

Agricultural Sustainability in Madhya Pradesh: A Policy-Based Analysis of Issues and Challenges

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ABSTRACT

Sustainable agriculture has emerged as a critical concern in India due to increasing pressure on natural resources, climate variability, and socio-economic challenges faced by farmers. Madhya Pradesh, one of India's leading agricultural states, presents a significant case for examining sustainability due to its extensive cultivated area, expanding irrigation network, and policy-driven agricultural growth. This paper aims to assess agricultural sustainability in Madhya Pradesh through a policy-oriented analysis using secondary data.

The study critically examines major agricultural and environmental policies influencing sustainability, including the Minimum Support Price (MSP) regime, Pradhan Mantri Krishi Sinchayee Yojana (PMKSY), Soil Health Card Scheme, and state-level initiatives promoting natural and climate-resilient farming. Secondary data have been sourced from government publications, state economic surveys, agricultural census reports, and groundwater assessment studies. Key sustainability issues such as groundwater depletion, soil degradation, cropping pattern imbalance, and climate stress are analyzed in relation to policy interventions.

The findings reveal that while policy measures have contributed to increased agricultural productivity and irrigation expansion, sustainability concerns remain inadequately addressed. Excessive dependence on water-intensive crops, uneven regional development, and weak implementation mechanisms limit the effectiveness of existing policies. The paper highlights critical gaps between policy intent and ground-level outcomes, particularly in managing natural resources and promoting environmentally sustainable practices. The study concludes by emphasizing the need for region-specific, resource-sensitive policy frameworks that integrate environmental sustainability with agricultural development. The findings contribute to policy discourse by providing a

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geographically grounded assessment of agricultural sustainability in Madhya Pradesh and offer insights relevant for other agrarian states facing similar challenges.

Keywords: Agriculture, Government policies, Sustainable, Climate, MSP.

1. Introduction

The imperative for agricultural sustainability has gained global prominence, underscored by international commitments such as the United Nations Sustainable Development Goals, particularly Goal 2: Zero Hunger, which seeks to ensure food security and promote responsible agricultural practices (Chauhan & Wehrden, 2025). This overarching objective highlights the necessity of agricultural systems that are efficient, environmentally sound, and economically viable over the long term (Chauhan & Wehrden, 2025; Hiywotu, 2025).

In this context, sustainable agriculture has emerged as a crucial solution in the global discourse surrounding climate change and food security, aiming to balance productivity with ecological stewardship (Chauhan & Wehrden, 2025). It seeks to achieve long-term food production while simultaneously preserving environmental health and biodiversity (Lad et al., 2025). The historical focus on maximizing agricultural output, particularly during periods like the Green Revolution, often led to unintended negative consequences such as soil degradation, water pollution, and biodiversity loss, necessitating a re-evaluation of policy frameworks to integrate environmental considerations (Jha et al., 2024). These ramifications highlight the pressing need for comprehensive policy interventions that foster sustainable agricultural practices, particularly in regions facing acute environmental and socio-economic vulnerabilities (Goyal et al., 2024). India, as a prominent agrarian economy supporting a vast population, exemplifies the intricate challenges and opportunities in transitioning towards sustainable agriculture, making it a critical case study for policy analysis (Chauhan & Wehrden, 2025). Its role as a major food producer for a significant portion of the global population underscores the importance of examining its agricultural sector through the lens of sustainability and climate adaptation (Chauhan & Wehrden, 2025). This analysis delves into the specific challenges and policy landscapes within Madhya Pradesh, a state pivotal to India's agricultural output, examining how existing frameworks address issues such as erratic rainfall, soil degradation, and the need for climate-smart interventions (Nema & Singh, 2025). This examination is particularly pertinent given the disproportionate impact of climate change on smallholder farmers who comprise a significant portion of the agricultural landscape in Madhya Pradesh (Rao & Sharma, 2025).

2. Study Area

Madhya Pradesh, the second largest state in geographical area in the country has 49% of the total available land under cultivable area and out of which only 20% cultivable area comes under irrigated area. About 72 per cent population lives in rural areas and dependent on agriculture for their livelihood. The state has 35 per cent of the population under SC (15.6 per cent*) and ST (21.1 per cent*) categories who undertake low input sustenance farming and do mostly rainfed agriculture with production and incomes. Low holding stakes and are unable to take proper agricultural production due to various reasons. The average size of holdings is very low in the state 1.55 Hectare, with 48.3 percent marginal farmers and 27.15 per cent small farmers (<http://agcensus.dacnet.nic.in/>). The state has diverse agro-climatic conditions and soil profiles and is divided in to 11 agro-climatic zones. Madhya Pradesh ranked 1st in the production of Soybean, Bengal Gram, Black gram (Urd), Red gram (Tur) and 2nd in the production of Maize, Sesame, Niger, Green gram (Moong) and 3rd in the production of Wheat, Sorghum, and Barley. The major kharif crops are Soybean, Paddy, Maize and in Rabi season, wheat, gram, peas, lentils, mustard, sugarcane and linseed are sown in abundance. In recent years, there has been a gradual shift in the cropping pattern towards cash crop cultivation like cotton and soybean. (GOVINDRAJ, 2017).

Table No. 01: Major Crops

Sr. No.	Category	Major Crops
1	Food Grains	Paddy, Wheat, Maize and Sorghum
2	Pulses	Gram, Green gram, Red Gram, Lentil, Black Gram
3	Oilseeds	Soybean, Rapeseed, Mustard and Linseed.
4	Vegetables	Potato, Tomato, Onion, Green Pea, Cauliflower, Lady Finger,

3. Objectives

1. To analyze the government policies that contributes in promoting sustainable agriculture development.
2. To identify the barriers in the implementation of these policies.

4. Research question

1. What are the policies of government that promote sustainable agricultural growth in Madhya Pradesh?
2. What are the certain reasons for the failure of policies in achieving sustainable development goal?

5. Methodology

The methodology for this research involves a qualitative policy analysis using secondary data. First, policy documents, reports from the government of Madhya Pradesh, research studies, and statistical data will be collected. Selection criteria include policies specifically aimed at agricultural sustainability, resilience, and resource management. A thematic content analysis will categorize policies into environmental, social, and economic dimensions. Predefined indicators such as crop yield stability, soil health, water efficiency, farmer income, and biodiversity will be used to assess outcomes. The analysis will compare intended policy goals with observed outcomes, identifying gaps or successes. Limitations include reliance on available documents and potential reporting bias. By linking policies to these indicators, the research will evaluate their effectiveness in promoting sustainable agricultural growth.

6. Discussion

6.1 Government Policies And Sustainable Agriculture: Government policies plays a critical role in promoting sustainable agricultueal practice by providing financial incentives, technical support and creating regulatory frameworks that encourage the adoption of environmentally friendly practices. In Madhyapradesh, several key policies have been instrumental in shaping the agricultural landscape (sharma, 2014)

6.1.1 Rashtriya Krishi Vikas Yojana: Rashtriya Krishi Vikas Yojana (RKVY) is a central government scheme launched in 2006-07 to incentivize states to invest more in agriculture. It focuses on holistic development, boosting farmers' income, and enhancing productivity. It also gave liberty to state to use the available funds as and where required under two category: firstly Production Growth, secondly Infrastructure and Assets. During 12th plan period Government has revised the guideline of the scheme and issued new guideline in the year 2014. The states are required to submit the State Agriculture Plan and State Agriculture Infrastructure Development Plan for 12th plan period. Up to the year 2014-15 the RKVY was implemented with 100% Government of India support, but from the year 2015-16 the funding pattern has been changed to Central : State as 60% : 40%. Simultaneously as per the recommendation of 14th Finance Commission, Government of India has again changed the name of RKVY to RKVY-RAFTAAR (Rashtriya Krihi Vikas Yojna) Remunerative Approaches for Agriculture and Allied

Sector Rejuvenation) and issued a new guide line in the year 2017 effective from the financial year 2017-18 to 2019-20. (state agriculture plan report, 2019-20). To analyse the state's available resources and to prepare such a road map which can mitigate the risk of farmers with focused efforts on increasing farmer's income.

6.1.2 Soil Health Card: A Soil Health Card is used to assess the current status of soil health and, when used over time, to determine changes in soil health that are affected by land management. A Soil Health Card displays soil health indicators and associated descriptive terms. The indicators are typically based on farmers' practical experience and knowledge of local natural resources. The card lists soil health indicators that can be assessed without the aid of technical or laboratory equipment. The soil card will give the farmers a proper idea of which nutrients their soil is lacking. And hence, which crops they should invest in. They will also tell which fertilizers they need. So, ultimately, the crop yield will see a rise. In Madhyapradesh during 2022-23 target for sample collection in 183443.100% sample were collected and 168208 (92%) were tested.

6.1.3 MP Balram Talab Yojana: MP Balram Talab Yojana 2007 works to solve the water shortage that farmers face during irrigation. Under this scheme, farmers get financial help to build ponds and canals on their land. Agricultural tools are also provided to improve farming. The Agriculture Department manages this scheme and sets targets to assist as many farmers as possible at district and block levels. Farmers from economically weaker sections get up to 75% subsidy (max ₹1,00,000) for pond or canal construction. Any extra cost beyond this must be paid by the farmer. Farmers from the general category get up to 40% subsidy (max ₹80,000) for pond/canal building, with additional costs covered by themselves.

6.1.4 Soorajdhara Scheme: The Suraj Dhara scheme in Madhya Pradesh is aimed at supporting small and marginal farmers from Scheduled Caste and Scheduled Tribe communities. It provides certified seeds for pulses and oilseeds at subsidized rates. Farmers can exchange old seeds or receive seeds at up to 75 percent subsidy, and the subsidy is transferred directly to their bank accounts. The scheme covers all districts in the state and focuses on improving productivity and farmer incomes.

6.1.5 Mera Khet Meri Maati: The "Mera Khet Meri Maati" scheme is an initiative launched by the Madhya Pradesh government with the objective of empowering the state's farmers and increasing their income. Introduced under the Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA), the scheme aims to generate employment opportunities in rural areas and assist farmers in improving the fertility and productivity of their land. Key components include providing Soil Health Cards to help

farmers understand soil fertility, promoting organic farming to enhance soil quality and reduce environmental harm, encouraging micro-irrigation for better water use efficiency, promoting horticulture and fishery to diversify farmers' income, improving agricultural marketing facilities for better prices, and setting up agro-processing units to add value to produce and boost income.

6.1.6 Mukhyamantri Khet Teerth Yojana: The Madhya Pradesh state government launched the "Mukhyamantri Khet Teerth Yojana 2020" (Chief Minister Farm Pilgrimage Scheme 2020) for the welfare of farmers. Under this scheme, farmers within the state will be taken on study visits to expose them to new agricultural technologies. These visits include tours of advanced agricultural institutes, agricultural universities, model research fields, demonstrations by agricultural science centers, and farms of progressive farmers. It also covers activities identified by the Horticulture and Food Processing Department, pasture development, sericulture, animal husbandry, national experimental fields, seed corporation fields, private institutions, public enterprises, NGOs, and regional research centers. The goal is to empower farmers by acquainting them with advanced farming techniques, encouraging them to adopt better practices, and ultimately boosting productivity.

6.1.7 Madhya Pradesh Agricultural Women Participation Scheme (MAPWA) - The Government of Madhya Pradesh has implemented a targeted intervention known as the Madhya Pradesh Agricultural Women Participation Scheme (MAPWA) in 2007 to promote the economic and technological empowerment of women farmers. The scheme is designed in recognition of the substantial participation of women in the state's agricultural workforce, which is nearly equivalent to that of men. MAPWA focuses on enhancing women farmers' access to modern, low-cost agricultural technologies through structured training and capacity-building programmes. By facilitating the adoption of efficient and resource-saving farming practices, the scheme aims to improve crop productivity, reduce input costs, and increase farm-level profitability. Beyond its economic outcomes, MAPWA also contributes to strengthening women's decision-making abilities, leadership roles, and socio-economic status within rural agrarian households, thereby aligning with broader objectives of gender-inclusive and sustainable agricultural development.

6.1.8 Minor Irrigation Schemes in Madhya Pradesh - Water is essential for crop production, indeed for survival itself. Madhya Pradesh, one of the largest states in the country, suffers from inadequate availability of irrigation water, mainly because of its undulating topography, high surface runoff, and lack of surface storage facilities. Out of its total geographical area of 307.74 lakh hectares, the net sown area is only 150.74 lakh

hectares. The net irrigated area in the state by all sources is 64.18 lakh hectares, which accounts for only 42.57% of total cultivated land. The average annual rainfall in the state is 857.70 mm and as estimated 60% of rain water is wasted as run off.

Of the total irrigated area in the State, canals contribute 10.51%, well and tube wells 42.56%, other sources 9.73% and tanks a mere 1.38%. Thus despite all efforts to increase irrigated area by way of constructing big irrigation dams, so far only 10.51 lakh ha area has been brought under irrigation through dams and canals. Moreover, dams can only irrigate land in specific areas downstream of the dam by way of canal irrigation. Therefore, remote areas where no rivers flow are deprived of irrigation facilities. To remedy the situation, the State started Minor Irrigation Schemes (Tube wells) and Micro Minor Irrigation Schemes (Micro Minor Irrigation Tank (MIT) & Percolation Tanks (PT) and during 10th Five Year Plan, 128 MIT and 763 percolation tanks were constructed which brought additional 101341.28 ha under irrigation. However, the size of the State Sector Scheme in 10th Five Year Plan was Rs 6025.28 lakhs, which was too small to benefit the large number of farmers.

Research has already proved that irrigation has a vital role in enhancing crop productivity & thereby production. It is anticipated that 15-20 % increase occurs by virtue of providing irrigation. The overall status of production & productivity of major crops in Madhya Pradesh has recorded significant increase since implementation of this RKVY intervention began in 2007-08. By 2011, paddy, despite recording a marginal decrease in area cultivated by 2010-11 registered an increase in production of 33% overall with a productivity increase of 36.81% per ha. As for wheat, the area under cultivation showed an increase of 11.48%. The total increase in production was 34.29% and in productivity the increase was an impressive 20.47%. As regards pulses the area cultivated recorded an increase of 17.89%. Production grew by 27% and productivity by 7.73%. Area under oilseeds grew by 7.11%, production by 30.36% and productivity by 18.14% (chr)

6.1.9 Mukhya Mantri Kisan Kalyan Yojana - The Mukhyamantri Kisan Kalyan Yojana is a major agricultural welfare initiative of the Government of Madhya Pradesh, launched on 25 October 2023, with the primary objective of enhancing the annual income of farmers in the state. The scheme is implemented by the Department of Revenue, which serves as the nodal agency, and is also referred to as the MP Chief Minister Farmer Welfare Scheme or the Madhya Pradesh Financial Assistance Scheme for Farmers. Aligned with the objectives of the Pradhan Mantri Kisan Samman Nidhi Yojana, under which the Government of India provides annual financial assistance of ₹6,000 to farmers in three equal installments, the Madhya Pradesh government supplements this support through its own scheme. Initially, the Mukhyamantri Kisan Kalyan Yojana provided ₹4,000 per year in two installments; however, from 2023 onwards, the assistance amount was enhanced

to ₹6,000 annually, disbursed in three equal installments of ₹2,000 each. These installments are credited directly to farmers' bank accounts, with payments scheduled between April–July, August–November, and December–March. As a result, eligible farmers in Madhya Pradesh receive a combined annual income support of ₹12,000 from both central and state governments, thereby strengthening financial security and supporting agricultural sustainability.

6.1.10 Tubewell Excavation Scheme - Irrigation is a critical determinant of agricultural productivity, and in Madhya Pradesh the irrigated area accounts for nearly one-third of the total cultivated land. In view of the increasing production requirements of major crops, expansion of irrigation coverage has become essential. Over the past four to five years, concerted efforts by the state government in irrigation management have led to a substantial increase in irrigated areas. The promotion of modern irrigation techniques such as sprinkler and drip systems has enhanced water-use efficiency, while complementary initiatives including pond construction schemes and water conservation measures have supported water augmentation and sustainable water management. Within this framework, the Tube Well Excavation Scheme has been implemented to support farmers, with Scheduled Caste and Scheduled Tribe farmers identified as the primary beneficiaries, while general category farmers are covered under separate schemes. The scheme is applicable across Madhya Pradesh, excluding Shajapur and Indore districts, and provides financial assistance in the form of a subsidy amounting to 75 percent of the cost or a maximum of ₹25,000, whichever is lower, for both successful and unsuccessful tube well excavation, along with an additional subsidy of 75 percent of the cost or a maximum of ₹15,000, whichever is lower, for pump installation on successful tube wells.

6.1.11 Paramparik Krishi Vikas Yojana - Considering the existing potential of organic farming and the future demand for organic produce, the Government is promoting organic farming across the country. The Paramparagat Krishi Vikas Yojana (PKVY) is a comprehensive scheme under National Mission of Sustainable Agriculture (NMSA) to promote organic farming through a cluster approach along with Participatory Guarantee System (PGS) of certification. This centrally sponsored scheme is being piloted by the states government on farmers' field. This scheme was initiated for implementation in the year 2015-16 but State Governments have not achieved the assigned target due to lack of infrastructure support and knowhow about the scheme. On the other hand the availability of expert resourceful agencies have not been utilized due to policy constraints where these agencies can support in a major way in the implementation of PKVY Scheme. Keeping in view it is proposed to involve/invite these agencies in major role to provide Model Organic Cluster Demonstration and Model Organic Farm. At present, under this scheme there is no direct involvement of Indian Council of Agricultural

Research (ICAR), State Agricultural Universities (SAUs), Central Agricultural Universities (CAUs), Krishi Vigyan Kendra (KVK), which have good knowledge in the field of organic farming and have availability of large number of field farms & infrastructure. The existing huge potential of these organizations in the form of qualified Human Resources and large infrastructure including farms can be put to use for demonstration of organic farming technologies. To boost the organic farming across the country, there is a need to implement Model Organic Cluster demonstration and model organic farms under the PKVY scheme through these institutions.

6.2 Challenges in Madhya Pradesh's sustainable agricultural development

6.2.1 Economic Sustainability- Economic sustainability in agriculture in Madhya Pradesh is primarily influenced by crop productivity, cost of cultivation, and price realization, given the state's heavy reliance on agriculture for rural employment and income (Government of Madhya Pradesh, 2023). The state is one of India's leading producers of wheat, soybean, pulses, and oilseeds, with average wheat productivity in irrigated areas ranging between 3.0 and 3.5 tonnes per hectare, while soybean, the dominant Kharif crop, continues to exhibit relatively low and unstable yields due to rainfall variability and pest incidence (Directorate of Economics and Statistics [DES], 2022). Despite improvements in output, economic sustainability remains constrained by rising costs of cultivation, including expenditure on seeds, fertilizers, irrigation, and energy, compounded by fragmented landholdings and limited access to institutional credit in rural areas (Reserve Bank of India [RBI], 2022; NABARD, 2021). Market-related inefficiencies such as inadequate storage infrastructure, weak value chains, and price volatility further restrict farmers' capacity to secure remunerative returns (Ministry of Agriculture & Farmers Welfare [MoAFW], 2022). To address income instability, the state government complements central policy instruments such as the Minimum Support Price (MSP) with direct income support through the Mukhyamantri Kisan Kalyan Yojana, thereby enhancing short-term income security (Government of India, 2023; Government of Madhya Pradesh, 2023). Although public investment in irrigation and micro-irrigation has improved cropping intensity in selected districts, a significant proportion of agricultural land remains rainfed and vulnerable to climatic shocks (India Meteorological Department [IMD], 2022). Furthermore, relatively low public expenditure on agricultural research, extension services, and sustainable natural resource management continues to limit productivity growth and long-term resilience (Indian Council of Agricultural Research [ICAR], 2021). Consequently, improving economic sustainability in Madhya Pradesh requires a multidimensional policy approach focused on reducing cultivation costs, strengthening market access, expanding institutional finance, and increasing

investment in research, crop diversification, and sustainable agricultural practices.

6.2.2 Environmental sustainability - Environmental sustainability in agriculture in Madhya Pradesh is being increasingly addressed through policy interventions aimed at conserving natural resources, improving soil health, and enhancing climate resilience. The promotion of organic and natural farming practices under schemes such as the Paramparagat Krishi Vikas Yojana (PKVY) has contributed to a gradual reduction in the use of chemical fertilizers and pesticides in selected districts, thereby improving soil quality and reducing environmental degradation (Ministry of Agriculture & Farmers Welfare [MoAFW], 2022; Indian Council of Agricultural Research [ICAR], 2021). In parallel, the expansion of micro-irrigation systems under the Pradhan Mantri Krishi Sinchayee Yojana and state-level irrigation initiatives has improved water-use efficiency and reduced pressure on groundwater resources, particularly in semi-arid regions (Government of Madhya Pradesh, 2023). The implementation of the Soil Health Card Scheme has further supported sustainable nutrient management by promoting balanced fertilizer application based on soil-specific requirements (ICAR, 2021). Moreover, crop diversification towards pulses, oilseeds, and millets in rainfed areas has enhanced ecological sustainability by lowering water demand and improving soil nitrogen balance (NITI Aayog, 2022). However, despite these efforts, environmental sustainability remains constrained by uneven adoption of sustainable practices, continued groundwater depletion in intensively irrigated zones, and increasing climate variability (India Meteorological Department [IMD], 2022). Therefore, while policy measures in Madhya Pradesh demonstrate a clear commitment to environmentally sustainable agriculture, strengthening institutional support, scaling up sustainable practices, and integrating climate-smart strategies remain essential for long-term ecological resilience.

7. Barriers to the Implementation of Sustainable Agricultural Policies in Madhya Pradesh

- ❖ **Infrastructural barriers:** Inadequate irrigation facilities, insufficient water-storage structures, limited access to agricultural markets, and inadequate storage facilities restrict the effective implementation of agricultural schemes.
- ❖ **Financial barriers:** High cultivation costs, limited access to institutional credit, and insufficient financial resources can prevent farmers from adopting sustainable agricultural practices.
- ❖ **Technical and informational barriers:** Limited awareness of government schemes, inadequate technical knowledge, and insufficient agricultural extension services may restrict farmers' adoption of modern, water-efficient,

and organic farming methods.

- ❖ **Institutional and administrative barriers:** Weak coordination among implementing agencies, implementation gaps, and insufficient monitoring can create differences between policy objectives and actual outcomes.
- ❖ **Environmental barriers:** Groundwater depletion, soil degradation, irregular rainfall, and climate variability undermine the effectiveness of policies intended to promote long-term agricultural sustainability.
- ❖ **Socio-economic barriers:** Small and fragmented landholdings, particularly among small and marginal farmers, can limit investment capacity and access to technologies that support sustainable farming.

8. Conclusion

In conclusion, environmental sustainability in agriculture in Madhya Pradesh reflects a gradual but discernible policy shift towards resource conservation, climate resilience, and ecological balance. State and central government interventions promoting organic and natural farming, micro-irrigation, soil health management, and crop diversification have demonstrated measurable potential in reducing chemical input intensity, improving water-use efficiency, and enhancing soil productivity. However, the environmental gains remain uneven across regions due to limited scale of adoption, persistent groundwater stress, and increasing climatic variability. The evidence indicates that while existing policies provide a credible foundation for environmentally sustainable agriculture, their long-term effectiveness depends on stronger institutional support, increased investment in research and extension services, and wider farmer participation. Therefore, achieving enduring environmental sustainability in Madhya Pradesh's agricultural sector requires not only the continuation of current initiatives but also their integration into a comprehensive, climate-responsive, and region-specific development strategy.

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Statement of Conflict of Interest

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