

THE POLITICAL ECOLOGY OF CANAL COLONIES: BRITISH AGRARIAN STRATEGIES IN MULTAN, PUNJAB

Asma Sikandar¹, Prof Dr Muhammad Javed Akhtar^{*2}

¹Phd Scholar, Department of Pakistan Studies, Bahauddin Zakariya University Multan

^{*2}Chairperson Department of Pakistan Studies, Bahauddin Zakariya University Multan

¹asmasikandar@gmail.com, ^{*2}javedakhtar@bzu.edu.pk

Corresponding Author: Asma Sikandar

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ABSTRACT

The present paper examines the British canal colonization scheme in the Punjab in the political ecology, on the Multan region. It assumes that canal irrigation and land settlement schemes by British colonial government was a strategical instrument of agricultural development and also a strategy of ecological control and political domination. As the analysis indicates, the construction of canals was closely related to the imperial interests of spying, tax collecting, and social transformation. This is done through the integration of secondary literature, archival settlement reports and colonial era maps. The canal colonies transformed the dry plains of Multan into agricultural zones but this was done at the cost of environmental destruction and mass land alienation. The colonial state also re-allocated fertile land to other loyal communities, including ex-soldiers and upper-caste farmers, thereby creating new social hierarchies and disabilities of local communities. These interventions did not only reform land ownership but access to water and cropping patterns, and settlement patterns too, permanently reorganizing the agrarian ecology of the region. Placing the research into the context of the overall discussions in the postcolonial agrarian history and environmental governance, the article allows to understand the process of reordering the landscape by the imperial powers in order to gain their control. It raises to the fore the interrelation of environment, power and policy under colonial rule and the long-term effects of the colonization of canals in the agrarian economy of South Asia. The inquiry is mixed-method research that emphasizes the importance of historical political ecology in explaining current trends of inequality as based on colonial development programs.

Keywords: Canal Colonies, Political Ecology, Colonial Irrigation, Agrarian policy.

INTRODUCTION

The British colonial venture in the Indian subcontinent was more than just an administrative and political project; it was also an ecological and agrarian transformation project. This is nowhere better seen than in the canal colonies of Punjab, which were amongst the most extensive state-sponsored agricultural colonization enterprises in the modern world. The colonies were developed in the late 19th and early 20th centuries and transformed dry land

into highly productive agricultural areas by developing massive irrigation systems of canals that basically transformed the environment and social structure of the region. This paper dwells on the example of Multan, one of the most important districts of the southern Punjab, in order to study the relationship between the colonial rule, ecological change and restructuring of agriculture. The Punjab canal colonization scheme was two-fold: to produce agricultural

surplus that could be sold to imperial markets and to build a political control by means of social engineering. The British administrators encouraged the movement of agriculturists and former soldiers in central Punjab into new irrigated territories, thus colonizing the redistributed land with the population of the so-called loyal people (Ali, 1988). The choice of Multan as the place of colonization was not accidental, it was motivated by the ecological potential and political strategy. This area, due to its closeness to the Sutlej and Chenab rivers, was turned into an experimental plot of engineering the flow not only of the water but also of the behaviour, productivity and loyalty of the rural population.

In this article, the authors rely on the concept of political ecology as a multidisciplinary theory that investigates the influence of political, economic and social power relations on the environmental change and resource accessibility (Robbins, 2012). Political ecology assists in unravelling the fact that the British colonial state did not simply change land use by irrigation but restructured the ecology of the region in order to introduce a new pattern of land ownership, social hierarchy, and economic dependence. The system of water distribution controlled by the state, the method of taxing on canal-dependent productivity, and strict division of land and caste/tribe formed the essential part of creating a colonial agrarian order (Gilmartin, 1994).

As shown by the analysis by historian Imran Ali (1988), the Punjab canal colonies not only promoted agricultural commercialization and improvement of rural prosperity of some agriculturalists, but also at the same time created inequality and disrupted traditional tenure relations. The work by David Gilmartin (Gilmartin, 1994.) (Gilmartin, *Water and Waste: Nature, Productivity and Colonialism in the Indus Basin*, 2004)) also shows that the more politically explicit reasons behind resource control were hidden by the language of scientific management and developmental rationality. The notion of hydrological imperialism (D'Souza, 2006) places the colonial irrigation projects into the context of imperial rhetoric of ecological control. These works collectively indicate that

British canal colonies in Punjab were not merely agrarian initiatives, but also profoundly political endeavours' that integrated environmental engineering with imperial ideology.

Although the overall discourse of canal colonization of Punjab has now grown, Multan is relatively undocumented in the overarching discussion. The majority of the available studies focus on the more often mentioned Chenab and Upper Bari Doab colonies. Multan, however, offers a unique line of inquiry due to its frontier location, semi-arid ecology and the demographic mix. Land use, settlement patterning and local government: Major changes in these areas began when the Sidhnai Canal was finished in 1886, and new colony villages were established.

The current research paper answers four related research questions:

1. How did the British colonial state utilize canal irrigation and land settlement in Multan as instruments of ecological and political control?
2. How did the canal colony project transform the social, economic and environmental environment of Multan?
3. Who benefited from land redistribution in the canal colonies, and what was its effect on the local power dynamics and agricultural hierarchy?
4. What are the long-term environmental and socioeconomic consequences of canal colonization in Multan, and how do they correspond to broader patterns in colonial agrarian policy in South Asia?

This research employs a historical-political ecology framework to elucidate the dynamics of canal colony formation. Using archival materials, that is, canal records, Punjab Settlement Reports, and colonial land-classification manuals, in addition to maps and administrative correspondences of the colonial era, it shows that the establishment of canal colonies was not merely the extension of irrigation and colonization; it was an activity that involved environmental domination, social engineering and imperial desire. Focusing Multan as the main focus of the study, the research can be considered as contributing to the subtle understandings of the ways in which colonial ecological policies shaped the regional histories and still influence the modern agrarian system. Simultaneously, it

contributes to overarching discussions in environmental history, postcolonial studies, and political economy by elucidating how colonial control mechanisms were inscribed onto the South Asian landscape.

2.0 Literature Review

The historical development of canal colonies in Punjab has been the concern of scholarly interest since long ago, especially among those researchers who are interested in the colonial agrarian policy, environmental change and state formation. The major conceptual frameworks of examining the roles of irrigation and land distribution in the colonial economic development and imperial control are based on the works of Imran Ali ((Ali, 1988), David Gilmartin (Gilmartin, *Scientific Empire and Imperial Science: Colonialism and Irrigation Technology in the Indus Basin*, 1994.) (Gilmartin, *Water and Waste: Nature, Productivity and Colonialism in the Indus Basin*, 2004)), and Tan Tai Yong (Tan, 2005). However, the conditions of Multan, one of the epicentres of this regional phenomenon, have not been paid much attention. The current article adds to this body of literature by discussing the specifics of the canal colony in Multan in this colonial venture. These policies merged goals for agriculture and for politics.

2.1 Canal Colonies and Colonial Agrarian Strategy

The Punjab colonial canal colonization was one of the most significant agricultural engineering endeavours of the British Empire. The Punjab Under Imperialism, 1885-1947 (1988) by Imran Ali cannot be ignored as it exposes the canal colonization in terms of economic logic and institutional processes. According to Ali, canal colonies were not only motivated by the desire to make agricultural production as efficient as possible; the British also wanted to control the social sphere, as they distributed the land between castes and communities capable of agricultural work and politically loyal. David Gilmartin (1994) can be used to supplement the discussion presented by Ali as he argues against the existence of a benevolent discourse of colonial development. Gilmartin shows how

scientific theory of irrigation was tied to imperial goals, arguing that canal system allowed colonial state to exert what he calls hydraulic control, which is a type of governance that was based on water management. With this kind of strategy, the new agricultural frontier also served as a political buffer zone in particular the areas that were next to semi-autonomous princely states like south Punjab. In *The Garrison State* (2005), Tan Tai Yong goes further and brings about military factors in the land and water distribution process. A good proportion of canal colonies was inhabited by army veterans and their families, thus creating a militarized, loyal settler base. All of these works underscore the diverse aims of canal colonization, economic production enhancement, imperial dominance, and the safeguarding of imperial borders.

2.2 Political ecology and ecological initiatives implemented during colonization

During the past few decades, political ecology has been mobilized more and more by scholars to create a new way of thinking about the colonial encounter between people and the environment. The study of Indu Agnihotri (Agnihotri, 1996) shows that not only colonial irrigation in Punjab transformed the ecological landscape of the province, but it also intensified social and gender stratification due to the introduction of land-classification regimes and land-access restrictions. By critiquing colonial modernity and technocratic management of nature through the lens of the Punjabi canal colonies, Agnihotri draws attention to the need for a political ecology that challenges colonial environmental transformation. Political ecology puts ecological change in the context of systems of power and inequality, which goes against the technocratic view of development (Robbins, 2012).

In the South Asian region, Rohan D Souza (D'Souza, 2006) refers to colonial irrigation as a kind of hydrological imperialism and proves that the control of water, although presented as development, was a tool of surveillance and rearticulating of social life as well. Gilmartin (Gilmartin, *Water and Waste: Nature, Productivity and Colonialism in the Indus Basin*, 2004) applies this to Punjab and shows how

water management was a technology of rule that allowed categorizing soils, communities and landscapes as productive and unproductive. These classifications accounted for uneven land distributions and unequal development patterns. In this case, the rationality of the colonial science covered the socio-political consequences of ecological intervention. This kind of research reveals that building canals in colonial India was as much about controlling nature as it was about controlling people. However, political ecology in Multan district has not been adequately used due to its unique environmental and political characteristics in Sidhnai canal system.

2.3 Land Allocation and Agricultural Classification

The canal colonies established novel frameworks for ownership, productivity, and social prestige via land settlement regulations. Elizabeth Whitcombe (Whitcombe, 1972) and later Ian Talbot (Talbot, 1996) show the British rearranging landholding to the benefit of what they call agriculturalist castes, which excluded pastoralist and tribal communities. While these measures were rationalized as enhancements to agricultural output, they concurrently reinforced colonial class structures and rewarded political allegiance. The implementation of fixed tax assessments and canal water rates imposed strain on smallholders, frequently resulting in bankruptcy, dispossession, or emigration (Ali, 1988). Jasbir Singh (Singh, 2018) supports this position further arguing that canal colonies triggered significant changes in rural social structure, such as changes in labour relations, tenancy relations, and local economies. Though he concentrates on Multan, his discussions provide similarities when it comes to caste-based land distribution and canal-based livelihoods throughout Punjab

Subsequent colonization turned the rural periphery of the Punjab into a stratified space where the water, access to land and crop production was closely controlled by the colonial state. Even though these texts provide a general picture of the way in which agrarian hierarchies were rebuilt under the colonial regime, they do not exclude additional localized research.

Multan, with its inherited mixture of agrarian and pastoral culture and its location on the fringe of settled Punjab, makes an especially instructive example of the way in which such policies operated on the fringe. These dynamics emphasize the necessity of incorporating a political-ecological view into the canal colonies of Multan.

2.4 Literature Gaps and justification for this research study

Multan is placed in the focus of recent scholarship. Sajjad Akhter and Basit Nadeem (Akhter, 2022) analyse the impact of canal colonies in British Multan on agricultural transformation and socio-political change, providing a foundational albeit predominantly descriptive account of political ecology and environmental history. Likewise, Abdul Basit (Basit, 2023) investigates Multan's physical environment throughout the colonial period, emphasizing the significance of governing rules and settlement planning in imperial administration. Taken together, these works point to the pivotal role of Multan in British Punjab and requires further political-ecological evaluation of the environmental, infrastructural, and administrative processes in the colonial agrarian system.

The existing literature either focuses on the better-known colonies, the Chenab and the Upper Bari Doab ones, or it mentions the Sidhnai Canal Colony of Multan in passing without attempting a direct analysis of its effect on the environment, the agricultural economy, and social patterns of the district. Besides, although political-ecological frameworks can be applied implicitly, they are not explicitly used to the region. Occupying these gaps, the given article places the canal colony of Multan in the context of the larger colonial venture and in the context of the local environment, politics, and socio-economics. In this way, one can better understand the way in which displacement, resource distribution, and ecological change came into contact with the daily life of the British colonial government and the ordinary people. Recent literature has done much to explain the larger patterns of canal colonization in Punjab;

but comparatively little has been written about the ecological and political setting of Multan. This gap is filled in the present study which examines the Sidhnaï Canal Colony as a focused of research study where the intersections of environmental engineering, agrarian reform, and colonial power took place. The next section is complemented by an interdisciplinary approach that outlines the methodology and main sources with the help of which the Sidhnaï Canal Colony is analysed in terms of its ability to redefine the ecological and agrarian landscapes of Multan during the British rule.

3.0 Methodology and Sources

The paper embarks on a historical-political ecology approach to the study of canal colonization in Multan, which combines archival research with critical textual evidence and thus considers the examined phenomenon as an ecological project and a political tool at the same time. Political ecology does not look at the legislative frameworks and administrative machinery only, though, but at the reconfiguration of land, labour and water systems as well (Robbins, 2012). Based on this, the current paper questions the meeting of environmental change, imperial rule and social-economic rearrangement. In line with the arguments of Rohan D Souza (D'Souza, 2006), David Gilmartin (Gilmartin, *Water and Waste: Nature, Productivity and Colonialism in the Indus Basin*, 2004), and Maira Hayat (Hayat, 2024), the paper envisions the canal colony not as an ahistorical infrastructural project, nor as an apolitical technical project; instead, it is considered a racist, hierarchical, and extractive institution. The racial and moral reasoning used by the British in classifying labor, controlling use of water, and measuring land productivity as depicted by Hayat in the modern irrigation infrastructure and waste-management culture, is still influencing the current social relations. The paper thus examines the social logics that were behind British canal governance at Multan. The research adopts a qualitative, interpretive, and historically focused approach, utilizing primary

archive sources alongside essential secondary literature.

Some of the sources include Punjab District Gazetteers (Multan editions) and Settlement Reports of the Sidhnaï Canal, manuals of canal-colonies and irrigation-revenue reports all of which are available at the India Office Library and at the Punjab Archives. Moreover, the work is an application of technical studies similar to that of C.H. Buck (Buck, 1906) on the canal irrigation schemes in Punjab, whose technical language is an indication of the colonial hydrological thinking during that time. The technical documents are augmented by cartographic materials (maps, canal layout plans, land allocation plans) that clearly depict the environmental and village reorganization associated with the notion.

Recent local literature, especially the one by Maira Hayat (Hayat, 2024) on the practices of irrigation-infrastructure and waste-management in colonial and contemporary Punjab, is also accessed to frame the study. This analysis consequently uses archival sources, technical reports, geographic reports as well as current researches to explain the ecological and political aspects of British canal colonization in Multan.

The study of Akhter and Nadeem (Akhter, 2022) examines the history of agricultural development and socio-political shift in British Multan. Basit (Basit, 2023) examines the colonial fabrication of the terrain and administrative framework of canal colonies.

Agnihotri (Agnihotri, 1996) criticizes the use of land and exclusions of gender in canal settlements. Jasbir Singh (Singh, 2018) has a comparative framework in his analysis of rural social change in Punjab. Collectively, these materials provide a triangulated examination of how canal colonization restructured natural systems, agrarian hierarchies, and social norms in colonial Multan. The research not only reconstructs policy frameworks and material results but also offers a critical discourse analysis of colonial literature, demonstrating that the rhetoric of progress, waste, and efficiency was

employed to rationalize British dominion over land and individuals.

As it was stated by Hayat (Hayat, 2024), this essay investigates how moral and racial imaginaries impacted the distribution of land, labor demands and irrigation policy, namely in the Multan region, which was considered both marginal and a place about to change. The paper is in agreement with the purpose of historical political ecology that does not divide the environment and politics territories; it aims at proving that the land, water, and people were simultaneously managed by bureaucratic, racial, and ecological categories in the period of British imperial authority. The findings are interpretive rather than statistical and aim to construct a contextualized, historically situated narrative of environmental change within a colonial framework.

Now that the methodological framework has been established, it is of the utmost importance to place the instance of Multan within the contextual framework of its particular historical setting. A look at how British colonial policies transformed this frontier territory into an organized agricultural and political zone through canal irrigation and planned settlement is presented in the following section, which examines the origins of the Sidhna Canal Colony and its evolution over time.

4.0 Multan's Canal Colonization: A Historical Overview

The annexation of Punjab in 1849 increased the strategic and economic importance of the district of Multan which was located in the southern frontier of British Punjab. It is low-density, arid, and yet fertile, and semi-arid with a dearth of

population and an agrarian infrastructure, which made it appear blank by the colonial planners towards agricultural engineering as well as imperial consolidation. This was not only a canal colony that was created; it was not only a reflection of technological progress, it was an explicit imperial plan of expropriating resources, extending spatial control and rearranging social order. Thanks to the completion of Sidhna Canal in 1886, which was fed by Ravi River, Multan district became a primary place of British canal colonization. This project was a part of the bigger picture of canal colonies that were set up in Punjab between 1880 to 1940s. With Sidhna system, large tracts of land were made productive, taxable and governable in Lodhran and Khanewal and the colonial state could stake their claim over formerly uncultivated land as a productive space (M. Douie, 1914) (Buck, 1906). The colonial government introduced rice chakbandi system which was a uniform system of settlement in the countryside. In this system land was surveyed in chaks (village units) on a grid basis with fixed plots, canal outlets and centre-oriented roads. According to Zafar (Zafar, 2017), this was not just a technical exercise, but a tool of creating classes and socio-political stratification where landed property just went to farming and loyal castes and caste groups particularly Jats, Rajputs and military pensioners. Such communities were envisioned as the so-called yeoman sowers of the empire that were to be disciplined through water and bound by land tenure regulations (N, 2013).

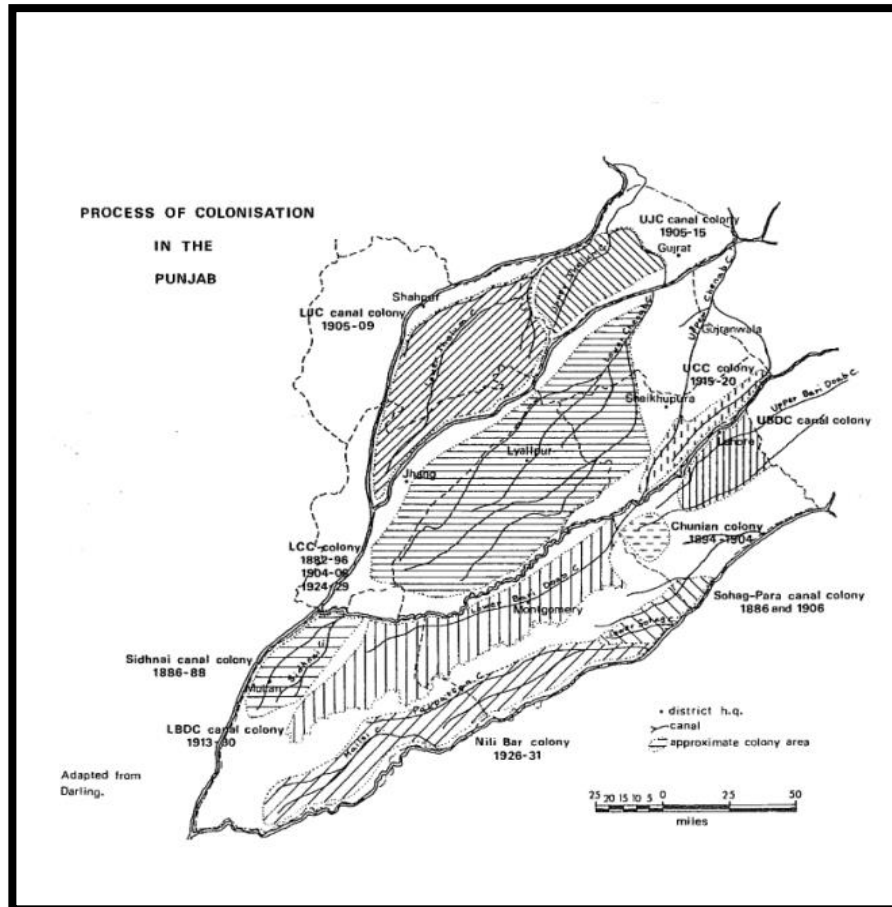


Figure 1. Process of Colonization in the Punjab showing major canal colonies, 1885–1931, including Sidhnai (1886–88).

Source: Adapted from Darling, as cited in Zafar (Zafar, 2017).

Another role of canal colonies that Brits perceived was that of political pacification in a restless or frontier region. Chaudhary and Dasti (Dasti, 2014) suggest that canal colonization in the Multan was not just an issue of getting revenue because demographic engineering was one way of guaranteeing social stability in the longer term. The colonists were also chosen very selectively in regards to their agricultural skills, but also based on their loyalty and adherence to the colonial regimes. This new irrigation system raised the productivity of the agricultural sector, especially by cash crops, such as wheat, cotton and sugarcane, but it also restructured the local hierarchy. The canal-irrigated land was allotted to the settlers, who were successfully and socially lifted to a higher status, whereas the pastoralists, nomadic tribes, and low-caste people were

marginalized and pushed out of their areas in general (Agnihotri, 1996) (Singh B. S., 2024). This was the stabilization of controlled inclusion and exclusion with a paradigm change in the socio-political scenario of rural Punjab. Besides, those canal networks were made to accommodate Multan in the bigger colonial economy. The canal road and railway connections enhanced the transportation of the excess crop to the cities or the ports leading to an increased pace of the commoditization of farming (L.D.Satya, 2008). The social framework of the settlement, which included administrative buildings, inspection bungalows and canal rest houses indicated an encroachment of bureaucratic spatial stewardship over what the British felt was a chaotic frontier (Basit, 2023). To British administrators, the Multan canal colony was the success of scientific

agriculture and rational rule. This, however, came at considerable costs of ecological and social displacement, as the subsequent body of scholarship helps to clarify, as such transformation was an intentional part of a colonial project of disciplining land, labour, and landscape in the interests of empire (D, 2024); (Hayat, 2024)). Having accomplished this historical background, this section discusses the mechanism through which the British applied agrarian techniques, such as land allotment, irrigation timing, and cast engineering, in an effort to attain political authority and social controls in such canal colonies as Multan.

5.0 Agrarian Strategies and Politics of control in the Sidhnai Canal Colony

The canal colonization of British canal in Punjab (and Multan in particular) was not just an engineering brilliantly done but a surmised agrarian statecraft and state policy of agrarian control. The colonial regime used the Sidhnai Canal Colony as a test site of political consolidation, economic exploitation and social engineering through irrigation infrastructure, selective land distribution and demographic planning. The allocation of land to loyal agrarian castes and military pensioners, mainly of central Punjab was one of the major ways in which power was exercised. These were Sikh and Muslim Jats and Rajputs and other groups, which the British defined as agricultural tribes or martial races (N, 2013). The land allotment system was strictly regulated: settlers obtained conditional concessions that required active cultivation in accordance with canal standards.

This made the ownership of land to depend on the political allegiance and agricultural productivity (Zafar, 2017); (Singh B. S., 2024)). This selective inclusion approach established a new rural elite, a loyalist faction of peasant proprietors perceived as disciplined, productive, and politically stable.

These groups became important partners of the colonial state especially during unrests or

nationalistic agitations. This established permanent stratification of classes in the rural population of Multan that favoured settler groups at the expense of pastoralists, tenants, and so-called non-agricultural castes (Dasti, 2014). British officials employed canal water allocation system in order to not only optimize productivity but also to create surveillance and control. The irrigation network was turned into a means of governance, through strict water distribution timetables (warabandi), inspection officials, and even penalties on non-adherence to the schedules. John Broich (J, 2007) maintains that colonial water infrastructure in British India was a material and symbolic tool of empire that strengthened the power of the state in the lives of cultivators on a daily basis.

The Sidhnai Canal Colony was similarly a spatial and bureaucratic regime with every field, outlet and settlement being surveyed, labelled and controlled. Basit (Basit, 2023) and Maheshwari (S.R.Maheshwari, 1978) assert that these administrative institutions institutionalized colonial notions of order, discipline, and modernity.

District collectors, canal engineers and patwaris were the key actors in ensuring obedience and allocation of rewards or punishment. The colonial dream was rational, calculable landscape in which land, water and people were set in calculable, readable categories. This was also supported by the railway and road networks integration. The canal colonies were complemented by the railway system in Punjab, which helped to take the agricultural surplus to export markets, as it appears in Satya (L.D.Satya, 2008). These infrastructural connections directly integrated the agricultural hinterland of Multan into the imperial economy, enhancing the commercialization of agriculture and reinforcing the extractive capabilities of the colonial authority. Nonetheless, the colonial agricultural policy faced opposition.

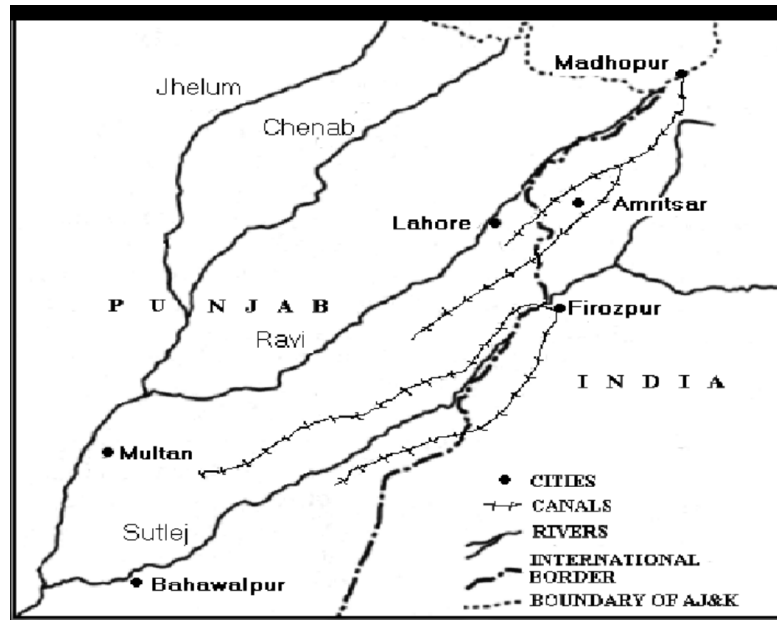


Figure 2; ; Sidhnaï Canal distributary network over Multan district (source: (Buck, 1906)

According to such scholars as Mukherjee (1988) and Hayat (2024), the canal colonization was also associated with resistance, contestation, and peasant negotiations. While the prevailing narrative emphasized serene and satisfied settlers, the reality was marked by disputes over water rights, taxation, land allocation, and caste-based discrimination.

By doing so, even in the highly regulated Sidhnaï Colony, local agency and subaltern voices were maintained and thus the neat categories to which the colonial planners aspired were undermined. On the whole, the agrarian policies of the Sidhnaï Canal Colony were not developmental neutral policies. They were embedded into a broader imperial framework that sought to govern not only land and water but also agrarian classes, political alliances, and more intricate regional identities. Long-standing structural inequities and power disparities in rural Punjab were founded on these practices and continued into the colonial period (Awan, 2016; Zafar, 2017).

Although agrarian policies enabled the British to colonize the Multan with political rule and loyal settlements of settlers, it led to radical changes in the ecological and hydrological environment of Multan. The following part discusses the way the construction of canals transformed the

environment, water regimes, and relations between people and the nature in the region.

6.0 Ecological changes in Sidhnaï Canal Colony

Arrival of Sidhnaï Canal system in Multan during British colonial rule had triggered the significant ecological shift in the area. Although the colonial authorities hailed these changes as a step toward progress and modernization of agriculture, the changes occurred within a political ecology governed by imperial interests. The canal colonization project reorganized not the land and water use only, but also the very correlation between people, nature and the colonial state. Other ecologic effects were also evident and these included the transformation of semi-arid scrubland to highly productive agricultural land. The regions that served as pasturelands of nomadic tribes, herders, and seasonal farmers were re-conceptualized as tax-paying, productive, and governed agricultural lands. Agnihotri (1996) asserts that this expansion led to the disruption of traditional land-use patterns, culminating in the marginalization of pastoralists and deforestation.

The British redesigned the hydrological system of the area and redirected the flows of natural water to supply the man-made canal systems. This altered the soil composition, changed the ground

water levels and it impacted the biodiversity of the area. Muhammad (2011) states that the dominance of geography that the canal irrigation represented entailed ecological imbalances, like salinity, waterlogging, and the long-term depletion of soil, all of which concerned the official discourse of development to a small

degree. Recent research has rethought canal irrigation as a kind of imperial environmental control. (J, 2007) claims that the systems of water supply in Britain were not mere technical solutions but were intended to display the power of the state and modernity.

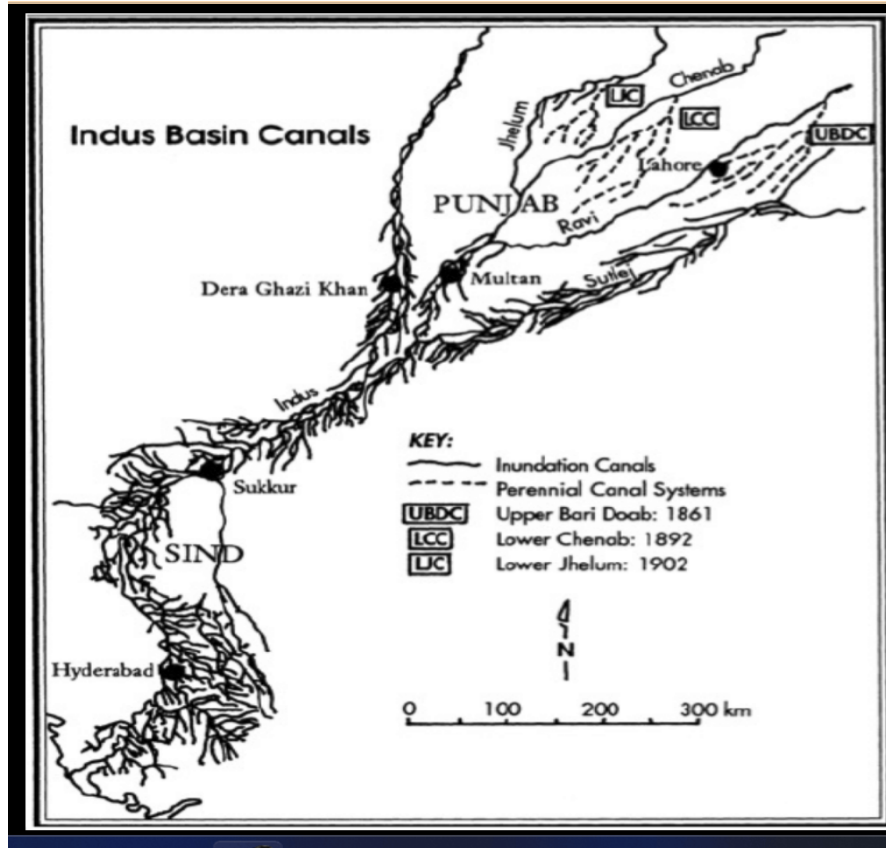


Figure 3: Canal system density in the Bār Tract, highlighting environmental re-engineering
 source: Wikipedia commons

One of such critiques is by Maria Hayat (Hayat, 2024) who presents the issue of the colonial framing of waste, waste of water, and waste of people. According to her, the canal irrigation systems in Punjab followed a racialized logic in which uncultivated terrains and their original inhabitants were branded as wasteful/inefficient, hence justifying state intervention. This ideology did not only change the land tenure and labor structure but also redefined the environmental stewardship as a colonial burden and right. Besides, the ecological change was connected to the settlement structure and

human-nature relations. The natural landscape was divided into inflexible administrative parcels by the grid-based chak system, and aligned watercourses. These regions forced monoculture agricultural activities, particularly cash crops such as wheat and cotton and diminished the biodiversity further and made the soil more susceptible (Dasti, 2014). The British claim of implementing green revolutions in Multan should be interpreted as a colonial environmental transformation, where productivity gains were merely superficial, masking underlying structural inequities.

According to the arguments of political ecology scholars, these changes were not neutral and universally positive. They reproduced social stratifications, undermined local knowledge systems, and established ecological dependence that would last beyond the empire (D, 2024) (Agnihotri, 1996).

To conclude, the history of the ecology of the Sidhnai Canal Colony demonstrates the overlaps of the environment, empire, and extraction. As much as it was a transformation of land and water under the British rule, it was a transformation of nature as well as a transformation of people.

7.0 Social-Economic and Political Implication of Sidhnai Canal Colony

Sidhnai Canal Colony, which was a constituent of the wider colonial policy of irrigation in Punjab, had long-term consequences on the social framework, economic growth, and political arrangement of rural Multan. These changes did not just happen to be collateral effects of the modernization of infrastructure, but were the specific tools of colonial domination that created obedient and efficient farmer community. Among the most important changes that took place, there was the appearance of new landholding classes. British land assignment policies favoured castes with agricultural competence and military allegiance: Jats, Rajputs, and ex-servicemen were thus encouraged to form a canal-based agrarian aristocracy, according to (Zafar, 2017).

These settlers did not only seize the land but also earned entrance to the water and credit systems, which secured their leadership in the power structure of the place. On the contrary, the indigenous and marginalized communities, especially the pastoral tribes and lower-caste workers did not receive such opportunities to a great extent ((Dasti, 2014); (Agnihotri, 1996). Commodification of agriculture was also brought through the irrigation infrastructure. Multan which was previously defined by subsistence mode and seasonal agriculture became part of the imperial commodity chains that thrived on producing cash crops like cotton, sugarcane and wheat (Satya, 2008). Railways and roads allowed the transportation of agricultural surplus towards

the urban market and the global markets, though this had the cost of food insecurity to local people and the degradation of the environment through mono-cropping (J, 2007) ; (Hayat, 2024). New spatial and social order was imposed by the canal colony policies with chakbandi system that provided fixed village units of standardized plots and access to water. This reorganization enabled the state to monitor land utilization, regulate population mobility, and facilitate tax collection. However, it adversely affected precolonial communal land ownership, informal tenancy arrangements, and indigenous water-sharing practices ((M.Douie, 1914); (D, 2024)).

Politically the canal colonies such as Sidhnai served as the laboratories of the production of loyalty. The British authorities tended to regard colonist farmers as the moral and political spine of Punjab. Land transfer to military pensioners and those who paid taxes through revenues institutionalized relationships between the colonial state and rural elites ((S.R.Maheshwari, 1978); Mooney, 2013).

Such selective empowerment guaranteed the support of colonial rule in cases of political turmoil and further stratification of villages.

These social and economic consequences were not the uncontested or homogeneous one. According to Mukherjee (M.Mukherjee, 1988) and Awan (M.A.Awan, 2016), peasant resistance, water conflicts, and local dissatisfaction did not simply fail to appear, especially among those who were not forced to benefit in any way by the canal colonization. Over time, these tensions resulted in a greater understanding of land inequality and bureaucratic favoritisms, which would shape the politics of both colonial and post-colonial Punjab.

Overall, the Sidhnai Canal Colony did not only change the geographical body of the Multan region, but it reshaped the class relationships, institutionalized socio-economic stratification, and strengthened colonial control in the form of developing agrarian areas.

8.0 Conclusion

The Sidhnai Canal Colony of Multan has been used as a case study in political ecology of colonial infrastructure within this article by discussing

how British agrarian policies promoted imperial goals by transforming the environment and engineering society. The analysis, established in multidisciplinary research, addressed four principal research questions: 1. How did British irrigation and land policies alter the ecology and agriculture of Multan? 2. What social-political interests did canal colonization in Punjab have? 3. With canal settlements, how was class, caste, and landholding pattern engineered? 4. What were some of the long term ecological and social outcomes of canal colonization?

Basing on both the colonial documentation and the contemporary scholarly work, the article has demonstrated that colonization of the canals was a multi-layered project which was not only aimed at boosting productivity but also at solidifying power. The British reformed the landscape of Multan by land distribution based on selectivity, incorporation of castes, bureaucratic management, and restructuring the environment to form a manageable, profitable, and loyal land. The Sidhnaï Canal Colony is therefore an example of the use of infrastructure and irrigation as means of empire, which was at the same time transforming both nature and society. These came with not only physical infrastructure, but with long legacies of inequality, ecological degradation, and social stratification that continue to infiltrate the Punjab agrarian terrain to this day. This study contributes to the broader discourse on colonial environmental governance by highlighting how imperial authorities utilized land, water, and human resources to achieve political and economic aims. This also prompts deeper investigations into the effects of these colonial frameworks on development, resource politics, and social hierarchies in postcolonial South Asia. This study paves the way for future multidisciplinary studies in a number of important ways. Archival land revenue records in local tehsils, oral histories from descendants of canal colony settlers, or geographic information system (GIS) tracking of ecological transformations (e.g., canal spread, forest loss, settlement expansion) over time could all be useful tools for future research. By using these methods, we may find out more about the ways in which the legacy of the Sidhnaï Canal Colony

influences the environment, resource access, and agrarian livelihoods in modern-day southern Punjab.

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