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CHANGING SCENARIO OF AGRICULTURE IN PALI DISTRICT OF PALI: A GEOGRAPHICAL ANALYSIS

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ABSTRACT

The agriculture in Rajasthan's Pali District has a number of challenges, including limited access to loans and agricultural inputs, uneven rainfall patterns, soil erosion and degradation, low productivity, and the need for crop diversification. Effective water management, climate-resilient strategies, soil conservation measures, credit and input availability, information sharing, and skill development are all necessary components of a multidimensional approach to addressing these concerns. Realizing Pali's agricultural potential and putting sustainable solutions into practice require cooperation between farmers, legislators, scholars, and agricultural extension groups. By giving priority to these concerns and investigating the opportunities they present, Pali may modernize its agriculture sector and forge the path towards a sustainable and successful future. Compared to traditional agricultural and fodder production systems, agro forestry systems can have advantages. A land use strategy called silvipasture provides animals with year-round feed by growing fodder trees alongside pasture. Although the exact amount of the territories occupied by these systems and activities is unknown, they are substantial.

Keywords: *Agriculture, Geographical Analysis, Low Productivity, Crop Diversification. Silvipasture*.

Introduction

The majority of people in Pali are employed in the agriculture sector, which is the foundation of the state's economy. The dry and semi-arid terrain of Pali, however, presents a number of difficulties for the agricultural industry. In addition to outlining the important areas that need attention and offering strategies for sustainable agricultural growth, the purpose of this study is to provide a thorough analysis of the opportunities and problems facing agricultural condition of Pali.

Climate

The district has a generally dry climate with hot summers and cold winters; January is the coldest month and May to early June is the hottest time of year.

Hydrology

The district's terrain might be characterized as sub-mountainous, featuring undulating plains interspersed with isolated hills. The Aravalli range crosses the area in the southeast. These hills have a peak that is approximately 1,099 meters high. Generally speaking, the plain's elevation ranges from 180 to 500 meters, with an east to west slope.

Pali Town is situated at an elevation of roughly 212 meters above sea level. The district's soil composition is primarily sandy loam, with the water table typically located 15 meters below the surface. The district does not have a perennial river. The district is home to the Sukri, Lilri, Bandi, and Jawai tributaries of the River Luni. In addition, the territory is traversed by several more seasonal streams and rivulets.

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Temperature and Potential Evapo Transpiration

The greatest and most fundamental element of the hydrologic cycle is evapo-transpiration (ET). The Pali district experiences semi-arid weather.

District Water Profile

Approximately 13.967% of the total land area, or 1233079 hectares, is irrigated. Wells are the primary source of irrigation, accounting for 75% of the total irrigated area. The district also has tubewells, tanks, and ponds. The area is home to 92 dams, some of which form reservoirs that are used for drinking water, flood control, and irrigation. The primary supply of drinking water during the summer is the Jawai Dam, the biggest dam in Western Rajasthan.

Pali District's Rivers

The district does not have a perennial river. The district is home to the Sukri, Lilri, Bandi, and Jawai tributaries of the River Luni. In addition, the territory is traversed by several more seasonal streams and rivulets. The district lacks a lake and a natural spring. Numerous large and small tanks have been built for irrigation.

The largest of these is the Jawai dam in Bali tehsil, while Walar is the smallest tank. In addition to these tanks, the district has five dams. These are the dams in Jawai Raipur Luni, Hemawas, Kharda, and Biratiya Khurd, which are mostly utilized for irrigation.

Production and Productivity

The three agricultural seasons in Pali District are Summer, Rabi, and Kharif. The main crops sown during the Kharif season include maize, beans, guar, bajra, and pulses. Major crops sown during Rabi Season include oilseeds, grains, wheat, barley, and pulses. The overall production for the 2014–15 year was 2,16,700 Qtl. under Rainfed area in Rabi season and 26,24,417 Qtl. under Rainfed area in Kharif season. The yield, or productivity, was 499 kg/ha during the Kharif season and 908 kg/ha during the Rabi season.

Trends in Water Level

The water level has marginally increased in Rohat, Pali, Bali, and Sumerpur throughout the previous decades. This rise has occurred between 0 and 5 meters. Within the range of 0 to –5 meters, there is a minor decrease in the water level in certain areas of the Pali, Sojat, and Jaitaran blocks. The majority of the region is between 10 and 20 meters below sea level. Shallow water levels are less than ten meters in several areas of the eastern peripheral foothill zone, as well as the Rohat and Pali blocks.

Water Limited Availability

One of the region's greatest challenges with agriculture is a lack of water. Due to its dry climate and scarcity of surface water, the state is mostly dependent on groundwater for agriculture. But unsustainable groundwater exploitation has resulted in falling water tables and an impending catastrophe. Crop productivity and farmers' livelihoods are directly impacted by the accessibility of irrigation water. Water scarcity must be addressed, and this requires the implementation of effective water management techniques. Promoting micro-irrigation methods, such as sprinkler and drip systems, can help cut down on water waste and increase water efficiency.

To improve water distribution and storage, check dams, canal networks, and rainwater harvesting structures should be built. Moreover, adopting drought-tolerant crop development and water-efficient cropping practices might help lessen the negative effects of water scarcity on agriculture.

Quality of Ground Water

The semi-arid environment and geological diversity of the Pali district have a considerable impact on the quality of the ground water; salinity, sodicity, and fluoride are the main elements impacting the ground water quality.

Crop Water Requirement

In the Pali district, the main crops planted in the winter are wheat, barley, rapeseed, and gram; in the summer and during the rainy season, the crops are pulses, oil seeds, and millets. The amount of water necessary for crop growth was calculated taking into account evapo-transpiration, or the total amount of water needed by a plant to grow, including evaporation losses from the soil, the water needed for the plant's stem to grow, and leaf evaporation. The water needed by the main crops is displayed in the table below:

Water Requirement in Pali District

S. No.	Crop to Grown	Season	Crop water Requirement (mm)
1	Wheat	Winter	550
2	Barley	Winter	103
3	Rapeseed	Winter	320
4	Gram	Winter	250
6	Maize	Summer & rainy season	650

Source: Department of Agriculture, Govt. of Rajasthan Revised District Irrigation Plan (DIP) for Pali District

Water used Overall for Irrigation

Surface Water

There are twenty-four (28) minor irrigation dams, four (15) medium irrigation dams, and three (3) major irrigation dams in the Pali district. The annual total available surface water is 461.922 MCM.

Ground Water

The district's net annual ground water availability has been estimated to be 296.305 MCM, while the district's total annually replenishable resource has been evaluated at 328.593 MCM. The anticipated gross annual ground water draw for all purposes is 341.8393 MCM, with a ground water development stage of 115.37%.

Uncertain Rainfall Variations

There are both temporal and spatial variability in the rainfall patterns that Pali encounters. Frequent occurrences of droughts, irregular monsoons, and erratic rainfall events result in crop failures and decreased agricultural productivity. The cropping calendar is upset by erratic rainfall patterns, which makes crop management and planning difficult.

Farmers require access to technologies and techniques for climate-resilient farming in order to lessen the difficulties caused by unpredictable rainfall. This covers the application of better seed treatment methods, drought-tolerant agricultural varieties, and early warning technologies for meteorological forecasts. During times of high rainfall, rainwater harvesting techniques-like farm ponds and small-scale water storage structures-can assist collect and use rainwater efficiently. Furthermore, encouraging intercropping and crop diversification might help disperse the hazards brought on by erratic rainfall and improve resilience overall.

Soil Attrition and Degradation

The region's agriculture faces serious obstacles as a result of soil erosion and degradation. The state's semi-arid and desert areas are vulnerable to wind erosion, which lowers soil fertility and causes topsoil loss. The issue is made worse by insufficient soil conservation measures, which lower crop output. Combating soil erosion and deterioration requires the implementation of soil conservation strategies. Strong winds can cause soil erosion. Methods like contour plowing, terracing, and bunding assist stop it. Further preventing soil erosion can be achieved through windbreak construction and reforestation. Furthermore, encouraging organic agricultural methods can enhance soil fertility and health. These methods include the use of compost and organic manure. More improvements to soil moisture retention and nutrient availability can be achieved by using suitable soil management practices, such as conservation tillage and cover crops.

Limited Access to Credit and Agricultural Inputs

Access to credit and agricultural inputs remains a significant challenge for farmers in Pali, particularly small and marginal farmers. Limited financial resources and inadequate institutional support hinder the adoption of modern agricultural practices and technologies. Efforts should be made to strengthen rural credit systems and provide timely and affordable credit facilities to farmers. This can be achieved through the establishment of cooperative credit societies, setting up agricultural development banks, and streamlining loan disbursal processes.

Furthermore, ensuring the availability and accessibility of quality agricultural inputs such as seeds, fertilizers, and pesticides is crucial. More improvements to soil moisture retention and nutrient availability can be achieved by using suitable soil management practices, such as conservation tillage and cover crops.

Lack of Production and Crop Diversity

Lower agricultural yields are a result of both the severe weather and the scarcity of irrigation facilities. The tendency to too depend on conventional crops like pulses, wheat, and barley limits the scope for value addition and diversification.

The implementation of contemporary farming practices and technologies is crucial for enhancing output. This covers the application of integrated nutrient management strategies, precision farming methods, and high-yielding crop types. Improving agricultural irrigation systems, like building farm ponds and canals, can make more water available for farming.

Research and development activities should concentrate on choosing high-value crops, horticulture, and agro forestry systems that are appropriate for Pali's climate in order to encourage agricultural diversity. Creating agro-processing enterprises and creating market connections might encourage farmers to choose a wider variety of crops and add value to their produce.

Lack of Information and Technical Skills

The agricultural sector in Pali has several key issues, including low levels of technical skills among farmers, poor training, and limited access to information. A large number of farmers lack knowledge about current government initiatives, market trends, and farming techniques. Improving agricultural extension services is essential to educating farmers and providing them with information. This entails setting up functional agricultural extension facilities, assigning skilled extension officers, and planning training courses and seminars with farmers as the focal point.

Working together with NGOs, research centers, and agricultural universities can aid in the creation and dissemination of best practices and agricultural knowledge tailored to particular contexts. Farmers can gain practical knowledge about contemporary agricultural techniques by participating in farmer field courses and demonstration plots.

MGNREGA Convergence

The Pali region is rapidly becoming more urbanized, which is opening up many job opportunities for laborers at very high daily wages. Because of this, the district's workforce is moving to cities in search of higher wages. Since the majority of the proposed works are in the catchment region of seasonal rivers, nallahs, etc., they must be finished under PMKSY under a time-bound timetable, i.e., before the official start of the monsoon season each year. It is necessary to bring in laborers from outside the Panchayat Samiti region to complete these works. Both machinery and skilled labor are needed for these tasks to be completed. These are not just labor-intensive projects.

However, it has been suggested that field bunding-a labor-intensive process that requires input from farmers who get benefits-be integrated with MGNREGA as part of the PMKSY (Pradhan Mantri Krishi Sinchayee Yojana) (Watershed Programme). Water harvesting, infrastructure provision for irrigation, and repair work on all 10 blocks of Pali district can be combined under PMKSY and MGNREGA. The entire project is expected to cost Rs. 107180.896 Lakh.

Pali District's Blocks

There were nine blocks in the district in 2011 when the census was conducted. One additional block, called Rani, was cut out of the Pali block in 2013. There are now ten blocks as follows: The district's chief executive for matters of law and order, revenue, and administration is the district collector. In addition, he serves as the district magistrate. There are ten subdivisions in the District Pali. A Subdivisional Officer (SDO) or Magistrate oversees each of the subdivisions, and their job is to enforce law and order policies in their particular areas. In the Pali district, there are ten blocks, and every block has a Tehsildar, an administrative official who serves rural farmers and landowners in line with the Land Record System and is in charge of overseeing revenue-related affairs in their individual Tehsils.

The district is divided into 10 Panchayat Samitis (Blocks) for the purpose of implementing rural development projects and schemes under the Panchayati Raj System. The Block Development Officer, also known as the Vikas Adhikari, is the Panchayat Samiti's controlling officer and acts as an extension and developmental executive at the block level. Pali District covers 12387 square kilometers. The district is located between latitudes 24° 45' and 26° 29' north and longitudes 72° 47' and 74° 18' east. Pali district is connected to Ajmer, Rajsamand, Udaipur, and Sirohi districts by the Great Aravali hills. Pali district is traversed by the well-known river Luna in Western Rajasthan, as well as its tributaries Jawai, Mithadi, Sukadi, Bandi, and Guhiabala. The Pali district is also home to the largest dams in this region, Jawai Dam and Sardar Samand Dam.

There are 1030 villages, 10 Blocks in Pali district. Pali district has a total rural population (2011) of 15,89,493 out of which the male population (Rural) 7,87,559, Female Population (Rural) 8,01,934, Children Population (Rural) 2,45,433, Population ST (Rural) 1,29,156 Population SC (Rural) 3,26,692 Population GEN (Rural) 11,33,645 in Census Book 2011.

Conclusion

Pali's agriculture has a number of difficulties, such as limited water supplies, unpredictable rainfall patterns, soil erosion and degradation, restricted access to loans and agricultural inputs, low productivity, and the requirement for crop diversification. A multifaceted approach is needed to address these issues, including effective water management, climate-resilient techniques, soil conservation measures, credit and input accessibility, information dissemination, and skill development. To fully realize the potential of Pali agriculture and implement sustainable solutions, cooperation between farmers, policymakers, researchers, and agricultural extension organizations is essential. Pali can modernize its agriculture industry and provide the foundation for a resilient and prosperous future by giving priority to these difficulties and seizing the opportunities they present.

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