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# BANANA CULTIVATION PRACTICES IN THE MID-TERAI AREA OF NEPAL

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**Abstract:**

In Nepal's Terai region, bananas are grown commercially and in larger quantities. The more consistent and substantial advantage from September to February. During the winter, Nepal imports more than 60-70% cheaper Indian products. Insecticides and pesticides are used seven to twenty-four times a day in the banana production area of Nifgadh. The benefits of banana farming are twice as great as those of sugarcane and grain crops. Poison degradation soil and reduced production after decays. It should be shown after a long time used effect and damage to human life also. It is needed to aware to Nijgadh area farmers in time otherwise great difficulties bear. Soon needed try to start organic production and supply in local, regional and central market of Nepal. It can win to Indian import banana also. Used of poison in banana founded less than 5 times used 46.9% (46), 6-10 times used 27.6% (27), 11-15 times used 12.2% (12), 16-20 times used 10.2% (10) and above 21 times used 3.1% (3). Hundred percent (100%) of farmers used insecticides and pesticides for banana cultivation.

**Key Words:** Banana Cultivation, Disease, Fertilizer, Income, Insect and Pest, Poison

## 1. Introduction:

The study was conducted in the Mid Terai region, specifically in the Nijgadh area of Bara, where banana cultivation began in 2004. This region is characterized by its surrounding forests and the presence of wild elephants, which pose significant challenges to the local banana farming community. According to Eka Bahadur Shrestha, Indian elephants migrate seasonally through Parsa National Parks in the Parsa district of Nepal. The threat of wild elephants has instilled fear among Nijgadh residents, complicating the timing of banana cultivation due to potential home invasions by these animals. Despite these challenges, banana farming has gradually become a staple for many families in Nijgadh Municipality, particularly in response to drought conditions that have affected traditional crops. Bananas offer a more viable income source compared to cereals, lentils, and oilseed crops. Ghimire et al. (2023) highlight that fruit crops, including bananas, are dynamic sources of food, employment, and income. Their research utilized secondary data to analyze the area, productivity, and growth trends of banana cultivation in Nepal over a 30-year period (1990-2019). The findings revealed substantial growth in the global banana area (57.19%), output (160.58%), and yield (65.77%) from 1989 to 2019. While India is the largest producer of bananas, Indonesia boasts the highest yield at 55.06 metric tons per hectare.In Nepal, the compound annual growth rate (CAGR) for banana production over the same period was 5.96% for area, 6.38% for output, and 0.40% for yield, indicating significant potential for growth alongside the need for stability as production increases. The decomposition analysis revealed that area contributed 86.90% to production variability, with an interaction effect of 10.66%, underscoring the importance of land in Nepal's banana production (Ghimire et al., 2023).Furthermore, Dahal and Kattel (2020) identified Eastern Chitwan as the primary hub for banana production in Nepal. They categorized farmers into three groups based on land area: small, medium, and large growers. Notably, a significant proportion of large-scale farmers have enrolled in banana insurance programs, reflecting an increasing recognition of the crop's economic importance. In conclusion, while banana cultivation in the Nijgadh area faces challenges from wildlife and environmental factors, it remains a promising agricultural venture with substantial economic benefits. Addressing these challenges through strategic interventions and promoting sustainable practices will be crucial for the future of banana farming in Nepal.

## 2. Problem Statement:

In Nepal, bananas are cultivated from the mid-hills to the Terai region, with the latter having a larger area dedicated to banana farming due to its favorable conditions, including easier access to land, abundant suckers, irrigation facilities, and marketing opportunities. However, the extensive use of chemical pesticides, fertilizers, and insecticides presents significant challenges to sustainable agricultural practices. Banana cultivation in Nijgadh, located in Nepal's mid-Terai, has been ongoing for approximately 18 to 20 years, resulting in a substantial area being planted with this crop. Despite this, farmers often lack access to high-quality fertilizers, which hampers their productivity. Additionally, the influx of cheaper Indian bananas during the cold season (September to February) creates instability in market prices for insecticides and pesticides, making it difficult for Nepali farmers to compete effectively with their Indian counterparts.

The Indian government has the capability to monitor and test bananas at the border, ensuring compliance with food safety regulations and pesticide usage standards. This regulatory oversight is crucial for maintaining the quality of imported bananas and could potentially benefit Nepalese farmers by establishing a more level playing field. In summary, while banana cultivation in Nepal holds significant potential due to its favorable climatic conditions and market demand, challenges such as

reliance on chemical inputs, competition from imported bananas, and inadequate access to quality fertilizers must be addressed. Implementing sustainable farming practices and enhancing the regulatory framework for imports could improve the viability of banana farming in Nepal.

**3. Research Objective:**

- The objective of this research paper is to analyze the banana cultivation practices in the mid-Terai region of Nepal and assess their impact on human health and the environment.

**4. Literature Review:**

Banana cultivation holds substantial promise for Nepal's agricultural landscape, particularly in regions like Chitwan. As a high-value crop with diverse applications, it has the potential to bolster rural economies and improve livelihoods. However, challenges such as low productivity, inadequate agricultural practices, and post-harvest losses hinder its full potential. This section provides a comprehensive overview of the current state of banana cultivation in Nepal, highlighting key research findings and the crop's significance.

Pandit, Bishnu Hari, and colleagues (2020) underscore the potential of sustainable agricultural practices for enhancing banana yields. Their study demonstrated that combining urine-biochar with compost significantly outperformed conventional NPK fertilization, increasing yields by 41% and surpassing the compost-only treatment by a substantial 102%. These findings align with the broader context of low fertilizer use efficiency and suboptimal agricultural practices prevalent among Nepali farmers, as reported by Joshi et al. (2020).

The demand for bananas is robust, and Nepal's Terai region offers favorable conditions for its cultivation. As highlighted by Adhikari et al. (2022), the Chitwan district, in particular, presents significant opportunities for banana production. However, challenges such as limited irrigation, poor post-harvest management, and inadequate adoption of good agricultural practices (GAPs) persist.

Bhatta et al. (2023) emphasize the economic importance of banana cultivation in Chitwan, focusing on profitability and resource use efficiency. Their analysis of small-scale and large-scale farmers provides valuable insights into production systems and potential areas for improvement.

Diverse applications: Bananas offer a wide range of uses beyond fresh fruit consumption, including food processing, animal feed, and biofuel production (Mohapatra et al., 2010; Rana G K et al., 2018).

Health benefits: The fruit is rich in essential nutrients and possesses medicinal properties (Sampath Kumar, K. P. et al., 2012; Kumari P., n.d.; Palde, C. et al., 2022; N. Rajesh, 2017; Chuwa, C. et al., 2022; Ogunlade, I. et al., 2019).

Economic viability: Banana cultivation can be profitable, as demonstrated by Sharma et al. (2021), but requires efficient resource management.

Market potential: The growing demand for bananas, coupled with Nepal's import dependence, presents opportunities for domestic production and export (Dhakal SC, 2023).

Banana cultivation in Nepal holds immense potential for both economic growth and nutritional security. By addressing challenges such as low productivity, limited access to technology, and inadequate post-harvest management, the sector can be transformed into a sustainable and profitable enterprise. Future research should focus on developing region-specific best practices, promoting value addition, and strengthening market linkages.

**5. Methodology:**

**Study Area and Population:**

Nijgadh, located in the Mid-Terai region of Bara district, Nepal, was selected as the study area due to its emerging status as a banana-cultivating region. The target population encompassed all banana farmers within this district.

**Sampling Technique:**

A total of 88 banana farmers were included in the study sample. A pre-test of the research instrument was conducted within the same community to ensure its validity and reliability. To select study participants, a random sampling technique was employed. Farmers were categorized as either small-scale or large-scale based on their cultivated land area.

**Data Collection:**

Primary data were gathered through face-to-face interviews using a structured questionnaire administered to banana-cultivating households.

**Data Analysis:**

The collected data were subjected to statistical analysis using SPSS software.

**6. Result and Discussion:**

Table 1: Total Households (Total Family Members, Male & Female)

| | N | Minimum | Maximum | Sum | Mean |
|---|---|---|---|---|---|
| Total Households | 98 | 1.00 | 1.00 | 98.00 | 1.0000 |
| Total Family No. | 98 | 3.00 | 14.00 | 562.00 | 5.7347 |
| Total Female No. | 98 | 1.00 | 6.00 | 279.00 | 2.8469 |
| Total Male No. | 98 | 1.00 | 8.00 | 287.00 | 2.9286 |

Table 1 shows the total respondents were 98; among them, the minimum number of female members in one house was 1 and the maximum was 6. The number of males in one house ranges from one to eight. Similarly, the total number of family members ranged from three to fourteen.

Table 2: Total households started Banana cultivation of year Cross tabulation

| | | Started Banana Cultivation Total Year | | | | Total |
|---|---|---|---|---|---|---|
| | | Less than 5 Years | 6-10 Years | 11-15 Years | Above 16 Yeas | |
| Total Households | Count | 50 | 39 | 6 | 3 | 98 |
| | % of Total | 51.0% | 39.8% | 6.1% | 3.1% | 100.0% |

Table 2 shows banana cultivation total years of farmers' households were 98; among them, those less than 5 years old were 51% (50); 6-10 years old were 39.8% (39); 11-15 years old were 6.1% (6); and those above 16 years old were 3.1 (3).

Table 3: Total households expenses of Banana cultivation expenses NRS. Cross tabulation

| | | Expenses of Banana Cultivation Expenses Nrs. | | | | | | Total |
|---|---|---|---|---|---|---|---|---|
| | | Less than 30000 | 31000-50000 | 51000-100000 | 100000-200000 | 200000-500000 | Above 500000 | |
| Total Households | Count | 12 | 7 | 34 | 27 | 12 | 6 | 98 |
| | % Within Total Households | 12.2% | 7.1% | 34.7% | 27.6% | 12.2% | 6.1% | 100.0% |

Table 3 shows the total expenses of banana cultivation farmers at 98; among the total expenses, farmers were NRS. Less than 30000 were 12.2% (12), 31000-50000 were 7.1% (7), 100000-200000 were 27.6% (27), 200000-500000 were 12.2% (12), and above 500000 were 6.1% (6).

Table 4: Total poison used households Cross tabulation

| | | Number of Poison Use Times | | | | | Total |
|---|---|---|---|---|---|---|---|
| | | Less Than 5 Times Total | 6-10 Times | 11-15 Times | 16-20 Times | Above 21 Times | |
| Total Households | Count | 46 | 27 | 12 | 10 | 3 | 98 |
| | % Within Total | 46.9% | 27.6% | 12.2% | 10.2% | 3.1% | 100.0% |

Table 5 shows total poison used households were 98, among them less than 5 times used 46.9% (46), 6-10 times used 27.6% (27), 11-15 times used 12.2% (12), 16-20 times used 10.2% (10) and above 21 times used 3.1% (3). Hundred percent (100%) of farmers used insecticides and pesticides for banana cultivation.

Table 5: Total Banana cultivation area (Katta) Cross tabulation

| | | Total Area Of Banana Cultivation Katta | | | | | | | Total |
|---|---|---|---|---|---|---|---|---|---|
| | | Less Than 5 Katta | 6-10 Katta | 11-20 Katta | 21-30 Katta | 31-50 Katta | 51- 100 Katta | Above 101 Katta | |
| Total Households | Count | 8 | 11 | 27 | 8 | 21 | 14 | 9 | 98 |
| | % Within Total | 8.2% | 11.2% | 27.6% | 8.2% | 21.4% | 14.3% | 9.2% | 100.0% |

The table shows that the that the total area of banana cultivation farmers was 98, among them less than 5 katta cultivated 8.2% (8), 6-8 katta cultivated 11.3% (11), 11-20 katta cultivated 27.6% (27), 21-30 katta cultivated 8.2% (8), 31-50 katta cultivated were 21.4% (21), 51-100 katta cultivated were 14.3% (14) and above 101 katta cultivated 9.2% (9) were. The majority of farmers cultivated bananas on one to four hectares. This is a well-cultivated area in Nepalese condition.

Table 6: Total households income annually form Banana cultivation NRS. Cross tabulation

| | | Annually Earning NRS. From Banana Cultivation | | | | | | | Total |
|---|---|---|---|---|---|---|---|---|---|
| | | 10000-30000 | 30000-50000 | 51000-100000 | 100000-200000 | 200000-500000 | 500000-1000000 | Above 1000000 | |
| Total Households | Count | 1 | 1 | 8 | 8 | 45 | 19 | 16 | 98 |
| | % Within Total | 1.0% | 1.0% | 8.2% | 8.2% | 45.9% | 19.4% | 16.3% | 100.0% |
| | % of Total | 1.0% | 1.0% | 8.2% | 8.2% | 45.9% | 19.4% | 16.3% | 100.0% |

Table 6 shows total banana cultivated farmers were 98; among them, 10000-30000 NRS was one percent (1) earning from banana cultivation, 30000-50000 NRS earning was one percent (1), 51000-100000 NRS earning were 8.2% (8), 200000-500000 NRS earning were 45.9% (45), 500000-1000000 earnings were 19.4% (19), and above 1000000 NRS earning were 16.3% (16).

Table 7: Total household expenses for Banana cultivation annually Cross tabulation

| | | Annually Expenses for Banana Cultivation | | | | | | Total |
|---|---|---|---|---|---|---|---|---|
| | | Less than 30000 | 31000-50000 | 51000-100000 | 100000 - 200000 | 200000 - 500000 | Above 500000 | |
| Total Households | Count | 9 | 9 | 30 | 26 | 15 | 9 | 98 |
| | % Within Total | 9.2% | 9.2% | 30.6% | 26.5% | 15.3% | 9.2% | 100.0% |
| | % Within Annually Expenses | 100.0% | 100.0% | 100.0% | 100.0% | 100.0% | 100.0% | 100.0% |

Table 7 shows total Banana cultivated farmers were 98, among them less than 30000 expenses for Banana cultivation: NRS 9.2% (9), NRS 31000-50000 expenses were 9.2% (9), NRS 51000-100000 expenses were 30.6% (30), NRS 100000-200000 expenses were 26.5%, NRS 200000-500000 expenses were 15.3% (15), and NRS above 500000 expenses were 9.2% (9). The results show that almost all farmers spend NRS. 51000-500000 for banana cultivation every year.To enhance banana farming and its supply chain, it is essential to incorporate various agricultural practices and recommendations from recent studies. This application outlines key strategies based on the findings from Mishra et al. (2022, 2023, 2024) and others, focusing on improving productivity and sustainability in banana farming.

Bananas are a vital crop in many regions, requiring specific cultivation practices to ensure optimal growth and yield. The soil should be tested for nutrient content, and both organic and inorganic fertilizers are crucial for achieving high yields. Fertilizer application should be tailored to climatic conditions and the growth stages of the plants.

- Soil Testing: Conduct soil tests to determine nutrient levels and pH, allowing for tailored fertilization strategies

- Fertilizer Application: Use a combination of organic manure and chemical fertilizers. For instance, organic manure should be applied two weeks before planting at a rate of 10 kg per planting hole, while chemical fertilizers should be applied at specific intervals to meet the plants' nutritional needs.
- Farmer Group Formation: Encouraging the formation of specialized farmer groups can facilitate knowledge sharing and resource pooling. This approach has been shown to enhance productivity by allowing farmers to access better tools, techniques, and markets (Mishra et al., 2024).
- Targeted Subsidies: Providing targeted subsidies can help bridge the gap between current yields and the potential for increased production. This financial support can incentivize farmers to adopt modern agricultural practices and improve their output significantly.
- Research and Development: Collaboration with agricultural research institutions, such as Madhesh University, can lead to innovations in farming techniques. Engaging with scientists can help identify best practices and technologies that can be implemented to increase banana yields. Banana based industry should be established for agricultural promotion as university company with direct partnership of farmer and university under adult learning under state supervision (Mishra, 2023).

**7. Conclusion:**

The findings of this study on banana cultivation in Nijgadh, Bara district, Nepal, reveal a complex interplay of economic opportunities, agricultural challenges, and public health concerns. While banana cultivation is a significant source of income for local farmers, contributing to over 65-70% of their livelihoods, the heavy reliance on chemical inputs poses a serious threat to both human health and the environment.

The district's potential for banana production is evident in its export to major markets like Nanaragadh and Kathmandu. However, the inaccessibility of sufficient chemical fertilizers during cultivation and the rampant overuse of insecticides and pesticides are alarming. The persistence of pesticide residues in the fruit, coupled with the practice of using ripening agents by local merchants, raises serious concerns about food safety.

The government's emphasis on organic production is a step in the right direction. However, the current reality is that purely organic bananas remain elusive to consumers due to various constraints. To address these challenges, a comprehensive approach is necessary. This includes promoting sustainable agricultural practices, providing farmers with access to organic alternatives, and implementing strict regulations on pesticide use and post-harvest handling. Additionally, consumer awareness campaigns about the importance of organic produce and the risks associated with excessive pesticide use are crucial. Banana based industry should be established in collaboration with university and society as university company under state supervision.

By prioritizing the health and well-being of both farmers and consumers, while also ensuring the long-term sustainability of banana cultivation, Nepal can harness the full potential of this valuable crop.

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