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Analysis of drumstick (*Moringa oleifera* Lam.) value chain: a case of eastern Nepal

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Abstract
Drumstick (*Moringa oleifera* Lam.) is categorized as an underutilized and neglected species in Nepal. Despite its nutritional value and potential for income generation, the production of drumstick is limited to backyard farming. Drumstick holds a huge potential for increasing the income of value chain actors, particularly farmers. The purpose of the study was to understand the roles and benefits of value chain actors as well as identify the major problems in the production and marketing of drumstick in eastern Nepal. A total of 148 drumstick value chain actors were interviewed to obtain the primary data, which ranged from the input supply to consumption. The major value chain actors were input suppliers, drumstick producers, local collectors (collecting drumstick from farmers and trading to local large markets), distributors (wholesalers, retailers) for delivering the drumstick to consumers, and ultimately, consumers. The drumstick is marketed mainly through the channel as "producers-local collectors-wholesalers-retailers-consumers". The marketing margin of drumstick was NPR 60 per kg, and the producer's share was 53.8% in the study area. Farmers perceived the diseases and pests as a serious problem in the drumstick production, while marketing intermediaries perceived less and irregular supply of the commodity to meet the market demand as the major problem. Farmers were unaware of the appropriate method of pest management in drumstick production. Technical assistance for drumstick production practices, availability of quality inputs, and value addition can encourage drumstick farmers to propel from the backyard to commercial production. Coordination among the value chain actors and enablers is required to enhance the market information and price control mechanism for increasing the producer's share and strengthening the value chain of drumstick.

Keywords: Marketing, producers, production, value chain actors
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Introduction
Drumstick (*Moringa oleifera* Lam.) is a fast-growing medium-sized tree commonly grown in tropical and sub-tropical climates with almost every part having numerous uses (Ojiako, Adikuru, & Emenyonu, 2011). Drumstick covers 114 hectares of land with 2,228 metric tons of production from the Terai and eastern hills of Nepal (MoALD, 2020). Drumstick is considered as one of the future smart foods by the government of Nepal due to its nutrient content and low cost of production (FAO, 2018). Smallholder farmers can access new markets and improve their livelihoods by strengthening the value chain for several uses of drumstick (Saavedra & Maden, 2015). Despite its potential for nutritional security and income generation, the production of drumstick is still limited to backyard farming. Thus, the study aims to understand the roles and benefits of core value chain

actors and identify the problems faced during production and marketing of the drumstick in eastern Nepal.

Material and Methods

Madhesh Province of eastern Nepal covered 75 ha under drumstick cultivation with 2,024 metric tons of production, and Siraha district produced 132 metric tons of drumstick on 11 ha (MoALD, 2020). Thus, Siraha, Kalyanpur and Karjanha municipalities of Siraha district were purposively selected for the study in the fiscal year (FY) 2020/21. The drumstick producers (105) were selected using the snowball sampling method, and a pre-tested semi-structured interview schedule was employed to obtain the information. The wholesalers (5) from the nearby major vegetable markets and adjoining district's markets, local collectors (5), petty traders/retailers (15), consumers (15) and input suppliers (3) were selected purposively from different markets of Siraha district. The key informant interviews (7) with personnel involved in the drumstick sub-sector and the focus group discussions (3) were conducted using the separate checklists. The value chain analysis includes the value chain mapping, identifying marketing channels, analyzing market margin and producer's share, and the indexing technique to prioritize the production and marketing problems of the drumstick sub-sector.

Results and Discussion

Value chain mapping of drumstick

The value chain involves the three components, namely functions, actors, and the enabling environment. In the study area, major functions were input supply, drumstick production, wholesaling, retailing, and consumption. The seed/saplings, tools and equipment for drumstick farming were supplied by the agro-nurseries. Drumstick growers purchased the micronutrients and pesticides from local agro-vets, and chemical fertilizers were supplied by local agro-vets and cooperatives. The majority of the farmers were using hard wood cutting for propagation of drumstick in their homesteads, as a farm boundary or an isolated plant in fences. Some of them used micronutrients to prevent the flower and fruit drops and pesticides to control the pests. Farmers produced young and mature pods of drumstick for vegetable purpose. The surplus production was either sold to local collectors, petty traders, and wholesalers or traded individually by the farmers. Large-scale production and processing of drumstick (pods, leaves, seeds, roots etc.) did not occur in the study area. Drumstick was sold in loose form to local collectors and wholesalers after primary cleaning by the farmers. The commodity was usually wrapped in gunny bags for distant transport. Meanwhile, farmers/retailers used bicycles, bamboo baskets for carrying the produce to local markets. Retailers practiced hand grading of drumstick based on length and diameter of pods, remove diseased and damaged pods and prepared hand full bundle of half or a kilogram before selling to consumers. Consumers prefer to consume immature drumstick pods as a green vegetable over mature pods due to their taste. The price of drumstick is determined by wholesalers based on demand and supply. The flow of market information was found less satisfactory. The drumstick market still need to be systematized. The Agriculture Knowledge Centre (AKC) is a major government entity for carrying out activities related to the promotion of the sub-sector. So far, limited government and non-governmental agencies have provided technical knowledge and inputs to the farmers. The drumstick carries a cultural significance in *Mithila* culture (consumption on April 14th), but the crop has not been promoted to commercialize as compared to other vegetable production in the Terai region.

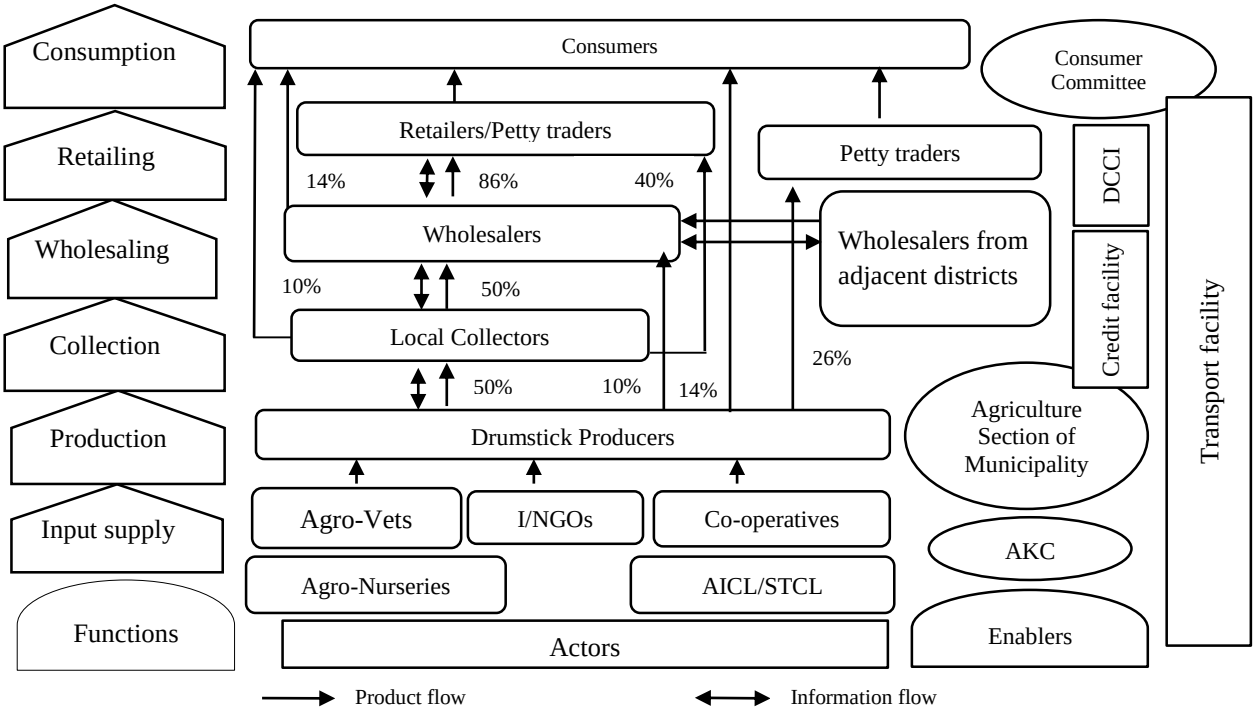

Figure 1: Value chain map of drumstick in Siraha district of eastern Nepal

Marketing channel, marketing margin and producer share of drumstick

There were seven different types of marketing channels for the drumstick flow from producers to consumers in the study area, among which "producers-local collectors-wholesalers-retailers-consumers" was the most prominent. During the season, the fresh pods were collected at an average farm gate price of NPR 70/kg by local collectors and sold to wholesalers at NPR 90/kg. It costs NPR 5/kg for transportation, packaging and load/unload charges for local collectors. The collector's per kg net margin was NPR 15, which accounted for 16.67 percent. Wholesalers sold it at NPR 100/kg to the retailers. The cost incurred by the wholesalers was NPR 1/kg for weighing and packaging, and NPR 1.8/kg for two percent loss through damage or desiccation. The wholesaler's per kg net margin was NPR 7.2. The cost incurred by the local retailers was NPR 1/kg for transportation and load/unload charges. About three percent loss through damage was equivalent to NPR 3/kg, and other cost accounted about NPR 1/kg. The total cost incurred per kg was NPR 5/kg. The net margin per kg was NPR 25, which accounted for 19.23 percent. The post-harvest loss due to transpiration seems to be less due to the short distance to market and high demand for drumsticks. The marketing margin of the product was NPR 60 per kg. The producer's share of the consumer's price of drumstick at different actors' involvement was 53.8 percent.

Figure 2: Marketing margin and producer's share of drumstick

Production and marketing constraints of drumstick

Farmers perceived the incidence of diseases and pests as the major constraints, as they were facing the problems of hairy caterpillar, pod fly, borer, foot rot, gummosis, and wilting during the drumstick production. Pests and diseases were the major constraints faced by drumstick farmers in Nigeria (Baba, Yakubu, Yelwa, & Haruna, 2015). Similarly, insufficient supply of drumstick to meet the market demand is the foremost problem during the marketing of drumstick.

Table 1: Constraints faced by farmers during drumstick production

Constraints	Index Value	Ranking
Incidence of diseases and pests	0.92	I
Less supply of quality inputs (appropriate variety)	0.67	II
Inadequate technical knowledge	0.54	III
Limited knowledge of how to use various parts	0.46	IV
Water logging	0.33	V

Table 2: Constraints faced by intermediaries in drumstick marketing

Constraints	Index Value	Ranking
Insufficient supply to meet market demand	0.82	I
High price fluctuation	0.80	II
Low self-life of commodity	0.77	III
Poor coordination among actors	0.35	IV
Limited value addition of different parts of crop	0.25	V

Conclusions and Outlook

The provision of adequate technical assistance, the availability of quality inputs and value addition for different parts of the crop could encourage farmers to commercialize production of drumsticks. Coordination among value chain actors and enablers is required for proper market information and price control mechanism to increase the producer's share and strengthen the drumstick value chain.

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References

1. Baba, M. D., Yakubu, G., Yelwa, J., & Haruna, L. (2015). Costs and Returns of Moringa (*Moringa oleifera*) Production in Zuru Local Government Area of Kebbi State, Nigeria. *New York Science Journal, 8*(1), 36-40. Retrieved from http://www.sciencepub.net/newyork
2. FAO. (2018). The state of food security and nutrition in the world: Building climate resilience for food security and nutrition.
3. MoALD. (2020). *STATISTICAL INFORMATION ON NEPALESE AGRICULTURE 2076/2077.* SINGHDURBAR, KATHMANDU,NEPAL: Planning and Development Co-operation Co-ordination Division Statistics and Analysis Section,MoALD.
4. Ojiako, F., Adikuru, N., & Emenyonu, C. (2011). Critical issues in Investment, Production and Marketing of *Moringa oleifera* as an Industrial Agricultural raw material in Nigeria. *J. Agric. Res. & Dev.*
5. Saavedra, Y., & Maden, E. v. (2015). *Opportunities for development of the Moringa sector in Bangladesh.* Wageningen,Netherlands: Centre for Development Innovation.