

Agricultural Development in Haryana: A Case Study of Rewari District

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ABSTRACT

This study investigates the agricultural development in Rewari District, Haryana, aiming to provide insights into the region's agricultural dynamics, challenges, and potential solutions. Rewari, located in the heart of Haryana, represents a microcosm of the state's agricultural landscape, characterized by a blend of traditional practices and modernization efforts. The research employs a multi-faceted approach, incorporating quantitative data analysis, field surveys, and stakeholder interviews to comprehensively assess the various facets of agricultural development in the district. The study begins by examining historical and socio-economic factors that have shaped agricultural practices in Rewari, shedding light on the evolution of farming techniques and land-use patterns. Subsequently, it delves into the current state of agricultural infrastructure, irrigation systems, and crop diversification in the district, highlighting key strengths and areas requiring improvement. Special attention is given to the impact of government policies, technological interventions, and environmental factors on the agricultural landscape of Rewari. Furthermore, the research explores the socio-economic implications of agricultural development, focusing on the livelihoods of farmers, rural communities, and the overall economic well-being of the district. It also investigates challenges such as water scarcity, soil health degradation, and market access, providing a comprehensive overview of the obstacles hindering optimal agricultural growth in Rewari.

Keywords: Agricultural Development, Rewari District, Agricultural Infrastructure

INTRODUCTION

Agricultural land is used for crop cultivation, livestock keeping, and other agricultural operations, utilizing various types of crops and livestock. Location, climate, and soil quality vary. Specialty crops like coffee, tea, and spices are grown. Animals like sheep, goats, cattle, and chickens are kept in specific areas for grazing (Fazal, 2000).

Irrigated areas are used for crop cultivation, supporting livestock grazing. Methods include surface, drip, sprinkler, and sub-surface irrigation, providing water to plant roots and roots. Irrigation boosts crop yields and extends growing seasons, reducing drought risk and ensuring food security. Water is diverted from rivers, pumped from wells, and delivered directly to plant roots through pipes and emitters (Yadav, 2018).

The statistics highlight the importance of efficient well and tube well management in Rewari district for agriculture. Addressing challenges like groundwater depletion, water quality, and sustainable use is crucial. Alternative irrigation methods and strategic planning are also needed (Sidhu, 1991).

Canals in Rewari district are underutilized for agricultural irrigation, highlighting the need for a diverse and resilient water management strategy (Arya & Rawat, 1990). Investing in infrastructure and addressing specific needs within Rewari district can enhance water availability for agricultural activities, promoting sustainable use of water resources for the region (Sihmar, 2014). Policymakers can use this data to develop strategies for improving irrigation infrastructure, promoting sustainable water management, and ensuring agricultural sector resilience in Rewari (Gehlot & Kaur, 2015). Farmers cultivate various crops like cotton, tobacco, cereals, fruits, vegetables, and legumes using techniques like tilling, ploughing, and soil preparation to prepare land for agriculture (Devi & Mehala, 2016).

On farmed land, crop rotation is a typical method whereby various crops are planted in a prearranged order to enhance soil health and lower the danger of insect infestations and soil depletion. Fertilizers are widely used by farmers to replenish the soil with vital nutrients and promote crop development (Kumar & Chand, 2012).

Study Area

In the southern region of India's state of Haryana sits the district known as Rewari. It is located around eighty kilometres southwest of New Delhi, the nation's capital. The district borders Rajasthan in both the west and the south. Administratively, the Rewari District is split up into a number of tehsils and blocks, each having its own system of local government. Rewari has historically had an agricultural economy, with the main industry being agriculture. The area is well-known for growing vegetables, millets, wheat, and mustard among other crops. But throughout time, there has been a trend toward industrialization, and the existence of factories and industrial parks has aided in the diversification of the economy. Rewari has witnessed an increase in industrial activity, especially in small-scale and manufacturing-related companies. The area is now the centre of several businesses, including textiles, car components, and metalworking. The neighbourhood has excellent rail and road connections. Due to its location on the Delhi-Jaipur route, it is reachable from several large cities. Rewari is also connected to other regions of the nation via the railway network. There are several educational facilities in Rewari, from colleges to schools. The district has been working to raise the school system's infrastructure and literacy rates. Forts, temples, and other historical sites are remnants of Rewari's history, giving the city historical value. The area has a rich cultural history that includes festivals, traditional dances, and music. Rewari, like many other areas, struggles with issues including water shortages, reliance on the monsoon season for agriculture, and the requirement for sustainable development.

Objectives

- i. To evaluate the existing agricultural infrastructure, including irrigation systems and storage facilities.
- ii. To Assess the adoption of modern farming technologies in the district.

DATABASE & METHODOLOGY

The current work is based on information from original sources. The primary data were gathered using a planned, well-structured questionnaire. For primary survey data, the statistical techniques have been examined, examining correlations, patterns, and trends in the agricultural development. Using instruments like data visualisation, and descriptive statistics is part of this. Analyze qualitative data from focus groups and interviews using thematic analysis to find reoccurring themes, and understated insights about socioeconomic and vocational choices. With the use of primary surveys that were carefully planned and conducted in every village within the Rewari district, the regional discrepancies have been examined. Twenty-five villages have been chosen for the primary survey. Each block's five communities have been chosen. Akbarpur, Bhudpur, Chillar, Mundhalia, and Kaunsiwas of the Rewari block; Banipur, Khijuri, Khtuwas, Rughnathpur, and Tankri of the Bawal block; Bawa, Liladh, Lula-Ahir, Nahar, and Gudiani villages of the Nahar block; Dhamlawas, Khaleta, Nandha, Pali, and Padla villages of the Khal block; and Badia Kamlpur, Khushpura, Jatusana, Palhawas, and Nagal Pathani villages of the Jatusana block are the twenty-five villages that were chosen. The thematic maps have been prepared by using ArcGIS software.

RESULT AND DISCUSSION

Table 1 displays the quantity of land that is under cultivation in each village as a percentage of the entire land area. The previously given data sheds light on how common agricultural activities are in each of these communities and can provide important insights into how dependent these people are on agriculture for their economic sustenance. The villages of Gudiani, Bodia Kamalpur, Lula Hir, Lilodh, Palhawas, Khushpura, Bawwa, and Kathuwas are included in the group with a high percentage of cultivated land (above 85 percent). In these localities, cropping occupies more than 85% of the total land area, suggesting that a significant portion of the land is dedicated to agriculture. This suggests a strong focus on agriculture and most likely indicates that farming activities make up a sizeable portion of the local economy. The intermediate cultivated land % group includes villages like Khijuri, Rughnathpur, Nangal Pathani, Kaunsiwas, Mundhalia, Banipur, Dhamlawas, and Akbarpur (between 80 and 85 percent). These villages show a notable but slightly more balanced approach to land usage for agriculture, with between 80 and 85 percent of their land devoted for crops.

Villages like Jatusana, Nahar, Nandha, Pali, Tankri, Bhudpur, and Khaleta have a low cropped land percentage below 80%, indicating less economic impact from agriculture. Table 1 shows irrigated areas in villages like Chillar, Bodia Kamalpur, Lula Hir, Lilodh, Palhawas, Khushpura, Bawwa, and Kathuwas, with over 85% of agricultural land being irrigated. The majority of villages in these regions rely on artificial watering methods for crop cultivation, indicating robust water availability for agriculture, with a moderate irrigated area percentage between 75% and 85%.

Irrigation is crucial for agriculture, but is maintained moderately in villages with less than 80% of agricultural land under irrigation, suggesting less widespread practices and potential scarcity of water resources (Table 1). In India, the percentage of unirrigated land in villages varies. For the purpose of growing crops, high unirrigated regions like Padla, Nandha, Tankri, and Rughnathpur mostly rely on rainfall. Pali, Gudiani, and Banipur are examples of moderately unirrigated areas that maintain a balanced approach between irrigation and natural precipitation. Villages like Mundhalia, Bodia Kamalpur, and Chillar, which have no unirrigated regions, depend on irrigation.

Table 1 reveals Rewari block's significant agricultural reliance, with 81.79 percent of the area classified as cultivated, highlighting the significant impact of farming operations on the local economy and way of life.

Table 1: Pattern of Agricultural Land of Sampled Villages in Rewari District, 2023

Sr. No	Sampled Village	Cropped Land (In %)	Irrigated Area (In %)	Unirrigated Area (In %)
1.	Akbarpur	82.35	82.35	0.00
2.	Banipur	82.67	74.26	8.42
3.	Bawwa	86.72	86.72	0.00
4.	Bhudpur	65.90	65.90	0.00
5.	Bodia Kamalpur	87.62	87.62	0.00
6.	Chillar	92.81	92.81	0.00
7.	Dhamlawas	82.66	82.66	0.00
8.	Gudiani	88.61	77.31	11.30
9.	Jatusana	79.58	79.58	0.00
10.	Kathuwas	85.94	85.94	0.00
11.	Kaunsiwas	84.04	84.04	0.00
12.	Khaleta	64.42	64.42	0.00
13.	Khijuri	84.91	84.91	0.00
14.	Khushpura	86.94	86.94	0.00
15.	Lilodh	87.33	87.33	0.00
16.	Lula Hir	87.48	87.48	0.00
17.	Mundhalia	83.85	83.85	0.00
18.	Nahar	76.97	76.97	0.00
19.	Nandha	76.18	24.73	51.45
20.	Nangal Pathani	84.16	84.16	0.00
21.	Padla	81.66	19.23	62.43
22.	Palhawas	87.18	87.18	0.00
23.	Pali	68.70	48.42	20.28
24.	Rughnathpur	84.85	42.42	42.42
25.	Tankri	67.45	22.89	44.56
Total		81.64	72.00	9.64

Source: Field Survey, 2023

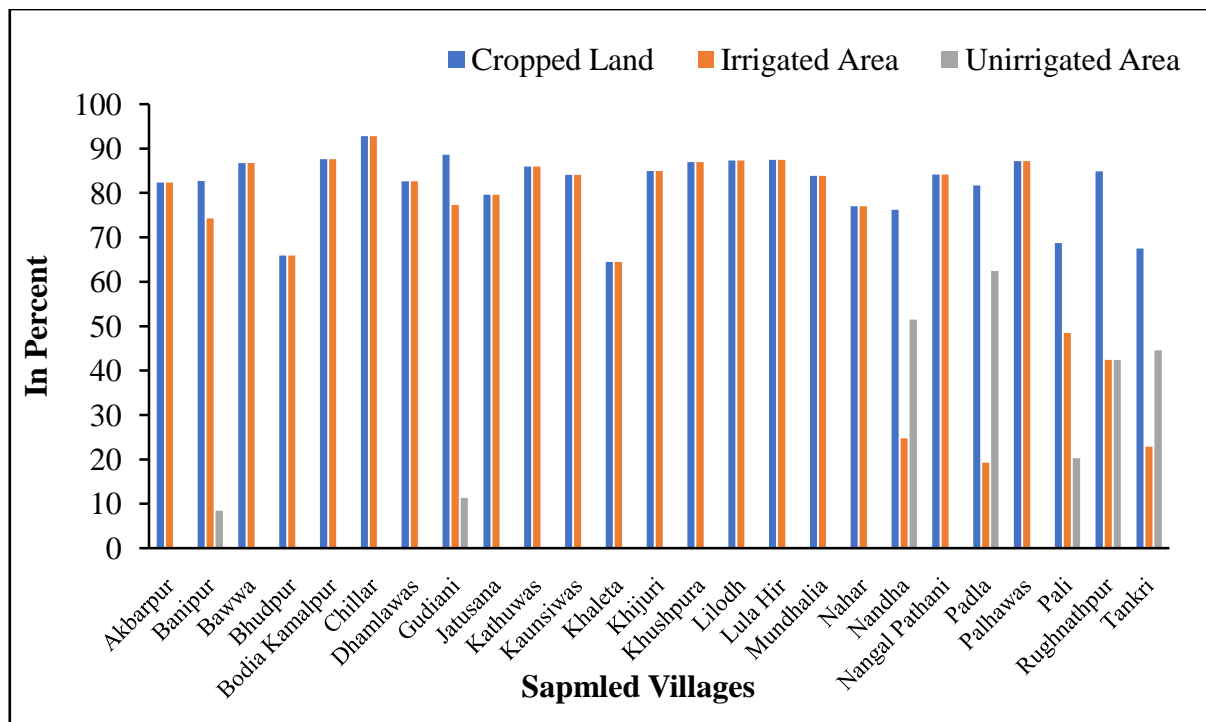


Figure 1: Pattern of Agricultural Land of Sampled Villages in Rewari District, 2023
Source: Based on table 1

The high agricultural practices in Rewari block and Jatusana and Nahar blocks, with 85.1% and 85.42% of cropped land respectively, highlight the importance of agriculture in influencing the landscape and contributing to the district's agricultural output. Khol and Bawal blocks in Rewari district have a significant agricultural commitment, with 74.72% and 81.16% of cropped land respectively. This highlights the district's agricultural orientation and its socio-economic fabric, allowing policymakers to develop sustainable development strategies and address specific community needs.

Table 2 shows that Rewari district has a significant irrigation infrastructure, with 81.79% of agricultural land benefiting from it. This ensures consistent crop yields and supports the local farming community, demonstrating the district's commitment to sustainable practices and food security. Jatusana block has the highest irrigated area, with 85.1%, indicating robust irrigation practices and infrastructure. Nahar block also shows a significant irrigated area, 83.16%, highlighting the importance of water availability for agricultural sustainability.

Khol and Bawal blocks have significant irrigation areas, with Khol's 47.89% and 62.08% respectively, indicating significant investment in irrigation infrastructure and crop cultivation. With a district-wide prevalence of irrigated lands of 72%, the aggregate percentage for Rewari district offers a thorough picture and highlights the overall importance of irrigation in promoting agricultural production and livelihoods throughout the whole district.

Table 2: Pattern of Agricultural Land in Rewari District by Blocks, 2023

Sr. No	Sampled Village	Cropped Land (In %)	Irrigated Area (In %)	Unirrigated Area (In %)
1.	Rewari	81.79	81.79	0.00
2.	Jatusana	85.10	85.10	0.00
3.	Nahar	85.42	83.16	2.26
4.	Khol	74.72	47.89	26.83
5.	Bawal	81.16	62.08	19.08
Rewari District		81.64	72.00	9.63

Source: Field Survey, 2023

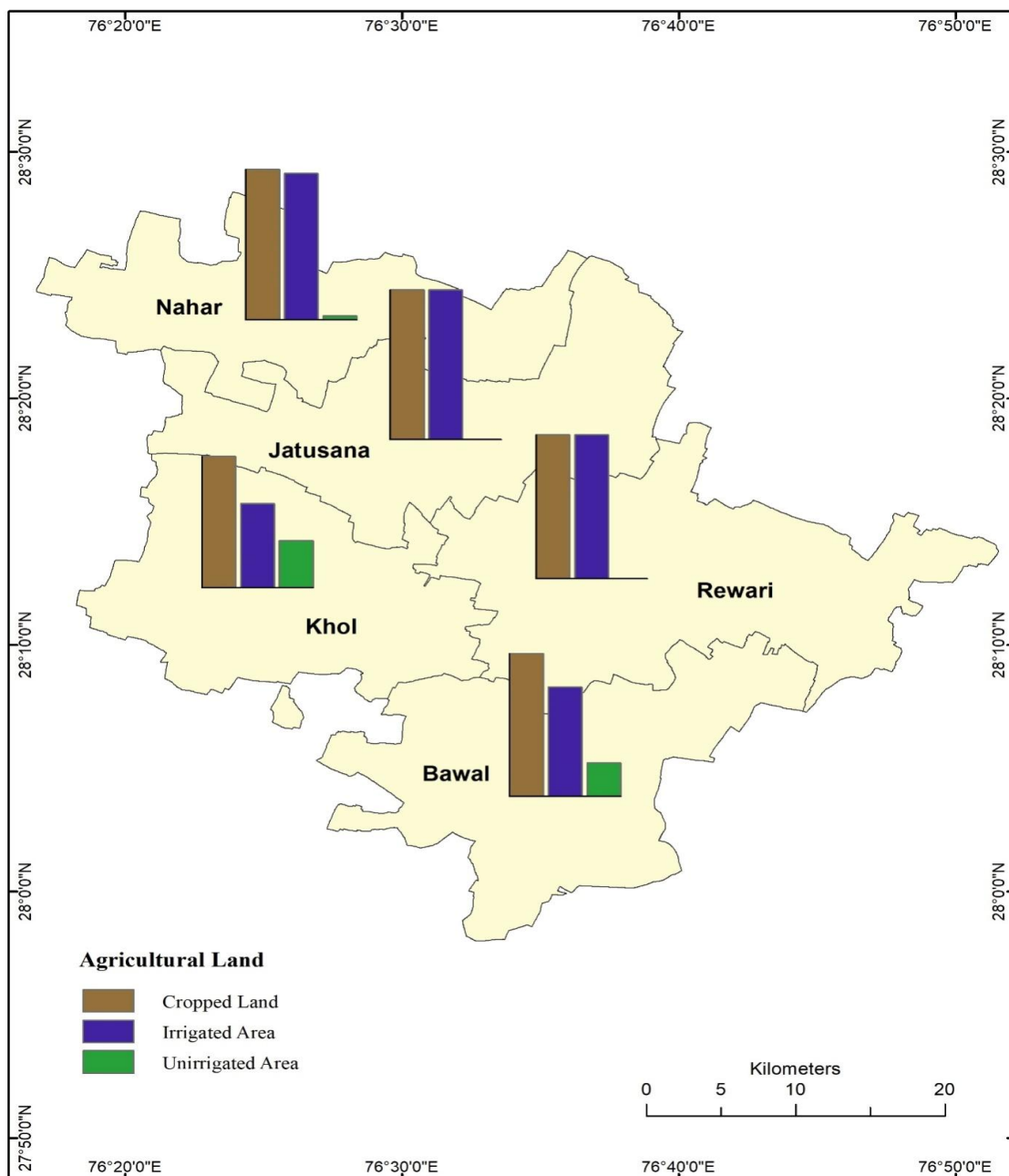
The figures about the percentage of unirrigated land in different blocks within Rewari district provide a comprehensive understanding of the approaches to water management and the challenges in agriculture faced by different

communities. Surprisingly, all of the agricultural land in the Rewari and Jatusana blocks has zero percent unirrigated regions, indicating a thorough and efficient irrigation infrastructure. The Nahar district is committed to ensuring reliable water supply for agriculture, contributing to sustained crop cultivation and potentially boosting productivity. However, 2.26% of land is unirrigated, highlighting a local challenge that policymakers can address (Table 2).

On the other hand, the percentage of unirrigated land in the Khol and Bawal blocks is higher, at 19.08 percent and 26.83 percent, respectively. These higher percentages suggest problems with reliable access to irrigation or a heavy reliance on rainfed agriculture in these blocks. Policymakers might take into account specialised projects to enhance water infrastructure in these regions, encouraging resilient farming methods and sustainable agricultural practises in the face of fluctuating water supplies (Map 1).

Rewari district's aggregate percentage, which is the average of all blocks combined, is 9.63 percent. This district-wide statistic highlights the significance of ongoing efforts to improve water availability and irrigation techniques throughout the district by offering a broad picture of the proportion of unirrigated regions. Using this data, policymakers may better plan and distribute resources, giving priority to interventions in blocks with larger proportions of unirrigated land in order to increase the district of Rewari's overall production and agricultural resilience.

Map 1: Pattern of Agricultural Land in Rewari District by Blocks, 2023



Source: Prepared by Research Scholar with the help of Arc-GIS

Table 3 lists the proportion of irrigated land in each hamlet, with wells or tube wells serving as the main supply of water. In the high irrigated area from wells/tube wells (100 percent) category are villages like Banipur, Bhudpur, Bodia Kamalpur, Chillar, Kaunsiwas, Khaleta, Lula Hir, Nandha, Padla, Pali, and Rughnathpur. These communities demonstrate a complete reliance on groundwater supplies for irrigation, with wells or tube wells providing water to every agricultural area. The second group consists of villages like Dhamlawas, Akbarpur, Khushpura, Nahar, Tankri, Bawwa, Khijuri, Gudiani, Mundhalia, Kathuwas, Nangal Pathani, and the average value.

In these settlements, wells or tube wells irrigate just a very small percentage of the agricultural land (between 99 and 99.89 percent); the bulk gets its water from other sources. The third category includes villages like Palhawas, Lilodh, and Jatusana, where less than 99 percent of the land is irrigated by wells or tube wells. These towns might employ more water sources or irrigation strategies to satisfy their increased agricultural demands. Jatusana and Lilodh are notable for having a notable proportion of their agricultural area irrigated by canals, at 40.07 percent and 12.47 percent, respectively. It is clear that these villages' agricultural needs are met by canal irrigation. A significant portion of their agricultural land—between 1.04 and 1.48 percent—is irrigated by canals; this includes the average value of 2.51 percent, Mundhalia, Gudiani, Bawwa, and Nahar, as well as Palhawas (8.26 percent). There are extremely few, if any, communities that rely only on canal irrigation (Table 3).

This includes areas like Banipur, Bhudpur, Bodia Kamalpur, Chillar, Kaunsiwas, Khaleta, Lula Hir, Nandha, Padla, Pali, Rughnathpur, Dhamlawas, Akbarpur, Khushpura, Tankri, Khijuri, Kathuwas, and Nangal Pathani where canal irrigation is either not reported or has very little effect on agricultural practises. Table 3.9 illustrates how much these tested villages, such as Nangal Pathani (2.56 percent), Kathuwas (2.51 percent), Khijuri (1.23 percent), Tankri (0.78 percent), Khushpura (0.43 percent), and Akbarpur, rely on these alternative irrigation approaches (0.32 percent). Drift and sprinkler irrigation methods are not used in any of the remaining villages, which include Jatusana, Lilodh, Palhawas, Mundhalia, Gudiani, Bawwa, Nahar, Banipur, Bhudpur, Bodia Kamalpur, Chillar, Kaunsiwas, Khaleta, Lula Hir, Nandha, Padla, Pali, and Rughnathpur. Rewari is a region that relies significantly on irrigation through wells or tube wells, accounting for an amazing 99.64 percent of the irrigated land. With 89.74 percent, Jatusana trails closely behind, suggesting a notable but marginally reduced reliance on wells for irrigation. With high percentages of 96.89 percent and 99.98 percent, respectively, Nahar and Khol likewise appear to be regions where wells are often used.

Table 3: Distribution of Irrigated Area of Sampled Villages in Rewari District, 2023

Sr. No.	Sampled Villages	Irrigated Area Wells/Tube Wells (In %)	Irrigated Area by Canals (In %)	Drift irrigation / Sprinkled irrigation/other
1.	Akbarpur	99.68	0.00	0.32
2.	Banipur	100	0.00	0.00
3.	Bawwa	98.96	1.04	0.00
4.	Bhudpur	100	0.00	0.00
5.	Bodia Kamalpur	100	0.00	0.00
6.	Chillar	100	0.00	0.00
7.	Dhamlawas	99.89	0.00	0.11
8.	Gudiani	98.73	1.27	0.00
9.	Jatusana	59.93	40.07	0.00
10.	Kathuwas	97.49	0.00	2.51
11.	Kaunsiwas	100	0.00	0.00
12.	Khaleta	100	0.00	0.00
13.	Khijuri	98.77	0.00	1.23
14.	Khushpura	99.57	0.00	0.43

15.	Lilodh	87.53	12.47	0.00
16.	Lula Hir	100	0.00	0.00
17.	Mundhalia	98.52	1.48	0.00
18.	Nahar	99.22	0.78	0.00
19.	Nandha	100	0.00	0.00
20.	Nangal Pathani	97.44	0.00	2.56
21.	Padla	100	0.00	0.00
22.	Palhawas	91.74	8.26	0.00
23.	Pali	100	0.00	0.00
24.	Rughnathpur	100	0.00	0.00
25.	Tankri	99.22	0.00	0.78
Total		97.07	2.61	0.32

Source: Field Survey, 2023

Bawal, which has 99.1% of its land irrigated by tube or well wells, follows the general pattern in the Rewari district. When taken as a whole, these data highlight the vital role that wells and tube wells play in maintaining agricultural operations in these areas.

The significance of sound irrigation techniques in the Rewari district is emphasised in Table 4. These high percentages imply that a large portion of the water needed for crops in the area is supplied via wells and tube wells. The numbers for every individual region in the district offer a detailed picture of how irrigation techniques are distributed. Planning for agriculture, managing water resources, and building infrastructure in the area may all benefit from these insights. Rewari districts as a whole continue to rely heavily on wells or tube wells; notably, 97.07 percent of the irrigated land is supplied by this technique.

Regarding canal irrigation, the data indicates that various blocks in the Rewari district rely on this water supply to differing degrees. In Rewari, the proportion of irrigated land supplied by canals is quite low, at 0.3 percent. Conversely, Jatusana has a markedly greater reliance on canals, as seen by the fact that 9.67 percent of its irrigated land is supplied by this water source. With 3.11 percent, Nahar comes in second, suggesting a considerable reliance on canal irrigation. The data shows that various blocks in the Rewari district rely on this water supply to differing degrees when it comes to canal irrigation. Only 0.3 percent of the irrigated area in Rewari is supplied by canals, which is a comparatively low amount. Jatusana, on the other hand, has a noticeably greater reliance on canals; 9.67 percent of its irrigated area gets its water from these sources. Nahar comes in second with 3.11 percent, suggesting a moderate reliance on irrigation via canals.

The differences in the percentages show how different the irrigation techniques are in the Rewari district. One neighbourhood that sticks out is Jatusana, which relies heavily on canal irrigation and would profit from water distribution infrastructure. Rewari and Khol appear to rely mostly on alternative water sources, such wells or tube wells, based on the lower percentages. Bawal probably uses other techniques to satisfy its agricultural water demands because there is no mention of canal irrigation there. For sustainable agriculture, resource allocation, and regional planning, it is essential to comprehend the distribution of irrigation sources.

Table 4: Distribution of Irrigated Area in Rewari District by Blocks, 2023

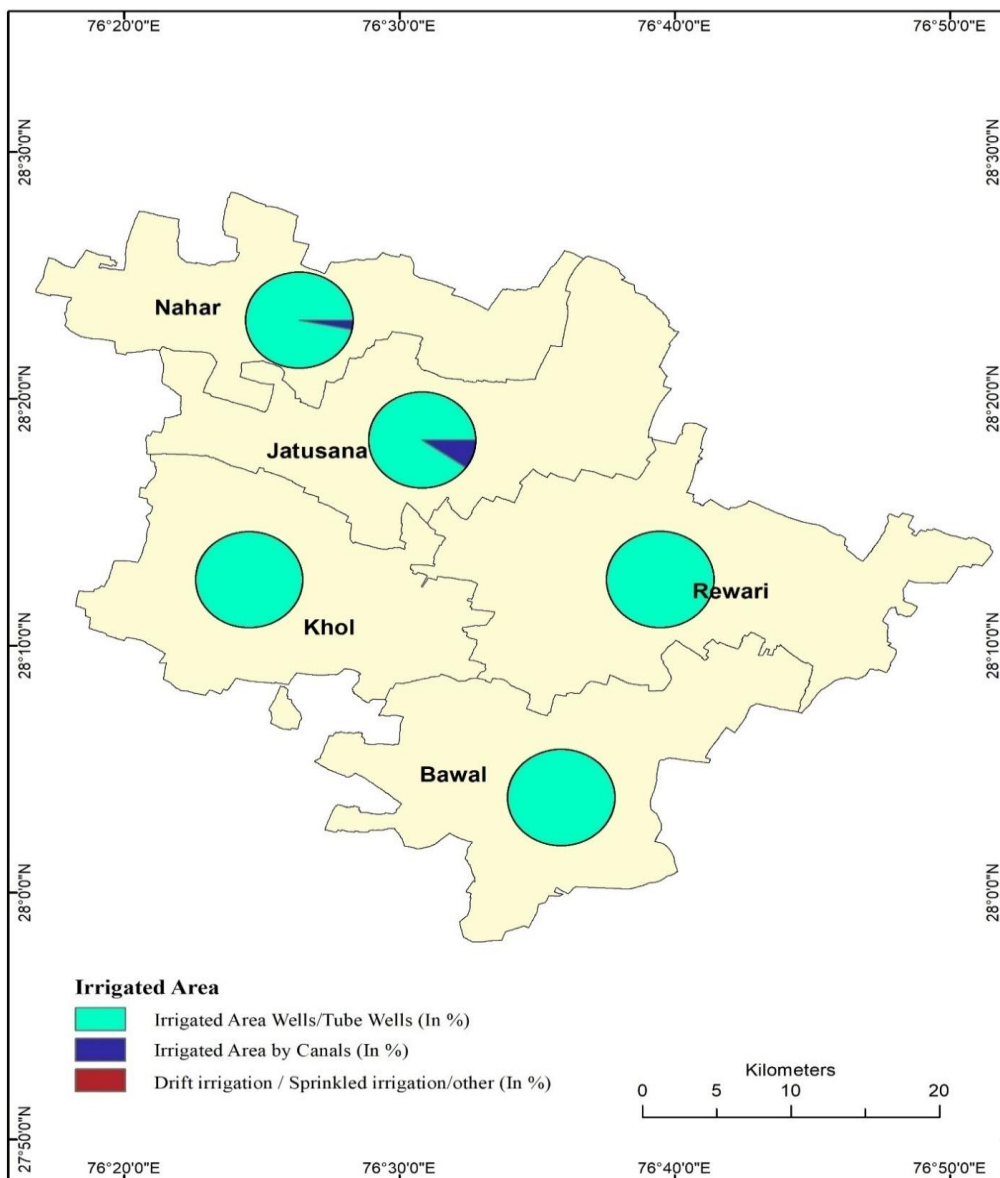
Sr. No.	Sampled Villages	Irrigated Area Wells/Tube Wells (In %)	Irrigated Area by Canals (In %)	Drift irrigation / Sprinkled irrigation/other (In %)
1.	Rewari	99.64	0.30	0.06
2.	Jatusana	89.74	9.67	0.60

3.	Nahar	96.89	3.11	0.00
4.	Khol	99.98	0.00	0.02
5.	Bawal	99.10	0.00	0.90
Rewari Districts		97.07	2.61	0.32

Source: Field Survey, 2023

Rewari, with only 0.06% of its irrigated area using drift irrigation, sprinkled irrigation, or other methods, indicates a minimal adoption of these modern irrigation techniques. Jatusana likewise has a low number, 0.6 percent, indicating that traditional practises could still be the norm in these places. There appears to be little or no usage of drift or sprinkled irrigation in this block, as Nahar does not provide the proportion of irrigated land that is watered using the designated techniques. In comparison to Rewari and Jatusana, Khol and Bawal show a little higher adoption of these contemporary irrigation systems, at 0.02 percent and 0.9 percent, respectively. The average percentage of Rewari districts that is watered using sprinkled irrigation, drift irrigation, or other techniques is 0.32 percent. From a district-level viewpoint, it appears that these contemporary irrigation methods generally contribute very little to the district's agricultural sector. In conclusion, the data points to a preponderance of traditional irrigation practises in the Rewari area, with a limited uptake of sprinkled irrigation, drift irrigation, and other contemporary technologies. For the purpose of resource allocation, agricultural planning, and the possible adoption of more sustainable and efficient irrigation technology, it is essential to comprehend the distribution of irrigation methods.

Map 2: Distribution of Irrigated Area in Rewari District by Blocks, 2023



Source: Prepared by Research Scholar with the help of Arc-GIS

CONCLUSION

The result highlights the significance of sound irrigation techniques in Rewari district, revealing high water supply through wells and tube wells, offering valuable insights for agricultural planning and infrastructure development. Rewari districts, including Bawal, heavily rely on wells or tube wells for irrigating land, with 97.07% of the irrigated land supplied by this technique. Canal irrigation in Rewari district varies, with Jatusana having a higher reliance at 9.67% and Nahar at 3.11 percent, indicating varying degrees of water supply in the region. The study reveals that canal irrigation in Rewari district is reliant on varying degrees. Jatusana and Nahar have the highest reliance, with 9.67% and 3.11 percent respectively, respectively, on canal water supply. The Rewari district's irrigation techniques vary, with Jatusana heavily reliant on canal irrigation, while Rewari and Khol mainly use alternative sources like wells or tube wells. Understanding irrigation distribution is crucial for sustainable agriculture and regional planning. Jatusana and Nahar show low usage of traditional methods, while Khol and Bawal show slightly higher utilization of modern techniques. The average irrigated area using drift, sprinkled, or other methods is 0.32% in Rewari districts. The result shows Rewari district's agriculture relies heavily on traditional methods, with limited adoption of modern techniques like drift and sprinkled irrigation, highlighting the need for informed planning and resource allocation.

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