State-wise Oilseeds Production in India (2000–2024): A Pivot Table-Based Analysis

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Abstract

This study uses Microsoft Excel pivot tables for data organization and visualization in order to analyse agricultural production in India by state from 2000 to 2024. Long-term patterns, inter-state differences, and rankings are highlighted by a descriptive research approach. In contrast to Jammu & Kashmir, which produced less and more sporadically, states like Maharashtra, Madhya Pradesh, and Karnataka consistently produced large amounts. Growth trends and regional imbalances influenced by policies, infrastructure, and climate are displayed in clustered bar charts. The report highlights the necessity of focused, data-driven approaches to promote balanced agricultural development across Indian states and shows how well pivot-based tools handle big datasets.

Keywords

Agricultural production, State-wise analysis, Pivot table, Microsoft Excel, Data visualization.

1. Introduction

India's economy still depends heavily on agriculture, which supports about 60% of the country's population and makes a substantial contribution to GDP. However, agroclimatic diversity, infrastructure, and policy implementation are some of the factors that cause significant variation in performance across Indian states. In order to support more focused policy planning, this study intends to perform a 25-year state-wise analysis of agricultural production (2000–2024), indicating leading and lagging states, looking at year-by-year growth, and highlighting regional disparities. The study interprets a large Excel dataset on state-level crop output using statistical techniques and pivot tables to conduct this analysis. Rapid comparisons and visualizations are made possible by these tools, which facilitate trend identification and performance consistency evaluation. The pivot table approach, which builds on earlier research, helps stakeholders identify important areas for development and intervention by converting raw data into actionable insights.

Given the ongoing agricultural reforms and the increasing risks associated with climate change, this research is especially pertinent. Performance tracking is crucial for programs like PMKSY and PM-Kisan, which rely significantly on efficient state-level execution. The study also provides hints regarding the climate resilience of each state by emphasizing production variability. The results open the door for further predictive research employing cutting-edge data analytics and machine learning and support evidence-based, region-specific planning.

2. Review of Literature

Modern data analysis tools, regional case studies, and empirical research must all be integrated to provide a thorough understanding of agricultural performance across Indian states. The pertinent literature on agricultural yield trends, state-level production analysis, and the use of statistical methods and pivot tables to comprehend crop performance is summarized in this review. The methodological and conceptual underpinnings of the current investigation are provided by the chosen studies.

2.1. Regional Disparities in Agricultural Yield and Production

A state-level analysis of yield data for the main food crops in 2014–15 was carried out by Talukdar, Chakravartty, and Sharma (2023). The productivity levels of Indian states varied greatly, according to their research, with northern states like Punjab and Haryana producing noticeably higher yields as a result of improved irrigation, mechanization, and input accessibility. On the other hand, yields were lower in eastern states like Odisha and Assam, indicating a continued imbalance in agricultural development. This emphasizes how important it is to conduct state-by-state studies in order to inform agricultural policies that are specific to a given region.

Panwar and Dimri (2018) concentrated on Haryana's long-term trends in crop production. They discovered that ecological stress and an excessive dependence on resource-intensive practices have caused the state to exhibit signs of stagnation in recent years, despite its historically strong performance. Their framework for trend analysis facilitates the use of time-series models to assess output volatility and agricultural stability over long time periods.

2.2. Longitudinal and Cross-State Agricultural Trends

Over a 20-year period (2002–2022), the Project Team (2022) examined trends in food and non-food grain production in Indian states. Their study showed both new performance in states that were previously thought of as low-yield regions as well as growth trajectories in historically dominant states. These results highlight how agricultural geography in India is dynamic, with newer states modifying policies and technologies to increase productivity.

In order to determine the main factors influencing regional agricultural productivity, Kulal, et al. (2024) expanded on this longitudinal approach by using multi-variable analysis. Their work reaffirmed the need for data-driven diagnostics in agricultural planning by showing that market access, climate, and input use efficiency all have a significant impact on state-level performance.

2.3. Application of Pivot Tables in Agricultural Data Analysis

Pivot tables are now very effective tools for analyzing and summarizing agricultural data. By analyzing Maharashtra's rice and ragi production using pivot tables, Khatal et al. (2024) showed how Excel tools can efficiently classify production, yield, and cultivated area over time. Similar to this, Kahar et al. (2024) examined the yield, production, and area under cultivation of jowar (great millet) in various Indian states using pivot tables. Their results demonstrated how versatile pivot tables are for sizable agricultural datasets, especially when state-by-state disaggregation is needed.

The analytical utility of pivot tables in connecting unprocessed data to practical insights was highlighted by Domino et al. (2021). The basic idea of using pivot tables to improve data interpretation and decision-making is applicable to agricultural analytics even though the study's focus was on business and accounting education. Their study demonstrates the methodological soundness of summarizing, visualizing, and identifying trends in complicated datasets using pivot tables.

2.4. Predictive Analytics and Technological Integration

A data mining framework was presented by Kiran and Deepak (2021) in order to forecast crop results using historical and environmental data. Their research highlighted how predictive models and machine learning could enhance agricultural decision-making. This research advances such predictive modeling by identifying trend directions and performance disparities that can be used as inputs for future machine learning applications, even though it mostly uses statistical techniques and pivot table summaries.

3. Materials and Methodology

This study uses a descriptive and comparative research methodology to assess India's agricultural production performance by state over a 25-year span, from 2000 to 2024. To investigate long-term fluctuations and inter-state comparisons in total agricultural output, the analysis makes use of pivot tables and simple statistical visualization tools.

3.1. Data Source and Preparation:

The Directorate of Economics and Statistics, Ministry of Agriculture, Government of India, and other reliable government organizations provided the data on agricultural oilseed production from 2000 to 2024. To guarantee uniform yearly entries for every state, state names were standardized and the dataset was examined for completeness.

3.2. Data Cleaning and Pivot Table Analysis:

The data was cleaned by removing missing values, outliers, and formatting errors. Using Microsoft Excel, pivot tables were created to organize state-wise annual production data and calculate cumulative output for each state over 25 years. This enabled easy filtering, sorting, and comparison.

3.3. Data Summarization and Visualization:

In order to categorize states according to performance and summarize important production trends, pivot tables were employed. Visual tools based on Excel, such as clustered bar charts, demonstrated growth, decline, or stability in state outputs, making it possible to quickly identify long-term trends.

3.4. Interpretation and Dashboard Creation:

The findings showed notable differences in state-by-state agricultural performance. To make the information interactive and easy to use, a dynamic Excel dashboard was created. This allowed stakeholders to filter the data by year or state and see trends so they could make well-informed decisions.

4. Results and Discussions:

4.1. Overall Production Trends (2000-2024):

Significant differences in agricultural production by state were found during the 25-year analysis. Effective policies and infrastructure are demonstrated by the consistently high and stable outputs recorded by states such as Madhya Pradesh, Karnataka, and Maharashtra. States like Jammu & Kashmir, on the other hand, displayed variations as a result of topography and climate.

4.2. Year-wise Fluctuations and Stability:

Clustered bar charts provided visual data that emphasized trends over time. Karnataka saw a decline in the early 2010s before rebounding, whereas Maharashtra demonstrated consistent growth. The ability of each state to adjust to difficulties and preserve production stability is reflected in these trends.

4.3. Comparative Rankings and Performance Gaps:

When states were ranked according to their total production, the disparities between high and low performers were clearly visible. In order to identify where assistance is most needed, this ranking highlights the disparities in resource distribution, technological accessibility, and climate adaptability between states.

4.4. Policy Implications and Regional Insights:

According to the analysis, states with a strong agricultural economy gain from investment and mechanization, while others fall behind because of inadequate infrastructure. These revelations highlight the necessity of region-specific approaches to support equitable agricultural development throughout India.

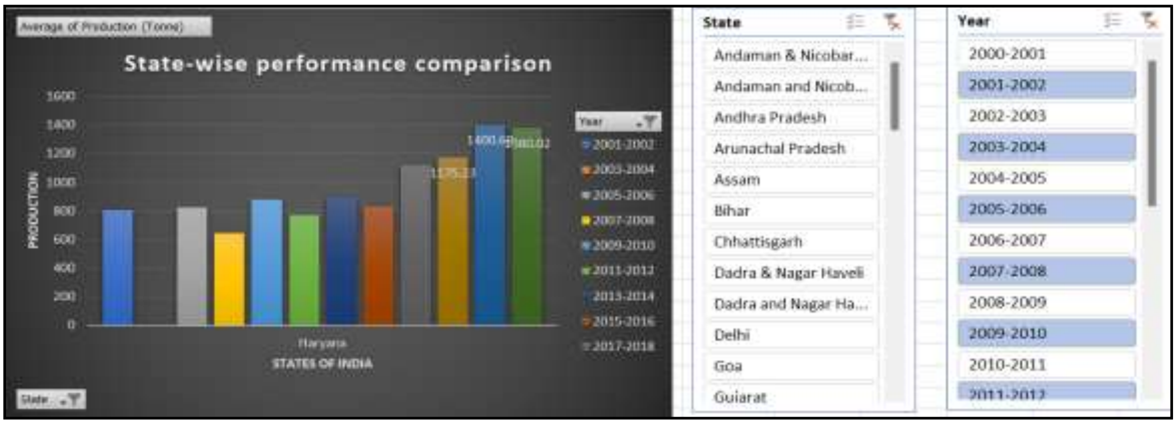

Fig. 1: Dashboard of Haryana State Oilseeds Production

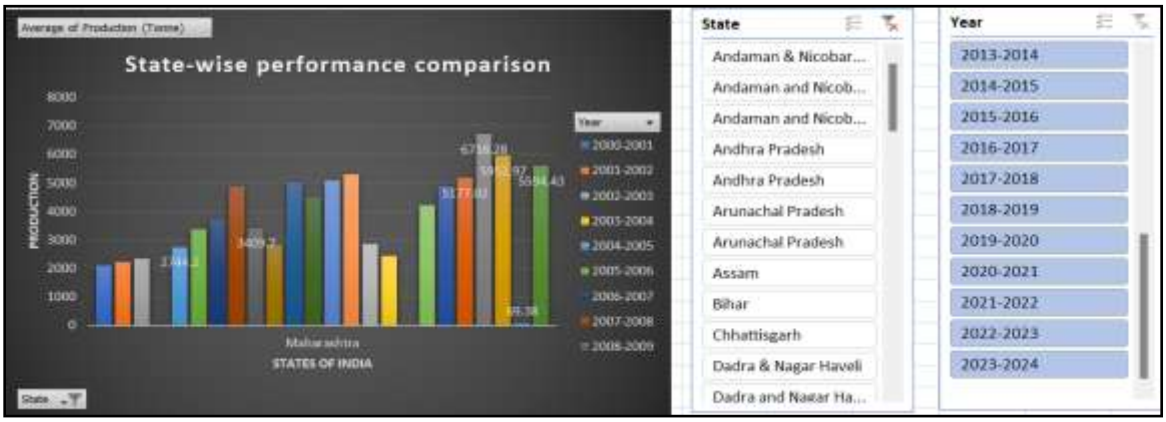

Fig. 2: Dashboard of Maharashtra State Oilseeds Production

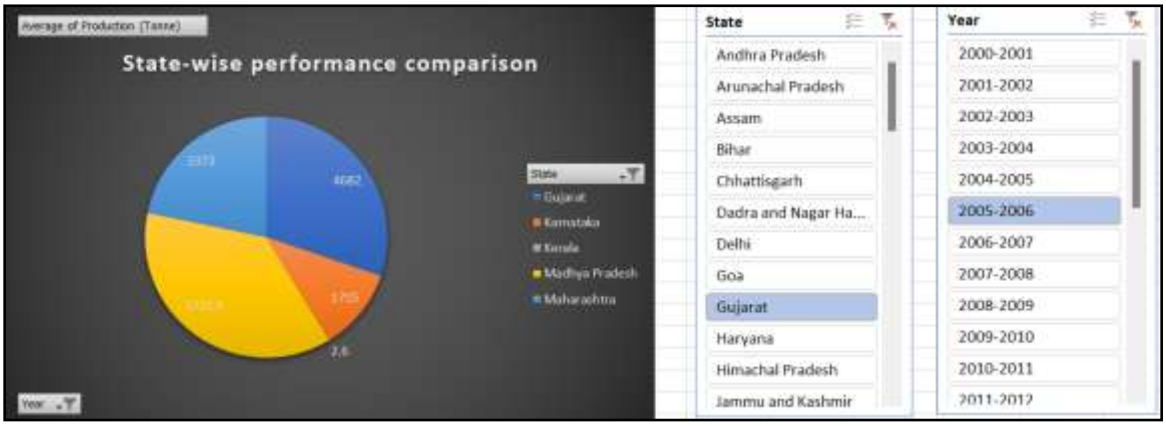

Fig. 3: Contribution to oilseeds production in 2005 of some states

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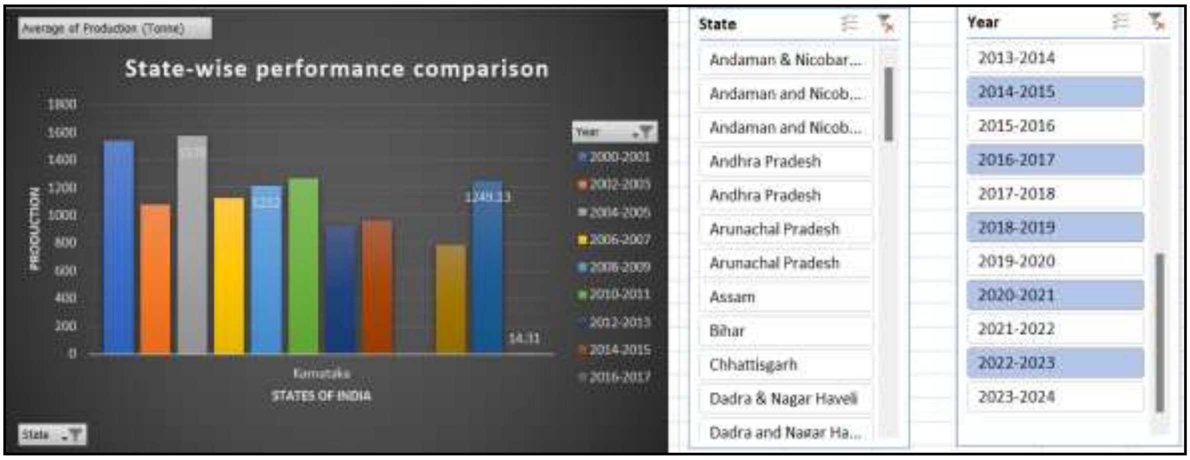

Fig. 4: Dashboard of Karnataka State Oilseeds Production

5. Conclusions:

This study uses Excel's pivot tables and visual tools to provide a 25-year state-by-state analysis of India's agricultural production from 2000 to 2024. The results show notable regional differences in output. Better infrastructure, resource access, and policy implementation are the reasons why states like Maharashtra, Madhya Pradesh, and Karnataka have continuously shown high and stable production. States such as Jammu and Kashmir, on the other hand, displayed inconsistent and reduced outputs, most likely as a result of geographical and climatic limitations.

Pivot tables made it possible to handle big datasets effectively and visualize annual and cumulative production trends in an understandable way. Several eastern and northeastern regions continue to lag behind central and western states, according to the analysis, which emphasizes the necessity of region-specific agricultural strategies and interventions.

While the study used descriptive methods, it successfully captured key performance patterns and long-term trends. These insights are valuable for policymakers aiming to promote balanced agricultural development through data-driven decisions and support for lagging states.

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