenistan from 76 to 305 mm annually.

50 Létolle and Mainguet 1996, pp. 41–42.

51 Ibid., p. 37.

Despite the usual perception, water resources in Central Asia are not insufficient per se or constrained. Surface water is rather concentrated in a limited number of (big) rivers and lakes.



Fig. 1: Survey map of the Aral Sea Basin. It shows the two major rivers, the Amu Darya and the Syr Darya, and the coastal lines of the Aral Sea in 1977 (when siltation had already begun) and in 2013

In 1960, when the Aral Sea was fed by two mighty rivers, it was the world's fourth biggest lake with a surface area of 66,458 km<sup>2</sup>.<sup>52</sup> As with all major rivers in Central Asia, they have their sources in the high mountains and carry melting snow and glacier waters down to the lowlands. The larger river is the Amu Darya. It was 1,445 km long from the point where its tributaries – the Piandsh and Wakhsh rivers – unite to the former coast of the Aral Sea.<sup>53</sup> Before major construction projects were undertaken in the 1950s, the water discharge of the river at the city of Kerki (today's Atamurat in eastern Turkmenistan) equaled 1,850 m<sup>3</sup>/s.<sup>54</sup>

52 Ibid., p. 54.

53 Ibid., p. 79. The Amu Darya's longer tributary, the Piandsh, emerges at the border of the Pamir and the Hindukush at 4,900 m height, and together with it the length of the Amu Darya amounts to 2,540 km.

54 Ibid., p. 83. In 1914, the geographer A.I. Voeikov indicated the average yearly runoff of the Amu Darya at 1,613 cubic meters per second at Chardzhou (Chärjew, today's Türkmenabad).

At 2,212 km long, the Syr Darya was the only feeder of the Aral Sea besides the Amu Darya.

With its longest tributary in the upper reaches, the river Naryn, it extended a total of 3,019 km.<sup>55</sup> Before 1914, the river had an average runoff of 671 m<sup>3</sup>/s near the Hungry Steppe.<sup>56</sup>

The water levels of both rivers depend on the melting waters from the mountains and are unstable. While the Amu Darya has two periods of seasonal high water – a smaller one in April/May due to the melting mountain snow and a bigger one in June/July caused by glacier melting – the Syr Darya has only one such period in June. The considerable disparity in the water levels in relation to the time of year may be indicated by the following example: in 1947, the Syr Darya carried 436 m<sup>3</sup>/s in January and 1,640 m<sup>3</sup>/s in June at the point where it exits the Ferghana Valley.<sup>57</sup>

Additionally, the high level of alluvium that is characteristic of both rivers made their waters enormously valuable for usage in agriculture. The Amu Darya's waters are especially rich in phosphates, lime, and potassium. Until 1960, the river carried more sediment than any other river in the world (210 million tons per year and more recently 128 million tons). As a result of its relatively high speed of water flow and the low cohesion of the materials that make up its embankments, the river is highly susceptible to erosion. Because of the fine texture of the alluvium, the river's course tends to change quickly, as does the depth of its bed.<sup>58</sup> As a consequence, the Amu Darya came to be known to Russian and Soviet writers as an even "capricious" river.

Agriculture in the region, which dated back millennia, was an oasis economy limited to a relatively small area surrounded by steppe or desert lands. Travelers from Russia or Western Europe have long been impressed by the contrast between the "barren" steppe and the green of the oases. Fruits and vegetables, rice, grain and cotton have been cultivated for many centuries. The date of the introduction of cotton as an annual plant to Central Asia is not known.<sup>59</sup> In Central

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Woeikof, 'Die Gewässer Russisch-Turkestans und die Zukunft der Bodenkultur des Landes', *Zeitschrift der Gesellschaft für Erkunde zu Berlin* (1914), pp. 341–355, p. 343.

55 Létolle and Mainguet 1996, p. 88.

56 Woeikof 1914, p. 343.

57 Létolle and Mainguet 1996, p. 91. Woeikov compared the differences between maximum and minimum of water levels of the Amy Darya and Syr Darya to those of the Nile and Volga in 1914. While the difference was relatively small in the case of the Syr Darya being 3,6 : 1, the Amu Darya's equaled the Volga's with 9 : 1. The Nile's water levels differed far greater with 22 : 1. Woeikof, 1914, p. 343.

58 Sinnott 1992, p. 83; Létolle and Mainguet 1996, pp. 83–85.

59 Cotton was first cultivated 7,000 years ago by the inhabitants of the Indus Valley. In Iran (Persia), the history of cotton dates back to the Achaemenid era (5th century B.C.); however, there are few sources about the planting of cotton in pre-Islamic Iran. The planting of cotton was common in Merv and other parts of Iran. As a comprehensive introduction to cotton

Asia, the crop is sown in spring and harvested in autumn. Its spiny capsules are harvested when they are ripe. They are then separated from the white cotton fiber, which has to be cleaned of seeds and dirt. The length and quality of the cotton fiber are important for its usage in textile production. The fiber of long-staple cotton can reach up to 51 mm in length, compared to the usual 24–27 mm.<sup>60</sup> In the 20<sup>th</sup> century, many attempts were made to grow long-staple cotton in Central Asia, which had previously been imported, mainly from Egypt.

In general, the successful cultivation of cotton requires a long frost-free period, plenty of sunshine, and moderate rainfall, usually between 600 to 1,200 mm (24 to 48 inches). Soils normally need to be fairly heavy, although they do not need to have an especially high concentration of nutrients. Cotton is fairly salt and drought tolerant, and can thus be cultivated in arid and semiarid regions. Due to the climatic conditions and high temperatures with low precipitation in summer and the characteristics of the water resources, cotton growing and agriculture typically required man-made irrigation systems in most areas of Central Asia. Where precipitation was sufficient, *bogara* fields could be cultivated without irrigation systems, although their sizes depended on the season's rainfalls.<sup>61</sup>

Irrigated agriculture usually was small-scale and tenuous, especially in the large, densely populated areas of Bukhara, Khiva, and in the Ferghana valley. Irrigation systems have existed for many centuries and were usually derived from rivers. They accordingly depended on the rivers' water levels. Fortunately, water levels were high in the summer at the peak of the vegetation period and low in winter when water was only needed for preparatory irrigation.

Irrigation systems differed regionally and locally and were interwoven with the social and political organization of the respective societies. It is not easy to historically reconstruct the forms and usage of irrigation systems, and existing information is often difficult to date. Some of the main features of irrigation in the 19<sup>th</sup> century will, nevertheless, be presented here. The most detailed knowledge of irrigation is available for Khiva, where irrigation was especially labor-intensive. The following, however, generally holds true for several other areas as well.

First, there were "archaic" forms of irrigation that continued to be used well into the 20<sup>th</sup> century such as by diverting a water course into a depression that

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with many aspects see: C.W. Smith and J.T. Cothren, *Cotton. Origin, History, Technology, and Production* (New York 1999).

60 The history of long staple cotton is not explored well. Genetically, it has a complex ancestry. Cf. *Ibid.*, p. 154.

61 *Bogara* is the Russian term for dry farming which was known in the region as *bāharikarlik* to the Uzbeks and *baharikari* or *lalmikari* to the Tajiks. I.M. Matley, 'The Golodnaya Steppe: A Russian Irrigation Venture in Central Asia', *Geographical Review* 60, 3 (1970), pp. 328–346, footnote 1, p. 328.

could be used for agriculture, or the usage of a temporary creek for irrigating a field surrounded by low walls. These forms did not require the construction of bigger installations or a canal.<sup>62</sup>

More elaborate irrigation systems derived water from a (small) river with a guiding dam that was built into the river bed to lead water into a canal. Such a dam usually takes up a maximum of one half of the river bed's breadth. For the heads of larger irrigation canals, permanent or temporary installations were constructed. Weirs could dam up the river so that water would be delivered to the canal even when the water level of the river was low. There were famous dams in Central Asia before the Russian conquest, one of them being the Sultan-Bent (Sultān-band) at Marw (Merv oasis). They were already in use in pre-Islamic times. The largest canals were in Khiva, but the Dargom at Samarkand or the Shakhruddin in Bukhara were also of impressive size. They were dozens of kilometers long and able to irrigate sizeable areas. Some canals, such as those in Khiva, were navigable.<sup>63</sup>

The basic scheme for larger irrigation systems had three levels: first, there was a head or main canal deriving water from a river; next, secondary canals derived water from the main canal; and, finally, distributaries brought the water to the fields. Most systems relied on gravity. Here, water would simply run down into the canals using the area's natural slope. Where this was impossible, water was pumped upward into the canals or onto the fields by means of special devices, most prominently the *chigir* in Khiva. This was a turning wheel installed in a horizontal position and put into motion by a camel or other draft animal. The methods of irrigation by *chigir* and by gravity were able to co-exist using the same canals and lands.<sup>64</sup>

For widespread surface irrigation systems, all necessary installations like dams, intake points and gates were made from organic materials like earth, wood and brushwood. At the places where water was derived from the river, several intake points could be used. Thus, the water intake was flexible and adjustable to the river's water level and course. This was also true for the secondary canals, at least in Khiva. Here, every secondary canal had two "heads" (intake points), one

62 Paul 1996, pp. 37–38.

63 Ibid., pp. 39–41. Besides, there existed the high technology of underground water acquisition of qanāt which Iran is famous for. It was much less widespread in Turkestan, but existed in today's Turkmenistan and in the basin of the Kashka Darya. Ibid., p. 42.

64 Sazonova 1978, p. 18. On chigirs used by Turkmen: M. Annanepesov and M. Moshev, 'Turkmenistan', in C. Adle, M.K. Palat, and A. Tabyshalieva (eds.), *History of Civilizations of Central Asia* (Paris 2005), pp. 305–327, p. 307. See as much-cited Russian-language studies on the history and practices of irrigation in Central Asia: V.V. Tsinzerling, *Oroshenie na Amu-Dar'e* (Moscow 1927); V.V. Bartol'd, 'K istorii orosheniia Turkestana', *Sochineniia*, t. 3: *Raboty po istoricheskoi geografii* (Moscow 1965), pp. 95–236; V.V. Bartol'd, *Istoriia kul'turnoi zhizni Turkestana* (Leningrad 1927).

for the intake of small amounts of water for the period before sowing and one for the intake of high waters (during the summer).<sup>65</sup> As Soviet ethnographer Sazonova stresses, irrigation systems in Khiva were not fixed, but rather changed gradually, with new derivations being built when needed. The water-running capacity of single canals was augmented, but every step was taken with caution and only after thorough measuring.<sup>66</sup>

The flexibility of the systems came with a price, namely, the need for constant regulation, ongoing manual work and the overall vulnerability of the systems themselves.<sup>67</sup> Frequent high water could rapidly sweep away installation constructions. Every season, large-scale and well-established operations cleaned the canals from siltation. In Khiva, for example, the cleaning of canals was known as *kazu*: “outer *kazu*” for the main canals, “inner *kazu*” for the distributaries and “big *kazu*” for the cleaning in the beginning of March.<sup>68</sup> Toward this end, every water users’ group sent a certain number of workers on collective work assignments that were directed by water officials or deputies from the political authorities. This practice became known as *khashar* (modern Uzbek: *hashar*) to the representatives of the Tsarist government. Its aim was not only to clean the canals, but also to reconstruct them or build new ones. *Khashar* or *kazu* could assume huge dimensions, involving hundreds and thousands of men and last for several days or weeks. For example, between 5,000 to 8,000 men gathered to clean of one of the biggest canals in Khiva, the Palvan-iab.<sup>69</sup>

After the fields were watered, the head of a canal had to be closed. This was done in Khiva by piling up a dam (*peremychka*) made from earth. At its foundation, wooden plugs or heavy fascines were fixed. When the canal had to be opened, the dam was dug out again.<sup>70</sup> In the Ferghana Valley, smaller canals were

65 Central State Archive of the Republic of Uzbekistan (in the following cited with its Russian acronym TsGARUz), 837–32–1210, l. 15.

66 Sazonova 1978, p. 16.

67 The engineer A. Askochenskii described this well in 1933. A. Askochenskii, *Iuzhnyi Khorezm, kak ob-ekt vodokhoziaistvennogo stroitel'stva* (Tashkent 1933). Though he seemed to acknowledge of the advantages of the established, indigenous irrigation, he was one of the influential proponents of rapidly and thoroughly transforming it. Cf. Chapter Two of this study.

68 TsGARUz, 837–32–1210, l. 14; Sazonova 1978, p. 22.

69 N. Dingel'shtedt, *Opyt izucheniia irrigatsii Turkestanskago kraia. Syr-Dar'inskaia oblast'* (St. Petersburg 1893), p. 39. The area of the gigantic irrigation fan of the Sokh in the Southwest of the Ferghana Valley in the oasis of Kokand consisted of up to 360 smaller canals (*aryki*). Here, one person out of every family of water users had to take part in the repair and cleaning of the irrigation system. This was called *paishikan* which means fixing of the head of a canal. A. Abdulhamidov, ‘Iz istorii oroshaemogo zemledeliia v zone Sokha’, *ONU*, 9 (1967), pp. 48–49, p. 48.

70 TsGARUz, 837–32–1210, l. 15.



closed off with loam after the harvest in autumn in order to maintain them until the following spring.<sup>71</sup>

Water distribution on the local level was a complicated matter. It had to be supplied to everybody's satisfaction between the villages and communities of a certain area. Frequently, this was done by rotation: every community received water for a certain period, e. g. two days or a week, and then their canals were cut off, allowing the next community to receive its share.<sup>72</sup> To this day, upstream water users are at a certain advantage in comparison to downstream users. Villages located at the upper part of a river or a canal that derive a lot of water for their needs can harm downstream users by limiting the amount of available water. But downstream users are not powerless, as they can utilize certain strategies that force upstream users to leave them their share. The upstream-downstream users' constellation is an established subject of irrigation studies.<sup>73</sup>

On the local and regional levels, water distribution was regulated by officials called *mirab* (mīrāb) and *aryk-aksakal* (aryq aqsaqal). They watched over customary regulations that typically had not been written down. On a local level, these positions were elected; in some cases, and on larger irrigation systems, they could be inherited.<sup>74</sup>

To summarize, pre-colonial irrigation systems were flexible and could be adjusted to the changing courses of the rivers, different water levels and the water users' growing needs. They were intimately connected to the social organization of the rural population and demanded much labor and time for construction and maintenance. Water distribution was subject to intense regulation that was overseen by special water officials.

The present study focuses on Uzbekistan and Turkmenistan, two neighboring countries with common eco-geographical spaces and natural resources (most importantly the Amu Darya) and also the common historical experience of tsarist and Soviet rule. Both were cotton-growing republics in the Soviet period (along with the Tadzhik and Azerbaidzhan republics), though Turkmenistan to a lesser extent. Both are downstream users of the big rivers and were connected physically and ecologically by the Amu Darya as a main water resource. Both, finally, have suffered from the gradual desiccation of the Aral Sea and shortage of water since the 1960s. The treatment of these two countries in one study is justified because it allows for constructive insights from an eco-regional, rather than a strictly national perspective.

At the same time, the two countries differ significantly in the sizes of their

71 Thurman 1999, p. 60.

72 On the example of the Sokh irrigation system: Abdulkhamidov 1967.

73 Bichsel 2009, pp. 49–52.

74 Paul 1996, pp. 64–65. Cf. for more on the *mirabs* and *aryk-aksakaly* in Chapter One.

populations, geography, as well as in certain aspects of their historical and cultural backgrounds. Turkmenistan's population has been, and still is, much smaller (today, Uzbekistan has a population of more than 30 million people and Turkmenistan of more than 5 million), and the country is even more dominated by desert than Uzbekistan. In Uzbekistan, several cities were known as cultural-religious centers in the medieval Arab world. Turkmenistan had no cities of its own before the Russian conquest. In the eyes of tsarist colonial authorities, the population of what would later become Uzbekistan was in some respects more civilized because it was predominantly settled and partly urban. At the same time, it seemed more "fanatical" in its Muslim faith and thus politically unstable. Turkmen were seen as less developed because they were associated with nomadism. This particular perception of "Uzbeks" and "Turkmen" continued to influence political practice well into the Soviet period. Uzbekistan was more important economically.<sup>75</sup> Moreover, its capital Tashkent had been the main hub of cultural and political imperial life in southern Central Asia since the conquest.

Unfortunately, the analysis of the two countries in this book is not weighted entirely equally. As work in Turkmen archives proved to be a fruitless enterprise in 2007 and 2008, little archival evidence is used here on Turkmenistan. Uzbekistan is generally represented more fully, which is due both to its economic significance and to the state of historiographical research as reflected in this study.

A comparison of Uzbekistan with Tadzhikistan as the other major cotton producing republic and later country in Central Asia would be very useful for a survey history of the whole region's agriculture and modernity but was beyond the capacities of this project. Tadzhikistan has attracted quite a lot of scholarly attention in recent years, and as a consequence, a scholarly comparison will be easier to make in the future.<sup>76</sup>

## Concepts, Approaches, and Questions

The tsarist and Soviet regimes legitimized their rule in Central Asia with a civilizing mission and a promise to catapult the region from its obscure "feudalistic" and medieval developmental stage to a world of modernity. While the term "modernity" is usually not used in the sources, the phenomenon is frequently described in the writings and speeches of functionaries, commentators

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75 As an introduction to the economy of the Central Asian countries in Soviet and post-Soviet periods: R. Pomfret, *The Economies of Central Asia* (Princeton, NJ 1995).

76 Some of the fascinating (and partly ongoing) studies on Soviet and post-Soviet Tadzhikistan by scholars such as Tim Epkenhans, Beate Gehler, Artemy Kalinovsky, Thomas Loy, or Flora Roberts will be cited in the chapters of this book.

or engineers as a productive present and future associated with modern science and technology, secular rule and education, order and clarity and “European-ness”. Tsarist officials as well as their communist successors related these goals to irrigation and agriculture. Many important discourses and projects of the elites managed to survive the historical divide created by the events of 1917. One aim of this study, therefore, is to show the continuities that extended beyond this turning point. By tracing certain subjects post-1917, the colonial history of Central Asia in the tsarist empire is directly linked to the history of the region’s transformation in the socialist empire.<sup>77</sup> This approach consequently makes it possible to put the transformation aims and methods into a broader perspective. Moreover, as subjects of study, irrigation and cotton growing clearly demonstrate how economic interests, political aims and the center’s civilizing mission went hand in hand in both the tsarist and the Soviet context. This study will endeavor to describe these interrelationships.

This book does not provide a history of the peasants of Central Asia, at least

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77 There has been much discussion on how to evaluate the Soviet civilizing mission in Central Asia in comparison to the prerevolutionary one. Highlighting the continuities between the Russian imperial and Soviet civilizing missions: J. Baberowski, ‘Auf der Suche nach Eindeutigkeit. Kolonialismus und zivilisatorische Mission im Zarenreich und in der Sowjetunion’, *Jahrbücher für Geschichte Osteuropas* 47, 4 (1999), pp. 482–504. Baberowski sees the Stalinist campaigns of the 1930s as continuing the tsarist civilizing mission in a much more violent and radical way and regards them as expressions of colonialism and cultural imperialism. While his main focus is on the non-Russian and Muslim minorities, he contends that the civilizing mission was equally imposed upon Russian and Ukrainian peasants. His focus is on the wide gap between the elite’s programs and the broad population’s realities. *Ibid.*, p. 502 and *passim*. In a comment to a forum on Soviet nationalities in the interwar period in comparative perspective, Marc Beissinger warns that seeing both the tsarist and the Soviet states as empires can lead to overlooking the difference between “colonial state” (tsarist) and “aggressively modernizing state” (Soviet). As the contributions by Adrienne Edgar, Adeeb Khalid and Peter Blitstein to the volume point out, the Soviet campaigns in pre-war Central Asia resemble more those of the neighboring Muslim states (Turkey, Iran) than classical colonial domination of European powers. Beissinger, nevertheless, does not reject the concept of empire for the Soviet Union. Both Baberowski and Beissinger point to the fact that indigenous elites were participating actively in those campaigns. Beissinger stresses that they could do that referring to their nation rather than to the center’s politics which raises the question how to reconcile the national and the imperial in Soviet history. M.R. Beissinger, ‘Soviet Empire as “Family Resemblance”’, *Slavic Review* 65, 2 (2006), pp. 294–303, especially pp. 296–298. Adeeb Khalid, too, argues against the early Soviet period as being regarded as colonial and points to the parallels between Soviet Central Asia and Turkey in the 1920s, speaking of both as “modern mobilizational states”. In both cases, national identities were very actively and rigorously shaped and defined. Khalid, as Baberowski, sees the Soviet civilizing mission as having affected Russian peasants as well. Khalid 2006, p. 250, *passim*, citation p. 232. This study, due to its chronological scope, does not imply a comparison with neighboring states but rather situates Central Asia in the context of the tsarist and Soviet policies. The question of whether (early) Soviet rule can be qualified as “colonial” is taken up in the conclusion of this book.

not in regard to their mind-set, worldview or everyday lives. It is rather intended as a history of the political, scientific and technical elites, including engineers, economists, agronomists, and irrigation specialists, administrators, heads of provinces and high representatives of the imperial centre. They all developed their own visions of the future for Turkestan and, later, the Soviet republics, applied organizational concepts (for people, the economy, and the landscape), tried to make sense of their own successes and failures, and had specific ideas about time, history, and development. They advanced arguments and indulged fantasies, ordered and punished subordinates, and were sometimes helpless and disillusioned.<sup>78</sup>

Beyond the level of the individual, the study aims more broadly to provide a history of infrastructure development and transformation in the modern era. It does not use “modernization” as a normative concept, which carries a heavy historical burden. The term was rather teleological, Eurocentric, and conceived of in terms of an ideal Western path of development that included democratization and liberalization. The critical assessment of this concept and its political implications has become a concern of historiography, especially in the United States.<sup>79</sup> The term “development” is similarly complicated by the fact that it has been used in reference to the developmental projects of Western countries during and after the colonial periods. Recent studies have tried to reflect on the ideological overtones of these terms. The history of modernization and development in non-Western countries is now understood as a complex process in which indigenous actors not only suffered or profited from developmental projects supported by the West, but also influenced, used or adapted them or made them into political issues of their own.<sup>80</sup>

When the term “modernization” is used in this book, it denotes devel-

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78 Cf. M. Reinkowski and G. Thum (eds.), *Helpless Imperialists: Imperial Failure, Fear and Radicalization* (Göttingen 2012).

79 Most prominently: N. Gilman, *Mandarins of the Future. Modernization Theory in Cold War America* (Baltimore, MD 2003); D.C. Engerman (ed.), *Staging Growth. Modernization, Development, and the Global Cold War* (Amherst 2003). See also a sociologist’s critique of the modernization theory: W. Knöbl, *Die Kontingenz der Moderne: Wege in Europa, Asien und Amerika* (Frankfurt a.M. et al. 2007).

80 As one example see C.R. Unger, S. Malinowski, and A. Eckert (eds.), *Modernizing Missions: Approaches to “Developing” the Non-Western World after 1945 = Journal of Modern European History* 8, 1 (2010), especially the introduction: F. Cooper, ‘Writing the History of Development’, *Journal of Modern European History* 8, 1 (2010), pp. 5–23. As a much earlier contribution that includes aspects of knowledge and the environment: T. Banuri, ‘Development and the Politics of Knowledge: A Critical Interpretation of the Social Role of Modernization Theories in the Development of the Third World’, in F.A. Marglin and S.A. Marglin (eds.), *Dominating Knowledge. Development, Culture, and Resistance* (Oxford 1990), pp. 29–72. On Soviet development policies and debates with a focus on Central Asia see the contributions by Artemy Kalinovsky cited in the chapters of this book.

opmental processes whose general aims do not necessarily touch upon political structures. In the context of this study, it implies, most of all, the introduction of modern technical equipment, mechanization, and the spread of secular education and modern science. As in other contexts, these processes were envisioned and supported by the elites, who culturally were of both foreign and indigenous descent. The term is used with the understanding that it does not entail a political liberalization or democratization. It is also not meant to describe a process in which all spheres of life are modernized with the same speed or intensity.

While the notion of modernization is treated with caution, I refer to the concept of *modernity* more affirmatively. Understood as a historical period and referring to the intellectual history of the Western world, philosophers Stephen Toulmin and Wolfgang Iversch have detected the origins of modernity (German: *Moderne*) in early modern times, more particularly in the enlightenment of the 17<sup>th</sup> century and the mathematical thinking of Descartes.<sup>81</sup> Certain features of enlightened thinking such as the emphasis on rationalism and abstraction, as well as the trend towards universalization, strongly influenced the course of the 18<sup>th</sup> to 20<sup>th</sup> centuries.

Modernity is also typically viewed as an agenda for states and elites whose realization is always sought after, but never achieved. It is equated with rationalism, order, and transparency. This striving for order and homogeneity has become very aggressive at times, especially in the 20<sup>th</sup> century, when order was established in dictatorial states by means of terror. Zygmunt Bauman's "Modernity and Ambivalence" (1991) is still a cornerstone in this critical elaboration of the concept of modernity.<sup>82</sup> The book title is illustrative of the fact that we now see modernity as an ambivalent phenomenon that is not necessarily tied to Western-type democratic and pluralistic systems or societies.<sup>83</sup> Through the studies of Shmuel Eisenstadt and others, the concept of modernity has been opened up to include non-Western and non-European societies.<sup>84</sup> This was

81 S. E. Toulmin, *Cosmopolis. The Hidden Agenda of Modernity* (New York 1990); W. Iversch, *Unsere postmoderne Moderne* (Berlin 1993).

82 Z. Bauman, *Modernity and Ambivalence* (Cambridge 1991). The big dictatorships of the 20<sup>th</sup> century have been regarded as outcomes of modernity's striving for creating order and "unambiguousness" which led to terror and the (attempted) extinction of whole groups of the population. As one example for the application of this modernity concept to Stalinism and the Nazi dictatorship: J. Baberowski and A. Doering-Manteuffel, *Ordnung durch Terror. Gewaltexzesse und Vernichtung im nationalsozialistischen und im stalinistischen Imperium* [Dietrich Beyrau zum 65. Geburtstag] (Bonn 2006).

83 Criticizing dominant modernization theories, the sociologist Hans Joas stressed that "(w)ar and violence are parts of modernity and not just of its prehistory." H. Joas: *The Modernity of War. Modernization Theory and the Problem of Violence*, in: *Ibidem: War and Modernity* (Cambridge et al. 2003), pp. 43–54, p. 43.

84 Just one of several much cited contributions of this author: S.N. Eisenstadt, 'Multiple Modernities in an Age of Globalization', *Canadian Journal of Sociology / Cahiers canadiens de*

another important step that helped made it possible to move away from a Eurocentric or Western-centric treatment of modernization and modernity.

In discussing the cases of Russia and the Soviet Union, a “neo-traditionalist” view highlighting patronage, clientelism and other supposedly pre-modern phenomena has been opposed to a “modernist” view drawing on Eisenstadt.<sup>85</sup> Supporting the latter, David L. Hoffmann has shown, for example, that Russia’s development in the 19<sup>th</sup> and the beginning of the 20<sup>th</sup> centuries can be regarded as a part of Western modernity more generally with its growing state social-engineering program and mass mobilization.<sup>86</sup> In a more recent study on social and spatial dimensions of the railway in the late tsarist Empire, Benjamin Schenk has promoted an understanding of modernity that encompasses both its variety and its ambivalences.<sup>87</sup>

The discussion has centred more on the Soviet Union than on pre-1917 Russia, implying that the main concern is with how to evaluate Communism in regard to modernity. Today, many authors agree that the Soviet Union’s Communist system can be seen as a variation of modernity that evolved as a response to the perceived crises of Western modernity. Socialist modernity, however, is not a mere copy of the Western model plus a socialist political program. It is rather “a version of modernity in its own right” with its own dynamics and its own appeal to the populations in question.<sup>88</sup>

From a perspective that is not limited to the Soviet case, sociologist Johann Arnason has reflected on the relationship between Communism and Modernity after the “culturalist and pluralist turn”.<sup>89</sup> It is possible to detect general internal structural flaws in the communist states, such as that the educational and scientific processes were greatly encumbered ideologically and therefore averse to innovation. Arnason points to the fact that the main protagonists of the Communist state world, the Soviet Union and China, pursued projects of “imperial

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*sociologie* 24, 2 (1999), pp. 283–295. See also: D. Sachsenmaier, ‘Multiple Modernities – The Concept and its Potential’, in D. Sachsenmaier (ed.), *Reflections on Multiple Modernities. European, Chinese and other Interpretations* (Leiden 2002), pp. 42–67.

85 Summarizing: M. David-Fox, ‘Multiple Modernities vs. Neo-Traditionalism. On Recent Debates in Russian and Soviet History’, *Jahrbücher für Geschichte Osteuropas* 54, 4 (2006), pp. 535–555.

86 D.L. Hoffmann, *Stalinist Values. The Cultural Norms of Soviet Modernity, 1917–1941* (Ithaca, NY 2003).

87 F.B. Schenk, *Russlands Fahrt in die Moderne. Mobilität und sozialer Raum im Eisenbahnzeitalter* (Stuttgart 2014), pp. 33–36.

88 M.-J. Calic, D. Neutatz, and J. Obertreis, ‘The Crisis of Socialist Modernity – The Soviet Union and Yugoslavia in the 1970s. Introduction’, in M.-J. Calic, D. Neutatz, and J. Obertreis (eds.), *The Crisis of Socialist Modernity. The Soviet Union and Yugoslavia in the 1970s* (Göttingen 2011), pp. 7–27, pp. 9–14, citation p. 12.

89 J.P. Arnason, ‘Communism and Modernity’, *Daedalus* 129, 1 (2000), pp. 61–90, p. 65.

modernization” that easily led to overextensions and “self-defeating ambitions”.<sup>90</sup>

Contemporary reflections on Soviet or Communist modernity very often neglect the transformation of nature and rural modernization important in this study. These aspects have been treated in James C. Scott’s monograph “Seeing like a State” (1998).<sup>91</sup> Scott describes “high modernism” as conveying a certain kind of enthusiasm about planning and the nexus between planners and states in the context of making nature and societies “legible”. The state strives to achieve “legibility” for the things that exist within its boundaries, and engineers, project planners and scientists accordingly provide the necessary schemes for arranging people and landscapes in the right way. They are laid out on drawing boards and the designs generally make use of geometrical forms. Insofar as big models are derived from general principles, not from existing conditions on the ground, they are inevitably “thin” simplifications (as opposed to “thick” in a Geertzian sense).<sup>92</sup> Homogeneity and clarity are the ultimate aims of such efforts to establish a “legible” order. Because of their rigidity and claims to universality, and because of their neglect of local knowledge, high-modernist schemes were destined to fail.

Along with other case studies, Scott presents the collectivization in the Soviet Union in the 1930s and the compulsory “villagization” in Tanzania in the 1970s as “rather extreme instances of massive, state-imposed social engineering”.<sup>93</sup> As high modernism denotes the planners’ engagement, their often larger-than-life schemes and the political opportunities for realizing them in authoritarian states, planners, scientists and engineers had the greatest power in times of crises, war, revolution, or newly gained independence.<sup>94</sup>

Indeed, Scott’s *high modernism* is a good point of departure for one of the tasks of this study, namely, to make a contribution towards including the Russian Empire and the Soviet Union in the broader discussion of modernity.<sup>95</sup> Beyond this, the book also aims to achieve a more historical elaboration of Scott’s concept of high modernism, which has been challenged by various authors. The

90 Ibid., p. 67. He also highlights the global dimension of Communism. Ibid., pp. 67–68, 79–83. Cf. on the “price of the empire” pointing to different kinds of the Soviet Union’s overstretch: S. Plaggenborg, *Experiment Moderne. Der sowjetische Weg* (Frankfurt a.M. 2006), pp. 245–321.

91 J.C. Scott, *Seeing Like a State. How Certain Schemes to Improve the Human Condition Have Failed* (New Haven, Conn. 1998).

92 Ibid., p. 261.

93 Ibid., p. 310.

94 Ibid., pp. 342–343.

95 Cf. C. Bichsel, “‘The Drought Does Not Cause Fear’. Irrigation History in Central Asia Through James C. Scott’s lenses”, *Revue d’études comparatives Est-Ouest (RECEO)* 44, 1–2 (2012), pp. 73–108.

main criticism here is Scott's overvaluation of the state's (transformation) power.<sup>96</sup> To this, I would even add a general criticism: Scott's chronology of high modernism remains vague and he, moreover, does not sufficiently differentiate between groups of actors like politicians, engineers, etc. This is also true in regard to the differences between various political systems and cultures. For Scott, high modernism has a "completely ecumenical character" and can therefore be located in (post-) colonial contexts, international organizations, socialist and capitalist countries, or the East and the West. All the same, he does admit that modernity has proven to be most destructive in formerly socialist states and in "revolutionary Third World settings", because the state – "unimpeded by representative institutions" – could limit resistance. High modernist schemes, however, are "thoroughly Western".<sup>97</sup>

Such generalizations cannot be satisfying for an historian, because they raise a number of unanswered questions. When and under which political circumstances was high modernism able to evolve? What were its specific consequences? Who were the persons or groups involved, what educational backgrounds did they have, and how were they interconnected? How did official discourses and professional ethics shape high modernism? Despite these unresolved issues, his notion of "high modernism" nonetheless remains a valuable point of departure for further elaboration. It is one of the notable merits of Scott's book that he regards transformation schemes for society and nature simultaneously. His concept thus permits environmental history to be linked with a more general history of politics and development. Various aspects of his study line up well with the Soviet case and provide an opportunity for making comparisons to other cases. It is partly due to Scott's book that I was inspired to analyze the forms of cotton fields and irrigation installations, as well as to think about the specific characteristics of modernity in Central Asia. This study will accordingly analyze exemplary projects and general schemes of engineers and scientists in comprehensive detail. The discussion will be shaped by the following questions, among others: What is the basis of the engineers' and scientists' assumptions? In what forms were they expressed and presented? What general principles did they maintain or generate, especially in regard to water usage? How much did they take local conditions into account?

96 Cooper 2010, p. 8, fn. 11. Cf. also: M. Mann, 'Book Review on: James C. Scott: Seeing Like a State', *American Journal of Sociology* 104, 6 (1999), pp. 1813–1815. Positive reviews include: K. Gestwa, 'Rezension zu: James C. Scott, Seeing Like a State', *Jahrbücher für Geschichte Osteuropas* 49, 3 (2001), pp. 460–461, and S.E. Keen, 'Review of Scott, James C., Seeing Like a State: How Certain Schemes to Improve the Human Condition Have Failed', *H-Net Reviews*, February 2000, <http://www.h-net.org/reviews/showrev.php?id=3853> (accessed April 25, 2017).

97 Scott 1998, p. 342.



In examining the clash between scholarly science and the respective local conditions, Scott examines the “mētis” of the period. Here, the ancient Greek concept refers to the locally rooted, practical knowledge that is vigorously pushed aside by schemes based on “epistemic knowledge” or modern science.<sup>98</sup> Scott provides a wonderfully vivid example of this phenomenon: when the first European settlers in North America asked their Native American neighbors for advice about growing maize, they were told “to plant corn when the oak leaves were the size of a squirrel’s ear”. This type of knowledge is “keyed to common features of the local ecosystem, (inquiring) about oak leaves *in this place*, and not oak leaves in general.”<sup>99</sup>

As a concept, “metis” highlights the variability and adaptability of knowledge and implies “a developed feel or knack for strategy”.<sup>100</sup> Many of its features are treated in other scholarly contexts as local (or indigenous) knowledge that can be characterized as “the systematic information that remains in the informal sector, usually unwritten and preserved in oral traditions rather than texts.”<sup>101</sup> It is passed from generation to generation, often by family members, and is very tightly interwoven with the culture in which it is produced. The cultural traditions, in turn, “have co-evolved with local environments”.<sup>102</sup>

For decades, local knowledge has been studied almost exclusively by anthropologists, including the renowned Clifford Geertz. Consequently, the concept referred typically to non-Western indigenous peoples.<sup>103</sup> It has a “colonial” history: in the 19<sup>th</sup> and 20<sup>th</sup> centuries, local knowledge was usually opposed to modern, scientific (and Western) knowledge by contemporary Western authors and discounted as the “backward” and “unproductive” belief system of “primitive” peoples. With rational principles informing their civilizing mission, explorers and scholars in a colonial context had a tendency to disdain local knowledge.<sup>104</sup> Additionally, representatives of the colonial regimes frequently regarded local societies and methods as stagnant, even though they were of course developing and changing.<sup>105</sup>

98 Ibid., pp. 309–341.

99 Ibid., citations pp. 311 and 312 respectively. Another very good example is the knowledge of harbor pilots. They know very well their port, but cannot transfer their knowledge to any other port. Ibid., p. 317.

100 Ibid., p. 316.

101 Cited from: F. Fischer, *Citizens, Experts, and the Environment. The Politics of Local Knowledge* (Durham et al. 2000), p. 195.

102 Ibid., p. 195. Citation: Ibid., p. 201. Fisher’s study is used here as a basis for argumentation as it analyses many earlier studies and gives a good overview on the evolution of the concept of “local knowledge”.

103 Ibid., pp. 198–199. C. Geertz, *Local Knowledge. Further Essays in Interpretive Anthropology* (New York 1983).

104 Fischer 2000, pp. 195–196.

105 Cf. Ibid., p. 201.

In recent years, however, there has been a (re-)discovery of local knowledge in the social sciences and the attempt is being made to give it a more even-handed and meaningful evaluation, especially in spheres like biology or agroecology. It is also increasingly being used as a resource, as for example in Western pharmacology.<sup>106</sup> There is now greater understanding for the fact that a sharp dividing line should not be drawn between local and scientific knowledge. The latter in fact evolved out of the former. Be that as it may, it remains very difficult, if not impossible, to transfer local knowledge into scientific terms.<sup>107</sup>

In dealing with local knowledge, there is a danger of idealizing it as a kind of “natural” or pure knowledge and know-how which are still untarnished by the intervention of powerful modern states and overly rational expertise. Such romanticizing can culminate in “images of ‘noble savages,’ living harmoniously with nature in peaceful states”.<sup>108</sup> It has to be acknowledged that there are beliefs and practices among non-Western indigenous peoples that conflict with their own interests. It also cannot be denied that a lot of valuable knowledge has been lost or forgotten as a result of the dictates of (colonial) modern homogenization and rationalization. Policies based on modern science not only can have a grave socioeconomic and ecological impact, but also threaten the social and cultural identities of the effected people.<sup>109</sup>

It is not easy for an historian to explore and evaluate local knowledge, partly because it does not exist in written form and partly because it usually reaches the scholarly community in sources that have been generated by outsiders. Nevertheless, the present study will endeavor to expose the tension between local knowledge and given policies based on modern scientific schemes.

From the beginning of the conquest, the imperial authorities viewed the scientific exploration of the Russian Empire’s new periphery as a key objective. At first, individual scholars and exploratory groups were sent to Turkestan under the auspices of the Turkestan governor-general or other imperial institutions. The scientific and technical development continued after 1917, growing in scale. So far, the examples of the Russian Empire and the Soviet Union have been rarely mentioned in the discussion about colonial knowledge, which centers both on how Western science functioned as a deliverer of solutions for the needs of imperial governments and how it was simultaneously assimilated by indigenous populations and adapted for their own political ends.<sup>110</sup>

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106 Ibid., pp. 199, 201–202.

107 Ibid., p. 206.

108 Ibid., p. 202.

109 Ibid., pp. 198, 204–206, 208.

110 R. MacLeod, ‘Introduction’, in R. MacLeod (ed.), *Nature and Empire: Science and the Colonial Enterprise = Osiris*, 15 (2000), pp. 1–13. See as a classical study on the relationship

On the example of India, Zaheer Baber has described the adaptation of Western science and technology as a “complex process of negotiation, contestation, cooptation and resistance at work”.<sup>111</sup> Some scholars have started to disclose those areas of indigenous knowledge systems and societies that remained beyond the purview of the colonizers. The limitations and failures of colonial knowledge have become apparent as a consequence.<sup>112</sup> This book will explore the generation of colonial knowledge and its deficiencies, along with the involvement of the indigenous population in the spread of modern, Western-style science in Soviet times.<sup>113</sup>

Besides the production of knowledge, an equally important aspect of this study concerns the crucial role of infrastructure. German historian Dirk van Laak has initiated the debate on “infrastructure history” in the realm of German-speaking academia.<sup>114</sup> Infrastructure unites and organizes societies, though often in a way that is hidden. As a “seemingly neutral media of public welfare”, infrastructure mediates between political rule and everyday life, becoming part of both. While certain kinds of infrastructure, especially those related to the disposal of waste and sewage water, are typically kept underground, other kinds, like those related to communication or transport, are of an “ostentatious apparentness” and have strong symbolic power. Infrastructural planning has often aimed to provide and represent clear structures in order to overcome (especially urban) complexity.<sup>115</sup>

In his book on imperial infrastructure, van Laak explores German and European technical plans for Africa in the colonial and post-colonial periods. He characterizes the period from 1880 to 1960 as a “period of development (*Erschließung*)” in which technical progress and the development of new areas had the virtually unlimited support of the authorities, regardless of political turning points.<sup>116</sup> The German term *Erschließung* and the Russian term *osvoenie* are close

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between colonialism, science and technology: M. Adas, *Machines as the Measure of Men. Science, Technology, and Ideologies of Western Dominance* (Ithaca, NY 1989).

111 Z. Baber, *The Science of Empire. Scientific Knowledge, Civilization, and Colonial Rule in India* (Albany, NY 1996), p. 251.

112 T. Ballantyne, ‘Colonial Knowledge’, in S. Stockwell (ed.), *The British Empire. Themes and Perspectives* (Malden, Mass. 2008), pp. 177–197.

113 See as an influential combination of the history of technology and the history of imperialism: D.R. Headrick, *The Tentacles of Progress. Technology Transfer in the Age of Imperialism, 1850–1940* (New York, Oxford 1988).

114 D. van Laak, ‘Infra-Strukturgeschichte’, *Geschichte und Gesellschaft* 27 (2001), pp. 367–393.

115 Ibid., pp. 377, 385–386, citations pp. 377, 385 respectively. Van Laak’s suggestions have been pursued in a special issue on infrastructure in modern history with a focus on the nexus between early modern and modern history. J.I. Engels and J. Obertreis, ‘Infrastrukturen in der Moderne. Einführung in ein junges Forschungsfeld’, *Saeculum. Jahrbuch für Universalgeschichte* 58, 1 (2007), pp. 1–12.

116 D. van Laak, *Imperiale Infrastruktur. Deutsche Planungen für eine Erschließung Afrikas 1880 bis 1960* (Paderborn 2004).

in meaning but difficult to translate into English. They imply a drive, if not an aggressiveness, to appropriate certain resources or a certain region, often by a state or state authority. The aim is to fully use the resources and make them serviceable to man. The subjugation of nature and local populations can be implied as well. In lieu of a closer translation, the terms “development” and “opening-up” will be used in this book, sometimes with the addition of *osvoenie* to remind the reader of these special implications.

German infrastructure history has focused in recent years on water infrastructure and the relation between infrastructure and power. Political rule and power relations can be revealed through infrastructure projects as the latter are “not only a *result* but also *preconditions*, *instruments* and *sources* of power.”<sup>117</sup> Water infrastructures make power relations visible – consider, for instance, splendid fountains that have represented political rule since antiquity – and they help to legitimize power. Water infrastructures can also contribute to delegitimizing a political regime, for example, when they do not function well, are associated with corruption or use up too many (financial, natural, or other) resources. Infrastructure and power correlate in complex ways.<sup>118</sup> A recent contribution drawing on various research fields such as STS (Science and Technology Studies), critical water studies, anthropology, and history, has outlined these complex interrelations between power, rule, and water infrastructure from interdisciplinary perspectives. Among other themes, it is concerned with the relation between human and non-human actors.<sup>119</sup>

While the role of non-human actors has been a subject of debate in recent scholarship, human actors still deserve our full attention. Human actors behind infrastructure projects and agents of technical history should not be viewed as hidden participants in some seemingly anonymous planning process and thus be ignored. They should also not be represented uncritically as ingenious creators of engineering marvels. Engineers, their projects and their ideas regarding re-organization played an important role in technical modernity. They em-

117 B. Förster and M. Bauch, ‘Einführung: Wasserinfrastrukturen und Macht. Politisch-soziale Dimensionen technischer Systeme’, in B. Förster and M. Bauch (eds.), *Wasserinfrastrukturen und Macht von der Antike bis zur Gegenwart = Historische Zeitschrift, Beiheft 63* (Berlin et al. 2015), pp. 9–21, p. 10.

118 Proposing a new, historical concept of “coevolution”: J.I. Engels and G.J. Schenk, ‘Infrastrukturen der Macht – Macht der Infrastrukturen. Überlegungen zu einem Forschungsfeld’, in B. Förster and M. Bauch (eds.), *Wasserinfrastrukturen und Macht von der Antike bis zur Gegenwart = Historische Zeitschrift, Beiheft 63* (Berlin et al. 2015), pp. 22–58, pp. 24, 44–47.

119 C. Bichsel, P. Mollinga, T. Moss, and J. Obertreis, ‘Water, Infrastructure and Political Rule. Introduction to the Special Issue’, *Water Alternatives* 9, 2 (2016), pp. 168–181. On the main cross-disciplinary subjects of the special issue see also: C. Bichsel, ‘Water and the (Infra-)Structure of Political Rule: A Synthesis’, *Water Alternatives* 9, 2 (2016), pp. 356–372.

bodied a typical modern mind-set that applied categories pertaining to resources and effectivity. More and more, they tended to gravitate to large scale undertakings and some engineers' ideas about how to transform nature and society were truly breath-taking. Their understanding of nature, though, was more conflicted than one might assume. As has been shown for the late German Kaiserreich, the engineer was at once "Prometheus fighting with the dominant powers of nature" and an "admirer and connoisseur of nature".<sup>120</sup>

Engineering not only became a distinct profession in the 19<sup>th</sup> and 20<sup>th</sup> centuries, but its practitioners turned into role models. For instance, in Germany around 1900 engineers began to perceive themselves and were perceived by society as "master builders of a better world". It was accordingly thought that many problems of modern societies, including social ones, could be solved by means of technical solutions.<sup>121</sup> In the Soviet Union, technical education had great prestige, and it was through building up large cadres of technical experts that the communists wanted to overcome their perceived backwardness in relation to Western countries. As a consequence of the regime's efforts to create a substantial corps of "red" engineers, engineers constituted more than a third of all specialists in the 1960s. Technical qualifications, moreover, opened the door to positions of leadership in management, administration, and politics. The "Brezhnev generation" is known for having a large percentage of men with a technical education.<sup>122</sup>

A very positive, often idealized picture of technical progress and technical innovation is a general characteristic of modernity. The Soviet Union would become well known for nurturing a technology cult and promoting high esteem for large-scale technological projects. Lenin and the early Bolsheviks, for instance, praised electricity, and a cosmic cult emerged around 1960 as a consequence of the Soviet successes in launching satellites, rockets and putting the first man into space.<sup>123</sup>

120 H.-L. Dienel, *Herrschaft über die Natur? Naturvorstellungen deutscher Ingenieure, 1871–1914* (Stuttgart 1992), p. 181.

121 H.-L. Dienel, 'Zweckoptimismus und -pessimismus der Ingenieure um 1900', in H.-L. Dienel (ed.), *Der Optimismus der Ingenieure. Triumph der Technik in der Krise der Moderne um 1900* (Stuttgart 1998), pp. 9–24, p. 15. Cf. on engineers as role models: D. van Laak, *Weisse Elefanten. Anspruch und Scheitern technischer Großprojekte im 20. Jahrhundert* (Stuttgart 1999), pp. 38–44.

122 D. Beyrau, *Intelligenz und Dissenz: die russischen Bildungsschichten in der Sowjetunion 1917–1985* (Göttingen 1993), pp. 145–146, 149, 257–258.

123 A few contributions from a larger bulk of literature: K. Schlögel, *Jenseits des Großen Oktobers. Das Laboratorium der Moderne; Petersburg 1909–1921* (Berlin 1988), pp. 277–313 (on the work of the early Soviet commission GOELRO, including plans on the electrification of the country); P.R. Josephson, 'Projects of the Century in Soviet History. Large-Scale Technologies from Lenin to Gorbachev', *Technology and Culture* 36 (1995), pp. 519–559; P.R. Josephson, *Red Atom: Russias Nuclear Power Program from Stalin to Today* (New York

Technological developments and large scale technical and infrastructure projects had profound impact on the natural environment. The history of technology, infrastructure history, and environmental history, therefore, are closely related areas of study, as has been shown in Klaus Gestwa's work on the "Great Constructions of Communism", which centers on big hydro power stations and reservoirs in Russia and Siberia.<sup>124</sup> In the wake of Douglas Weiner's pioneering work on nature-preservation areas and their advocates there has been notable progress in the field of environmental history of Russia and the Soviet Union, and a first general history has recently been published.<sup>125</sup>

This study contributes to environmental history in two ways. First, it treats central aspects of global environmental history, namely, cotton growing and the expansion of irrigation and the ecological problems stemming from them. Concerning the latter, the salinization of water and soils and desertification were and remain urgent concerns in different parts of the world, including India, China, and Turkey.<sup>126</sup> The book's second contribution to environmental history is its close examination of the emerging ecological discourse of the 1970s and

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2000); K. Gestwa, 'Herrschaft und Technik in der spät- und poststalinistischen Sowjetunion', *Osteuropa*, 2 (2001), pp. 171–197; K. Gestwa, 'Technik als Kultur der Zukunft. Der Kult um die "Stalinschen Großbauten des Kommunismus"', *Geschichte und Gesellschaft* 30 (2004), pp. 37–73; K. Gestwa, '"Kolumbus des Kosmos". Der Kult um Jurij Gagarin', *Osteuropa*, 10 (2009), pp. 121–151. A volume on the importance of the cosmic cult for Soviet culture: E. Maurer, J. Richers, and M. Rüthers (eds.), *Soviet Space Culture: Cosmic Enthusiasm in Socialist Societies* (Basingstoke et al. 2011).

124 K. Gestwa, *Die Stalinschen Großbauten des Kommunismus. Sowjetische Technik- und Umweltgeschichte, 1948–1967* (München 2010).

125 D.R. Weiner, *Models of Nature. Ecology, Conservation, and Cultural Revolution in Soviet Russia* (Bloomington 1988); D.R. Weiner, *A Little Corner of Freedom. Russian Nature Protection from Stalin to Gorbachëv* (Berkeley 1999); Josephson, Paul R. et al., *An Environmental History of Russia* (Cambridge, New York 2013). See also: A. Bruno, 'Russian Environmental History. Directions and Potentials', *Kritika: Explorations in Russian and Eurasian History* 8, 3 (2007), pp. 635–650; J. Obertreis, 'Der "Angriff auf die Wüste" in Zentralasien. Zur Umweltgeschichte der Sowjetunion', *Osteuropa* 58, 4–5 (2008), pp. 37–56. Klaus Gestwa has traced the ideas about the subjugation of nature in Soviet propaganda and sketched the development of policies and protests relating to environmental aspects since the 1950s, for example in: K. Gestwa, 'Das Besitzergreifen von Natur und Gesellschaft im Stalinismus. Enthusiastischer Umgestaltungswille und katastrophischer Fortschritt', *Saeculum. Jahrbuch für Universalgeschichte* 56, 1 (2005), pp. 105–138; K. Gestwa, 'Ökologischer Notstand und sozialer Protest. Der umwelthistorische Blick auf die Reformunfähigkeit und den Zerfall der Sowjetunion', *Archiv für Sozialgeschichte* 43 (2003), pp. 349–384.

126 In many places in his seminal global environmental history, Joachim Radkau sheds light on irrigation practices in Asia, Europe and elsewhere. Radkau 2002, on salinization and desertification especially pp. 108–111. While Radkau includes early periods of history, another global environmental history concentrates on the 20<sup>th</sup> century: J.R. McNeill, *Something New under the Sun. An Environmental History of the Twentieth-Century World* (New York 2001). See for long durée approaches also E. Burke and K. Pomeranz (eds.), *The Environment and World History* (Berkeley 2009).

1980s on the Central Asian periphery. The 1970s have been portrayed as an “ecological turning point” for Western countries, especially the USA and Western Germany. The decade represents the end of industrial modernity, the transition to a “second modernity”, and the advent of modern environmentalism.<sup>127</sup> Impassioned citizens demonstrated against nuclear power plants, occupied construction grounds and experimented with alternative life styles. Modern environmentalism in the West emerged in the context of the “new social movements” (peace movement, womens’ movement) and against the background of a change in the societies’ value systems.<sup>128</sup>

By contrast, an equivalent transitional period seems to be missing in the Soviet Union and other socialist states in Europe. There were no far-reaching ecological protest movements before Gorbachev introduced perestroika and glasnost, and the serious ecological problems caused by rapid industrial development were often taboo subjects.<sup>129</sup> On closer inspection, however, one finds that the subject of protecting nature was not limited to the numerous laws and decrees issued by the socialist regime, but that there were also discussions about environmental questions within specialists’ circles. In fact, these exchanges sometimes even broadened into public debates, as in the well-known case of the

127 With a survey of German literature: J.I. Engels, *Naturpolitik in der Bundesrepublik. Ideenwelt und politische Verhaltensstile in Naturschutz und Umweltbewegung 1950–1980* (Paderborn 2006), p. 14. See also: D. Rucht, ‘Environmental Movement Organizations in West Germany and France. Structure and Interorganizational Relations’, *International Social Movement Research* 2 (1989), pp. 61–94; A.G. Mertig and R.E. Dunlap, ‘Environmentalism, New Social Movements, and the New Class. A Cross-National Investigation’, *Rural Sociology* 66 (2001), pp. 113–136. More recently: J.R. McNeill, ‘The Environment, Environmentalism, and International Society in the Long 1970s’, in N. Ferguson et al. (eds.), *The Shock of the Global. The 1970s in Perspective* (Cambridge, Mass. 2010), pp. 263–278. As a contribution to the ongoing debate on turning points of environmental history: F. Uekötter, *The Turning Points of Environmental History* (Pittsburgh 2010).

128 With a critical evaluation of the much-cited thesis by Ronald Inglehardt on a change from “material” to “postmaterial” values in Western societies beginning in the 1960s: Engels 2006, pp. 14–17. See an English version of his position in: J.I. Engels, ‘Modern Environmentalism’, in F. Uekötter (ed.), *The Turning Points of Environmental History* (Pittsburgh 2010), pp. 119–131.

129 With telling analyses on the Soviet Union and other European socialist states: H. Schreiber (ed.), *Umweltprobleme in Mittel- und Osteuropa* (Frankfurt a.M. 1989). There is a body of literature on the state of the environment in the late Soviet Union, environmental politics of the Soviet regime, and the emergence of broader environmental protests in the perestroika years. They range from in-depth, comparative studies such as A. Fey, *Umweltsituation und Umweltpolitik in der ausgehenden Sowjetunion. Eine vergleichende Fallstudie* (Frankfurt a.M. et al. 1994) to rather sensational depictions such as: M. Feshbach and A. Friendly, Jr., *Ecocide in the USSR: Health and Nature under Siege* (New York 1992). On the criticism of the neo-liberal approach that prevailed in Western, especially in US literature, in the early 1990s see: J.D. Oldfield, *Russian Nature. Exploring the Environmental Consequences of Societal Change* (Aldershot et al. 2005), p. 21. More literature can be found in Chapter Four of this study.

cellulose plants that were to be constructed at Lake Baikal in the 1960s.<sup>130</sup> Despite obvious differences in their political systems, it is worth understanding the relative importance of the ecological challenge in socialist and Western countries. In both cases, enthusiasm surrounding the post-war economic growth decreased in the face of (perceived or real) economic stagnation, and ecological problems challenged the ethic of economic growth. As in the West, ecological grievances and the criticism they evoked in socialist countries were symptomatic of a crisis of industrial modernity. Nonetheless, the crisis in the Soviet Union was much more “hidden”. After experts discussed economic reforms in the 1960s, more substantive economic reform debates did not take place until after Brezhnev’s death in 1982.<sup>131</sup> Ecological problems, however, began to be discussed more broadly in the 1970s. Central Asian journals, for instance, provided a forum for a critical debate, and though the critical voices could not influence politics directly, positions were nonetheless formulated and factions coalesced that prefigured the political divisions of the perestroika years.

This study has four chapters which largely follow the well-established caesurae of political history. This approach is warranted given the profound impact of the caesurae on imperial and Soviet history. At the same time, considerable attention will be paid to both transformational changes within these large periods and the continuities between them. The early to mid-1970s represent an exception here, for they are conceived as a period of change despite the absence of any major political upheavals. By means of a chronological framework, I will show how the second half of the 1950s and the 1960s was the heyday of high modernism, whereas the 1970s was a decade of growing environmentalism.

## Sources, Languages, and Transliteration

This study draws on a variety of sources, ranging from the accounts of travelers going to Turkestan to ministerial correspondence and the memoirs of Soviet engineers. The largest portion of my research utilizes specialist literature on irrigation and agriculture. For the Soviet period, several journals have been analyzed in-depth, including “Agriculture of Turkmenistan” (published since 1957) and “Agriculture of Uzbekistan” (published between 1933 and 2002).<sup>132</sup>

130 K. Schlögel, *Ökologiediskussion in der Sowjetunion* (Cologne 1984) With an early account on the opposition to the erection of a cellulose plant at the Lake Baikal: T. Gustafson, *Reform in Soviet Politics: Lessons of Recent Policies on Land and Water* (Cambridge et al. 1981), pp. 40–45.

131 Cf. Calic, Neutatz, and Obertreis 2011.

132 “Agriculture of Turkmenistan” (*Sel’skoe Khoziaistvo Turkmenistana*) appeared as “Agro-Industrial Complex of Turkmenistan” (*Agropromyshlennyi Kompleks Turkmenistana*) in



Both publications were issued by the Ministries of Agriculture of the respective republics. Their articles treat a wide range of subjects and viewpoints and were written not only by agronomists from different research institutes, but also by party representatives, biologists, irrigation engineers, and even peasants.

Archival material for this study is predominantly from the “Central State Archive of the Republic of Uzbekistan” (TsGARUz) in Tashkent. This rich collection contains materials from different historical periods, including the tsarist and Soviet eras. For the present study, materials were only analyzed for the Soviet period. Documents from the ministries of the Uzbek Soviet Republic, and their predecessors, the People’s Commissariats, are stored here along with materials from certain republic organizations. Research for the study focused on the vast records of the Ministries of Agriculture and Water Management as well as the Council of Ministers. Party documents are stored in a special archive in Tashkent, which was not accessible in 2007 and 2008. However, another Tashkent archive that proved to be available for research, the “Central State Archive of Scientific-Medical and Technical Documentation” (TsGANTMD), contains comprehensive materials from relevant research institutes. This archive was specifically used for documents from the above-mentioned Tashkent irrigation institute, the SANIIRI, in order to explore the water construction experts’ assessments of ecological and socioeconomic problems and their proposals for solving them in the 1980s.

Even in the post-war period, Russian remained the main language of technical expertise and scientific and political communication. All important articles in special journals were written in Russian, and monographs usually appeared in Russian as well. Russian was the language of modernity and the language of the elites.<sup>133</sup> For this reason, basing a study about these issues on exclusively Russian-language materials seems appropriate.

A last remark on transliteration: as this study is based on Russian-language sources, I have mostly used the scientific transliteration from the Russian variants for Central Asian names and terms. In some cases, though, transliteration from Persian, Turkic or other languages is also indicated. Well-known names are mostly indicated in their established English form.

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1988–1992. “Agriculture of Uzbekistan” (*Sel’skoe Khoziaistvo Uzbekistana*) appeared as “Socialist Agriculture of Uzbekistan” (*Sotsialisticheskoe Sel’skoe Khoziaistvo Uzbekistana*) in the pre-war period.

133 To be sure, language policy was a complex field and the Soviet period saw several significant changes in the attitudes of the regime towards indigenous languages in the non-Russian republics. Cf. on the question of languages in Chapters Three and Four of this study.

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## I. Russian Colonial Rule in Turkestan, 1860–1917

When Captain Butakov undertook his expedition to the Aral Sea in the late 1840s, the khanates in Southern Central Asia were still a distant and dangerous world for Russian soldiers. The existing forts at the Syr Darya were the result of the expansion of the Russian Empire into the Steppe areas since the times of Ivan the Terrible in the 16<sup>th</sup> century. The Russian Empire gradually took over the areas controlled by the Mongol Empire's succeeding khanates. From the beginning of the 18<sup>th</sup> century, Russians started to penetrate into the traditional summer pastures of the nomad Kazakhs (called Kirghiz by the Russians). In the first half of the 19<sup>th</sup> century, the Khans of the four existing hordes were ousted and their territory incorporated into the Russian Empire. Despite the Kazakhs' enduring resistance, the Russians were able to annex the vast territory of the Kazakh Steppe by the middle of the century. Fortresses erected by the Russians such as Vernyi in the East (1854) or Perovsk at the Syr Darya (1853) secured these territorial gains.

The Russian expansion stopped at the borders of the three Muslim khanates in southern Central Asia: the Khanate of Khiva, the Khanate of Kokand, and the Emirate of Bukhara. All together, they had about five million inhabitants.<sup>1</sup> Their borders were contested and unstable, and there was frequent warfare between them. They also fought with Persia, China, and Afghanistan.

In 1853, the Russians began to complete one of their existing fortress lines, the Orenburg line. The first Russian conquest of a portion of a khanate was the Kokand fortress of Aq Masjid. A decade later, Russian troops took two towns under Kokand sovereignty in order to connect the Orenburg and the Siberian fortress lines.<sup>2</sup> From that point on, military expansion southwards into Central Asia acquired its own dynamic and gained momentum. In 1885, the Russians

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1 D. MacKenzie, 'The Conquest and Administration of Turkestan, 1860–85', in M. Rywkin (ed.), *Russian Colonial Expansion to 1917* (London, New York 1988), pp. 208–234, p. 210.

2 Ibid., p. 209, and A. Khalid, *The Politics of Muslim Cultural Reform. Jadidism in Central Asia* (Berkeley 1998), p. 46.

fought Afghans in several battles. Russia's expansion stopped where it directly touched upon British interests. Clear borders were drawn in the middle of the 1890s. The Russian Empire was now in possession of a territory of 12,490 geographic miles and approximately 3.2 million inhabitants in the Turkestan general-governorship, which had been founded in the interim.<sup>3</sup>

To elucidate the motives for the conquest and the central features of Russian colonial rule in the following decades, this chapter will examine the state's civilizing mission and the imperial policies in Turkestan until the revolutions of 1917. On the one hand, the colonizers sought to transform the region socially and economically. A much-cited aim of imperial policies was the "establishment of order," expressing the perceived superiority of the center's culture and political order over the local societies.

The colonizers' perception of Turkestan's landscapes strongly influenced their ideas for the region's transformation. The vast, allegedly "empty" steppe and desert spaces soon turned from menacing logistical obstacles for military campaigns into veritable play grounds, which seemed to cry out for the establishment of modern infrastructure and verdant fields. In this context, the creation of "blossoming oases" emerged as a central topos.

This chapter will also explore the economic history of cotton production and the government's cotton policies. From the 1880s, the idea of "cotton autonomy" seized the imagination. With Central Asia's help, it was thought, the Empire could get rid of its dependency on foreign imports. At first glance, the cotton boom in Central Asia during this period seems to confirm the state's capacity for spurring transformation and its power to extract resources from its colonies. As will be shown, however, the boom was brought about less because of the imperial government's influence than economic changes and the introduction of the modern capitalist elements of trade and commerce – and thus, to some extent, in spite of rather than because of the imperial elites' aims.

Light will also be shed on the legal and administrative basis of the imperial efforts in irrigation and cotton growing. This will include the guidelines the administration followed regarding land and water rights and water distribution.

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3 See official figures from 1893 in: N. Petrov, *Ob irrigatsii v Turkestanskoi krae* (Tashkent 1894), p. 1. One geographical square mile (sq mi) or "German" square mile equaled 49 square versts or 20 English sq mi. Morrison 2008, p. 42. Morrison presents a population figure of 3.15 million as of 1881 that excludes Transcaspia and the protectorates but includes Kuldzha. Ibid., pp. 41–42. The imperial census of 1897 resulted in much higher figures: 5.3 million inhabitants of Turkestan. The big difference may be partly explained by the inclusion resp. exclusion of Transcaspia. A. Kappeler, 'Russlands zentralasiatische Kolonien bis 1917', in B.G. Fragner and A. Kappeler (eds.), *Zentralasien. 13. bis 20. Jahrhundert; Geschichte und Gesellschaft* (Wien 2006), pp. 139–160, p. 149. Until 1911, the population rose to 6.5 million in Turkestan. At that time, the population figures of Bukhara and Khiva were estimated at 2.5 million and 550,000, resp. Ibid., p. 149.

Much of the judicial and administrative oversight was left to local populations and regulated by “customs,” a term which reveals the new rulers’ incompetence in local affairs. The imperial state, accordingly, did not in fact create the legal basis for an exploitative colonial policy.

Engineers’ “fantasies” were the animating force behind irrigation and cotton growing. This will be illustrated on the basis of two major projects: the restoration of an old riverbed of the Amu Darya and the development of the Hungry Steppe. The actual results of the state’s efforts to develop infrastructure and irrigation systems remained limited until the government instituted a more systematic agricultural policy in the beginning of the 20<sup>th</sup> century. Research likewise became more centrally-directed and focussed. The Ministry of Agriculture and the Turkestan Agricultural Society in Tashkent played a prominent role. By centering on the latter’s activities in particular, it will be possible to show how difficult it was to enlist the support of local peasants with modernization programs. In the end, the colonial endeavour proved to be much more challenging than its visionaries had ever thought.

## The Motivation for the Conquest

The conquest’s actual motives have been a subject of debate in historiography. In his seminal work on the “incorporation” (*prisoedinenie*) of Central Asia, the Soviet author N.A. Khalfin stressed that the reasons were economic. Other historians further interpreted him as assigning a decisive role to Russian merchants interested in Central Asian cotton.<sup>4</sup> As a result of this reading of Khalfin, the precise role of cotton as a motive for the conquest has been frequently overstated.<sup>5</sup> According to the standard Soviet interpretation following Lenin, capitalism in the Russian Empire had begun to develop “in breadth” with the conquest of new markets at the periphery while it was hindered in its further development within Russia itself due to the remnants of feudalism.<sup>6</sup> When one reads Khalfin carefully, however, it appears that Russian imperial officials, most notably General N.A. Kryzhanovskii, the governor-general of Orenburg, and D.A. Miliutin, the Minister of War, had in fact pushed Moscow merchants to intensify trade with the khanates after the conquest of Tashkent in 1865 rather than the merchants, conversely, pushing the government toward conquest. The

4 N.A. Khalfin, *Prisoedinenie Srednei Azii k Rossii (60–90-e gody XIX v.)* (Moscow 1965), pp. 210–212.

5 Just one example: I. Lipovsky, ‘The Central Asian Cotton Epic’, *Central Asian Survey* 14, 4 (1995), pp. 529–542, p. 529.

6 D. Geyer, *Der russische Imperialismus. Studien über den Zusammenhang von innerer und auswärtiger Politik 1860–1914* (Göttingen 1977), pp. 74–75.

Russian companies involved were interested in Central Asia, first and foremost, as a supply area and hoped to “completely squeeze English goods out [of Turkestan].”<sup>7</sup> With regard to their interests in the natural resources of the region, metals either ranked higher or were on par with cotton and silk.<sup>8</sup> Russian officials were interested in making Tashkent into a Russian trade center. It was partly in the hope of compensating for the expenditures of the conquest that they hoped to enhance Russian trade in the region.<sup>9</sup>

Cotton was not the traditional focus of Russian economic interest in Central Asia. Instead, from the times of Peter I Russians believed that they could find rich mineral resources and gold in Central Asia. In 1849, a Russian author still spoke of Kokand as a new El Dorado.<sup>10</sup> The dreams of “mountains of gold” proved illusory, however, after the Russian expedition to Khiva in 1839/40 and the beginning of the conquest in the 1860s. The military official Lev Feofilovich Kostenko (1841–1891), whose observations from 1871 will figure prominently into parts of this chapter, reported a certain disappointment with the land that had “enticed” Russians for so long and now proved to be “inhospitable” and even “hostile.”<sup>11</sup>

The economic value of Turkestan was not at all obvious when the conquest began. Cotton also was not the only resource that attracted the Russians. There is no convincing evidence that Russian entrepreneurs pushed the government to conquer the region.<sup>12</sup> In fact, it was only the Russian expansion into southern Central Asia that provoked further economic ambitions, most notably the expansion of cotton growing.<sup>13</sup> The importance of cotton as a stimulus for conquest should thus be significantly downgraded.

Instead, geostrategic motives in the “Great Game” were decisive along with a

7 Letter from Romanovskii to Miliutin, 19. 12. 1865, cited in: Khalfin 1965, p. 210.

8 Ibid., pp. 211–212.

9 Ibid., pp. 207–209.

10 Thurman 1999, p. 19.

11 L. Kostenko, *Sredniaia Aziia i vodvorenie v nei russkoi grazhdanstvennosti. S kartoiu Srednei Azii* (St. Petersburg 1871), pp. 325–8, citations pp. 325, 328. Kostenko had been in Turkestan since 1867 and eagerly collected information about the region. He was a member of the Statistical Committee in Turkestan in 1868 and systematized Turkestan’s exhibits for the All-Russian manufactory exhibition in St. Petersburg. In 1870, he was sent on a diplomatic mission to Bukhara. After writing the book analyzed in this study, he took part in the Khiva campaign of 1873 and held different posts in Turkestan, until he was transferred to Petersburg in 1886. He is the author of several military-orientalist and military-historical monographs and numerous articles.

12 Cf. the skepticism about the existence of a “cotton lobby” during the later tsarist period: B. Penati, ‘The Cotton Boom and the Land Tax in Russian Turkestan (1880s–1915)’, *Kritika: Explorations in Russian and Eurasian History* 14, 4 (2013), pp. 741–774, p. 770. The term “cotton lobby” is used in: S.N. Abashin, *Tsentral’naia Aziia v sostave Rossiiskoi imperii* (Moscow 2008), p. 147.

13 This observation can be found already in: Geyer 1977 pp. 74–76, 80.

colonial-imperial civilizing mission. In contrast to the author Khalfin, other Soviet authors give priority to the British-Russian conflict as a motive for expansion.<sup>14</sup> In 1868, General von Kaufman formulated the contemporary idea that the confrontation with the British was taking place in Asia in response to the Russian defeat in the Crimean War.<sup>15</sup> Some historians have seen the Russian advance in Central Asia as a form of compensation for Russia's weakness in the West. Victory over relatively weak khanates and tribes was a means of bolstering the country's self-confidence as a civilizing force and thus placing it within the circle of ostensibly superior European powers who felt obliged to undertake a civilizing mission in non-European parts of the world.<sup>16</sup> Even when contemporary observers viewed the matter in pragmatic terms, it appeared, as Kostenko stated, that Russia had to act as "the maker of peace and order" (*ustroitel'nitsa i mirotvoritel'nitsa*).<sup>17</sup>

The idea of a civilizing mission was crucial in all the writings of the representatives of the Empire about Russian rule in Turkestan. "Civilization" was not something reserved for Europe, though. At times, it could also be attributed to Asian empires like China. In Turkestan, Russia presented itself both as a European and an Asian power. Contemporaries also made references to Asia when putting Russian rule in Turkestan into context. Although Great Britain was regarded as a major enemy, Russia and Great Britain were both viewed as civilizing forces in Asia that worked hand in hand.<sup>18</sup>

Central Asia was only deemed to have a higher civilization in reference to the distant past. Most Russian authors were aware of the general history of the region's ruling dynasties and epochs (e.g. as concerned the Arabs, Timur, etc.). They, therefore, often designated the occurrence of higher civilizations to an unspecified "antiquity" (*drevnost*) or a "deep antiquity" (*glubokaia drevnost*). In comparison to these earlier civilizations, the present period was one of decay. In regard to Southern Central Asia, the oasis region, Kostenko wrote: "Civilization has flourished here in several different periods and withered, has blossomed and died away; at the present, it is in a state of utter decay and stagnation: the local independent states [...] exist on the ruins of former, even if

14 Among others, see: M.K. Rozhkova, *Ekonomicheskie svyazi Rossii so Srednei Azii 40–60-ch godov XIX v.* (Moscow 1963). Cf. Geyer 1977, p. 75, footnote 64.

15 E. Glushchenko, *Geroi Imperii. Portrety rossiiskikh kolonial'nykh deiatelei* (Moscow 2001), p. 60.

16 Geyer 1977, p. 81.

17 In reference to khanates at the Amu Darya that had asked Russia for protection, see: Kostenko 1871, p. 353.

18 U. Hofmeister, 'Zwischen Kontinentalimperium und Kontinentalmacht. Repräsentationen der russischen Herrschaft in Turkestan, 1865–1917', in M. Aust and J. Obertreis (eds.), *Osteuropäische Geschichte und Globalgeschichte* (Stuttgart 2014), pp. 27–47, esp. pp. 45–47.