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Financial feasibility of the drumstick (*Moringa oleifera* Lam.) enterprise in eastern Nepal

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Abstract

Drumstick (*Moringa oleifera* Lam.) is an underutilized crop and limited to backyard farming in Nepal. However, drumstick farming is considered as a low-investment enterprise with an immediate return. The study analyses the financial feasibility of the drumstick enterprise in the Terai region of eastern Nepal. The primary information was obtained from drumstick producers (105) through a household survey, interviews with the key informants (7), and conduction of the focus group discussions (3). Besides, relevant literature was reviewed for secondary information. Drumstick farming could be a viable enterprise for smallholder farmers in the Terai. The drumstick enterprise is economically profitable for a continuous ten years of production plan. However, a comparison was made between continuous ten years (same plant) and each five years of production (new plantation every fifth year). The average Benefit Cost Ratios (BCRs) for continuous ten years and every fifth year plantation in drumstick production were 2.20 and 2.22 respectively. The Net Present Value (NPV) was NPR 6,870,992 and NPR 8,039,131 per hectare, and the Internal Rate of Return (IRR) was 127.1% and 142.2% for continuous ten years and each of the five years of drumstick production, respectively. The drumstick enterprise was profitable even with the 10% increase in total cost and 10% decrease in total revenue during the production. The Payback Period (PBP) was 2.56 years of a continuous ten-year period, and 2.56 years and 2.38 years for each five-year period of drumstick production. Therefore, the establishment of a new orchard every fifth year of drumstick production is more profitable compared to the continuous ten years of production from the same plant in the Terai region of eastern Nepal.

Keywords: Drumstick, investment, production
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Introduction

Drumstick (*Moringa oleifera* Lam.) belongs to family Moringaceae and is known as the 'Miracle Tree' (Akintunde, Onu, & Tashikalma KA, 2019). It is indigenous to the northern foothills, which includes Northern India, Pakistan, and Nepal (Leone, et al., 2015). Drumstick is a fast-growing, multipurpose tree of significant economic importance and has high nutritional values, several industrial and medicinal uses (Mabapa, Ayisi, & Mariga, 2017). Almost all parts of the tree, including leaves, flowers, fruit, bark, and roots, are useful (Seifu & Teketay, 2020). Drumstick is easy to propagate due to its minimal requirements for nutrients and water under basic cultural management (Rahim, 2017). It is grown in Nepal's Terai region and in the eastern hills on 114 hectares of land, producing 2,228 metric tons annually (MoALD, 2020). Farmers are still unaware of the profitability of the drumstick enterprise, so production is limited to backyard farming. Thus,

this study analyses the financial feasibility of the drumstick enterprise in the Terai region of eastern Nepal to explore the potential of the drumstick enterprise for encouraging farmers for its commercial production.

Material and Methods

Siraha district of Madhesh Province from eastern Nepal was purposively selected for the study in the fiscal year (FY) 2020/21. The primary information on drumstick production was gathered using semi-structured interview schedule from 105 drumstick producers through a household survey. Additionally, interviews with seven key informants involved in drumstick sub-sector from different parts of the country, and three focus group discussions were conducted in the selected municipalities namely Siraha, Kalyanpur and Karjanha of Siraha district. The relevant literature were reviewed for secondary information. The profitability analysis involves the calculation of Benefit Cost Ratio (BCR), Net Present Value (NPV), Internal Rate of Return (IRR), sensitivity analysis, and Payback Period (PBP) of drumstick production on a hectare of land for a continuous ten years and each five years of drumstick production.

Results and Discussion

Cost of drumstick production

The total cost of production was calculated by adding the initial investment and the total variable cost of production. The total investment cost calculated for cultivation of drumstick on one hectare of land was NPR 512,250 for both the continuous ten years and the first five years of drumstick production. Additionally, the initial investment cost for the second five years of drumstick production was NPR 136,250. The total variable cost for first year was NPR 750, 684 including the cost of the filler crop (onion) for both the continuous ten years and each of the five years of drumstick production. The total variable cost for continuous ten years of drumstick farming in successive years 2nd, 3rd, 4th, 5th, 6th, 7th, 8th, 9th and 10th years were NPR 842,150, NPR 871354.48, NPR 881,562, NPR 881,562, NPR 877,212, NPR 872,862, NPR 866,366, NPR 859,812, and NPR 855,462 respectively. Meanwhile, the total variable cost for each five years of drumstick farming in successive years 2nd, 3rd, 4th, 5th, and 2nd, 3rd, 4th ,5th years were NPR 842,150, NPR 871,354, NPR 881,562, NPR 881,562, and NPR 842,150, NPR 871,354, NPR 881,562, NPR 881,562 respectively.

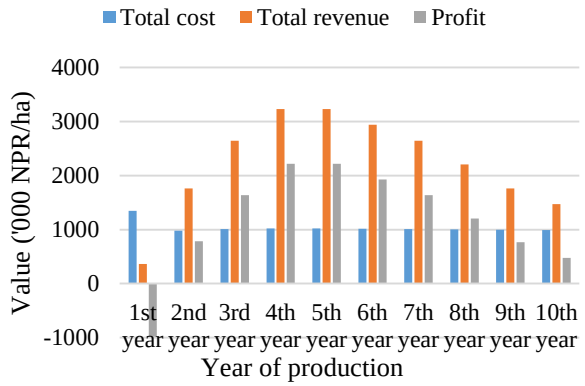

Fig.1:Total cost, revenue and profit of drumstick production for continuous ten years

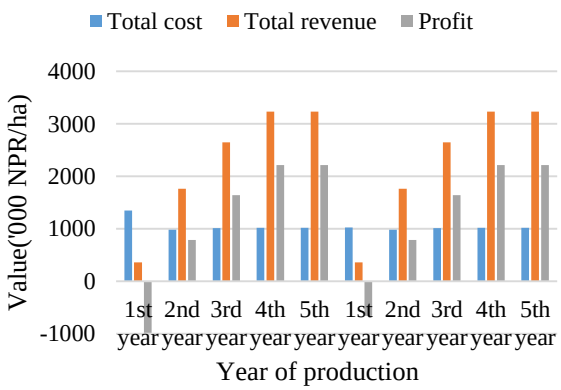

Fig.2: Total cost, revenue and profit of drumstick production for each five years

Benefit Cost Ratio (BCR)

The drumstick plant starts to bear fruits after six months of sowing. The average Benefit Cost Ratio (BCRs) for continuous ten years and each five years of drumstick production was 2.20 and 2.22 respectively, which indicates the profitability of drumstick enterprise. The BCR of drumstick farming per hectare was found to 2.77 in Nigeria (Ojo, Ogunleye, & Alimi, 2016), and in India the BCR of drumstick pods production was 4.17 (Sekhar, Venkatesan, Vidhyavanti, & Murugananthi, 2018).

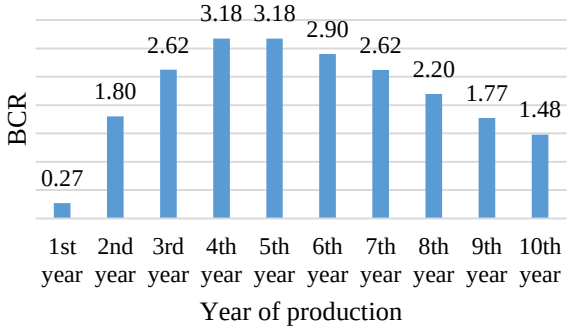

Fig.3: BCR of drumstick production for continuous ten years

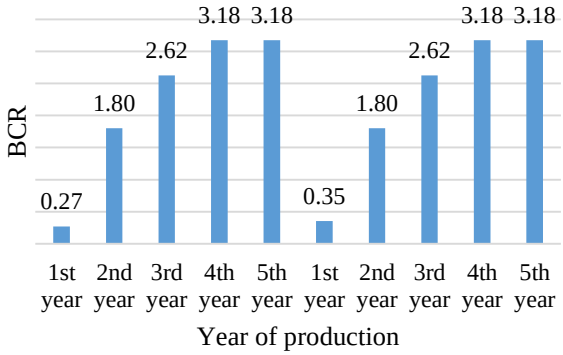

Fig.4: BCR of drumstick production for each five years

Net Present Value (NPV)

The Net Present Value (NPV) was negative for the first year of drumstick production for both continuous ten years and each five years; the value of NPV was positive for successive years of production. The overall NPV of the drumstick enterprise was positive for continuous ten years of production (NPR 6, 870,992) and for each five years of production (NPR 8,039,131). The result indicates that both enterprises are financially profitable.

Internal Rate of Return (IRR)

The Internal Rate of Return (IRR) for a continuous ten-year and each five-year period of drumstick production was 127.1 percent and 142.2 percent, respectively, which was higher than the prevailing interest rate. The result of IRR revealed that a drumstick enterprise for each five years of production is more profitable. In Tamil Nadu, India, it was found that IRR of drumstick pods production was above 100 percent (Sekhar, Venkatesan, Vidhyavanti, & Murugananthi, 2018).

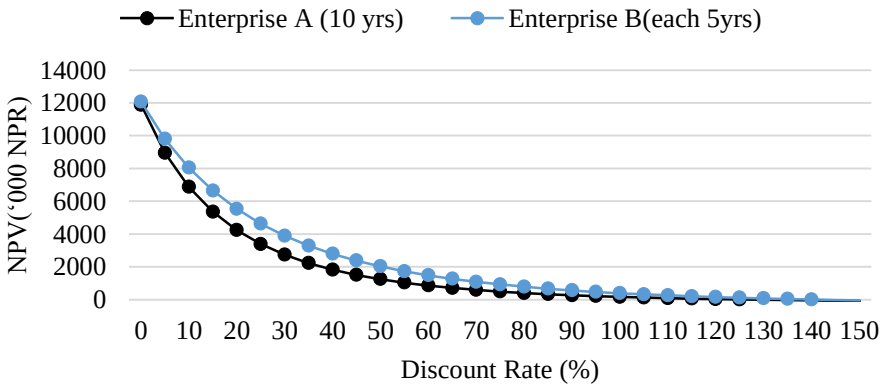

Fig.5: IRR of drumstick production for continuous ten years and each five years

Sensitivity analysis

The sensitivity analysis resulted in a positive Net Present Value (NPV) for both the continuous ten years and each five years of drumstick production. When the cost was increased by ten percent, the NPV was NPR 6,222,987 for a continuous ten-year period and NPR 7,245,011 for each five-year of drumstick production. Similarly, the NPV for decreasing revenue to ten percent was NPR

5,535,888 for continuous ten years and NPR 6,441,098 for each five years of drumstick production. This shows that the drumstick enterprise is not sensitive to either a ten percent increase in total cost or a ten percent decrease in total revenue.

Payback Period (PBP)

The Payback Period (PBP) of 2.56 years for continuous ten years of drumstick production, and 2.56 years and 2.38 years for each five years of drumstick production shows that the drumstick enterprise is financially feasible. In the study conducted in Gujarat, India during 2017 found that the minimum PBP was found 1 year, 4 months, and 2 days (Ritambhara, Prajapati, & Savani, 2017).

Conclusions and Outlook

The proposed financial feasibility of the drumstick enterprise reveals that drumstick farming is profitable up to ten years of production. However, to maximize profits, farmers could establish new orchards by replacing the existing ones after five years of pod production in the Terai region of eastern Nepal.

Acknowledgement

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