

Agricultural Harvests: Opportunities for Economic Development in Nepal

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References: (Dhungel, 2026)

Dhungel, L. N. (2026). Agricultural harvests: Opportunities for economic development in Nepal. *A Peer reviewed Journal on Social Science*, 3(1).

Abstract

This study examines the probability of successful agricultural harvests in Nepal and explores the opportunities available within the agricultural sector for promoting economic development, reducing poverty, and supporting sustainable rural transformation. The study adopts a mixed-methods design combining a qualitative review of secondary literature with a quantitative trend analysis of six national agricultural indicators Agriculture Value Added (% of GDP), Agriculture GDP, agricultural growth rate, irrigation coverage, food grain production, and the High-Value Crop Index for the period 2019-2024, compiled from government reports, journal articles, and other secondary sources. Agriculture's contribution to GDP fluctuated between 20.91% and 23.13% during the study period, while irrigation coverage, food grain production, and the High-Value Crop Index increased steadily, indicating expanding opportunities for agricultural-led economic development. Nevertheless, fragmented landholdings, limited irrigation and mechanization, weak market linkages, and climate variability continue to constrain productivity. Nepal holds significant, though only partly realized, potential for agriculture-led economic development. Coordinated investment in irrigation, technology adoption, agricultural financing, value chains, and market development is necessary to translate the country's agro-climatic diversity into sustained economic growth, improved farmer incomes, and stronger food security.

Keywords: *Agricultural productivity, High-value cash crops, Poverty reduction, Economic development*

Introduction

Agriculture remains the foundation of Nepal's economy, providing employment and income to a large share of the population, particularly in rural areas (Ministry of Agriculture and Livestock Development (MoALD., 2022). Nepal's varied topography and agro-climatic zones the Terai, Hill, and Mountain regions support the cultivation of a wide range of crops, including cereals, vegetables, fruits, tea, coffee, and other high-value commodities. In recent years, farmers have shown growing interest in commercial farming, supported by the gradual adoption of improved seed varieties, irrigation systems, and modern agricultural technologies.

Despite this progress, the sector continues to face structural challenges, including fragmented landholdings, limited mechanization, inadequate irrigation infrastructure, and the increasing impact

of climate change (Pandey, 2017). Recent national-level assessments confirm that although agriculture still accounts for a substantial share of Nepal's GDP and employment, this contribution has been gradually declining as the economy transforms structurally, while public investment in the sector has remained comparatively modest (Yogi, 2025). These constraints affect the productivity and reliability of agricultural harvests and, by extension, the livelihoods of farming households.

Understanding the likelihood of successful harvests and the opportunities available within the agricultural sector is therefore important for policy formulation and rural development planning. While previous studies have examined individual aspects of Nepalese agriculture such as crop diversity, market access, irrigation management, and policy support (Nepal, 2024) comparatively fewer studies have combined a review of this

literature with an integrated trend analysis of national agricultural performance indicators. This study addresses that gap by combining a structured literature review with an analysis of secondary agricultural performance data for the period 2019-2024.

The main objectives of the study are to examine trends in Nepal's agricultural performance including agricultural GDP contribution, growth rate, irrigation coverage, food grain production, and high-value crop production between 2019 and 2024.

Significance of the Study

This study contributes to the existing body of literature on Nepalese agriculture by integrating secondary trend data with a structured discussion of opportunities, challenges, and policy implications. The findings are expected to be useful to policymakers, agricultural extension agencies, development practitioners, and researchers seeking an updated, evidence-based understanding of the prospects for agricultural-led economic development in Nepal.

Literature Review

Crop Diversity and Opportunities

Nepal's diverse agro-ecological regions allow the cultivation of a wide range of crops, from cereals in the Terai to fruits and medicinal herbs in the hills and mountains (Shrestha, 2019), highlights reduces farmers' production risk and contributes to more stable incomes (Pandey, 2017), low productivity due to that the Terai region is well suited to cereal crops such as rice, wheat, and maize, while the hill and mountain regions favor fruits, vegetables, and other high-value crops, creating opportunities for increased production and improved food security. Studies showed by the (FAO, 2020) crops that that climate-resilient crop varieties, together with improved access to technology and technical support, can make farming more sustainable and productive.

(Koirala, 2020), points out the importance of high-value cash crops such as tea, coffee, cardamom, and spices for export development, noting that commercialization of these crops has considerable potential for rural employment generation and poverty reduction.

Market Access and Value Addition

(Adhikari, 2018), highlight that organized markets and agro-processing facilities improve farmers' access to markets and increase their

returns, and that value addition through processing and branding enables Nepalese agricultural products to compete more effectively in international markets.

Policy and Technological Interventions

Government policy and the adoption of appropriate technology are critical to realizing the sector's potential. (Thapa, 2021), discusses how grants, irrigation programs, and credit facilities support farmers in adopting modern techniques, while digital market information systems and improved storage facilities help reduce post-harvest losses and enhance productivity. Nepal et al. (2024) similarly emphasize that addressing irrigation and water-management constraints requires coordinated action across institutions and disciplines rather than isolated technical fixes.

Challenges in Nepalese Agriculture

Several studies identify structural challenges that constrain agricultural growth (Pandey, 2017), low productivity due to traditional farming practices, fragmented landholdings, weak infrastructure, and climate-related risks, while price instability and limited market access further restrict growth. According by (Dhungel, 2024), Nepal is in a changing that although a large share of Nepal's population depends on agricultural commodity production and local trade, farmers and traders continue to face constraints related to market access, infrastructure, and institutional support that limit the sector's contribution to local economic development.

Overall, the literature suggests that although Nepal has substantial agricultural potential arising from its ecological diversity, converting this potential into sustained economic development requires coordinated commercialization, technological adoption, policy support, and market integration.

Major Crops Grown in Nepal

Nepal's agriculture reflects the diversity of its geography, climate, and soil across three main ecological regions Mountain, Hill, and Terai each suited to different crop types. The major categories of crops include:

- Cereal crops: rice, wheat, maize, millet, and barley
- Cash crops: tea, coffee, sugarcane, tobacco, and oilseeds

Fruits and vegetables: potatoes, leafy vegetables, apples, oranges, bananas, mangoes, and tomatoes

These crops sustain the rural economy and provide raw materials for agro-based industries. Nepal's relatively low use of chemical fertilizers and pesticides in many areas also gives it good potential for organic farming; organic tea, coffee, honey, spices, and herbs from Nepal are increasingly in demand in international markets.

Methodology

This study adopts a mixed-methods design combining qualitative and quantitative approaches. Secondary data were collected from books, peer-reviewed journal articles, government reports, agricultural publications, policy documents, and online academic databases. The study is national in scope and examines Nepal's agricultural sector as a whole, drawing on data disaggregated across the country's three main ecological regions Mountain, Hill, and Terai. The qualitative component draws on the literature to analyze the opportunities,

Table 1:

Trend of Agriculture Value Added and Related Indicators in Nepal (2019–2024)

Year	Agri. GDP (% of GDP)	Agri. GDP (NPR million)	Agri. Growth (%)	Irrigation Coverage (%)	Food Grain Production (million tons)	High-Value Crop Index
2019	21.58	629,229	2.80	48.0	10.20	100
2020	23.13	647,154	3.10	49.0	10.45	104
2021	22.02	662,372	2.70	50.2	10.70	108
2022	20.91	705,275	1.90	51.5	10.85	112
2023	21.19	701,396	2.60	52.8	11.05	117
2024	21.87	728,442	3.35	54.0	11.30	123

Source: Collected secondary Data by the author from MoALD (2022).

Results and Discussion

Agriculture's contribution to GDP rose from 21.58% in 2019 to 23.13% in 2020, a change that may reflect the relative resilience of the agricultural sector during the COVID-19 pandemic, when tourism, trade, and other service activities were severely disrupted. The share subsequently declined to 22.02% in 2021 and 20.91% in 2022, consistent with the recovery of non-agricultural sectors and the broader structural transformation of the economy. A modest recovery followed, with the share rising to 21.19% in 2023 and 21.87% in 2024, suggesting improved agricultural production, expanding

challenges, and policy context relevant to agricultural harvests and economic development in Nepal. The quantitative component draws on secondary trend data for six indicators of agricultural performance Agriculture Value Added (% of GDP), Agriculture GDP (NPR million), agricultural growth rate (%), irrigation coverage (%), food grain production (million tons), and the High-Value Crop Index for the period 2019 to 2024, compiled from published sources including (MoALD., 2022)

Limitations

Because the study relies entirely on secondary data, its scope and conclusions are constrained by the availability, consistency, and quality of the reports and statistics from which the data were drawn. No primary data collection or field sampling was undertaken; consequently, the findings reflect national-level trends rather than region- or farm-level variation, which future research using primary sampling across Nepal's ecological regions could usefully investigate.

commercialization, and continued government support.

In monetary terms, agricultural GDP increased from NPR 629,229 million in 2019 to NPR 728,442 million in 2024. Although a slight decline occurred between 2022 (NPR 705,275 million) and 2023 (NPR 701,396 million), the overall trend remained positive, indicating steady expansion of agricultural output.

The agricultural growth rate fluctuated over the period, rising from 2.80% in 2019 to 3.10% in 2020, declining to 2.70% in 2021 and 1.90% in 2022 likely reflecting irregular rainfall, climate variability, and rising production costs before

recovering to 2.60% in 2023 and 3.35% in 2024 as irrigation coverage and input quality improved.

Irrigation coverage expanded consistently, from 48.0% in 2019 to 54.0% in 2024, reflecting sustained public investment in irrigation infrastructure. Expanded irrigation reduces farmers' dependence on monsoon rainfall, supports multiple cropping cycles, and contributes to higher productivity.

Food grain production rose steadily from 10.20 million tons in 2019 to 11.30 million tons in 2024, consistent with improvements in seed quality, fertilizer use, irrigation, and extension services, and contributing to stronger national food security.

The High-Value Crop Index increased continuously from 100 in 2019 to 123 in 2024, indicating a gradual shift toward vegetables, fruits, tea, coffee, spices, and medicinal herbs. This shift reflects growing commercialization and creates opportunities for export earnings, agro-processing, and higher farm incomes.

Taken together, these results indicate that Nepal's agricultural sector has shown steady improvement across most indicators despite year-to-year fluctuations, supporting the view that the country possesses substantial, though only partly realized, potential for agricultural-led economic development (Yogi et al., 2025). Nevertheless, several constraints including climate change, fragmented landholdings, inadequate mechanization, insufficient infrastructure, weak market linkages, and limited access to modern technologies continue to hinder productivity and competitiveness.

Market Opportunities for Farm Products

Nepal's population is increasingly urbanizing, raising demand for high-quality food and creating opportunities for farmers to supply vegetables, fruits, dairy products, meat, and processed foods to urban markets. Nepal also has export opportunities for products such as tea, coffee, cardamom, ginger, herbs, honey, lentils, and farm-based handicrafts; its proximity to large markets such as India and China facilitates such exports. Organized markets and wholesale centers help ensure fairer prices for farmers, reduce exploitation by intermediaries, and make market transactions more transparent; when markets are well integrated, farmers are better able to obtain competitive prices for their products.

Technology in Agriculture

The adoption of farming technologies such as improved seed varieties, greenhouse farming, drip

irrigation, and farm machinery can increase production and reduce labor costs while improving crop quality and productivity. Information and communication technologies including mobile applications, digital platforms, and online market information systems help farmers access real-time price information, weather forecasts, and technical advice. Improved storage, cold-chain facilities, and transportation infrastructure reduce post-harvest losses and help maintain the quality of perishable products such as fruits and vegetables.

Role of Government and Policy Support

Government policy plays an important role in creating a favorable environment for agricultural development. Measures such as grants, minimum support prices, irrigation development programs, and crop insurance help reduce the risks faced by farmers, while access to agricultural credit and insurance encourages investment in modern inputs and commercial farming. Partnerships between government agencies, the private sector, cooperatives, and non-governmental organizations can further accelerate development through shared investment and knowledge transfer.

Challenges Affecting Agricultural Opportunities

Despite these opportunities, several challenges continue to limit the full utilization of Nepal's agricultural potential, including traditional farming practices and low productivity, fragmented landholdings, insufficient irrigation and infrastructure, limited access to modern technology, weak market linkages and price instability, and the impact of climate change. Farmers also face difficulties related to unpredictable weather, pest infestations, inadequate cold storage, and poor transportation, while climate change has increased the risk of floods, droughts, and landslides. Addressing these challenges through targeted research, infrastructure development, and risk-management strategies is essential to transforming agriculture into a more competitive and sustainable sector.

Recommendations

Based on the findings of this study, the following recommendations are proposed to enhance agricultural productivity and strengthen the contribution of agriculture to Nepal's economic development:

Expand irrigation infrastructure: The Government of Nepal should invest in year-round irrigation systems, water-harvesting technologies, and efficient water-management practices to

reduce dependence on monsoon rainfall and increase cropping intensity.

Promote modern agricultural technologies: Farmers should be encouraged to adopt improved seed varieties, farm mechanization, precision agriculture, digital technologies, greenhouse farming, and climate-smart agricultural practices through financial incentives and technical support.

Strengthen agricultural research and extension services: Research institutions and extension agencies should develop and disseminate improved crop varieties, sustainable farming practices, and modern production techniques through regular farmer training and capacity-building programs.

Encourage commercial and high-value crop production: Greater emphasis should be placed on the cultivation of vegetables, fruits, tea, coffee, spices, medicinal herbs, and other high-value crops with strong domestic and export market potential.

Develop agricultural value chains: Investment should be increased in agro-processing industries, cold-storage facilities, grading, packaging, transportation, and marketing systems to reduce post-harvest losses and improve farmers' profitability.

Improve market access and export promotion: Strengthening agricultural cooperatives, digital marketing platforms, rural market infrastructure, and export-promotion policies will improve farmers' access to competitive markets and increase foreign-exchange earnings.

Enhance agricultural financing and insurance: Financial institutions should expand access to affordable agricultural credit, crop insurance, and investment support to reduce production risks and encourage commercial farming.

Address climate change impacts: Climate-resilient crop varieties, sustainable land management, disaster-risk-reduction strategies, and early-warning systems should be promoted to minimize the adverse effects of climate change on agricultural production.

Strengthen public-private partnerships: Collaboration among government agencies, private enterprises, cooperatives, universities, and development partners should be enhanced to improve technology transfer, investment, innovation, and market development.

Ensure long-term agricultural policies: Policymakers should implement consistent, evidence-based agricultural policies that prioritize

productivity enhancement, value addition, rural entrepreneurship, food security, and sustainable agricultural development.

Implementing these recommendations is expected to improve agricultural productivity, increase farmers' incomes, generate rural employment, strengthen food security, reduce poverty, and enhance the overall contribution of agriculture to Nepal's long-term economic development.

Conclusion

Agriculture continues to be the backbone of Nepal's economy, contributing significantly to employment generation, food security, rural livelihoods, and national economic development. This study examined the probability and opportunities of agricultural harvests in Nepal by analyzing agricultural GDP, agricultural growth, irrigation coverage, food grain production, and the expansion of high-value crops during the period 2019–2024. The findings reveal that although the agricultural sector experienced fluctuations due to climate variability, economic change, and structural transformation, it has maintained a substantial contribution to the country's economic growth.

The analysis shows positive trends in agricultural GDP, irrigation development, food grain production, and the cultivation of high-value crops, indicating that Nepal possesses considerable potential for agricultural-led economic development. The country's diverse agro-climatic conditions provide favorable opportunities for producing cereals, fruits, vegetables, tea, coffee, and other commercial crops. These opportunities can generate employment, increase farmers' incomes, improve food security, promote exports, and reduce rural poverty.

Despite these opportunities, several challenges continue to limit agricultural productivity and competitiveness. Climate change, fragmented landholdings, inadequate irrigation facilities, low mechanization, poor infrastructure, limited access to modern technology, and weak market linkages remain major constraints affecting sustainable agricultural development. Addressing these challenges requires coordinated efforts from government institutions, the private sector, research organizations, cooperatives, and farming communities.

The study concludes that Nepal's agricultural sector has strong potential to become a major engine of sustainable economic growth if

appropriate policies, technological innovations, infrastructure development, and market-oriented reforms are effectively implemented. Greater investment in climate-smart agriculture, irrigation expansion, agricultural mechanization, value addition, agro-processing industries, and export promotion will enhance productivity, strengthen agricultural value chains, and improve the overall

competitiveness of Nepalese agriculture. Transforming traditional subsistence farming into a modern, commercial, and technology-driven agricultural system will therefore play a crucial role in achieving long-term economic development, food security, poverty reduction, and sustainable rural transformation in Nepal.

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