Research Article

Issues in rice marketing system: a case of central terai

Meena Kharel[1], Krishna Prasad Timsina[1], Surya Prasad Adhikari[1], Yuga Nath Ghimire[2], Samaya Gairhe[2], Deepa Devkota[1] and Hema Kumari Poudel[3]

[1]National Agricultural Policy Research Centre, Khumaltar, Lalitpur, Nepal
[2]Nepal Agricultural Research Council, Kathmandu, Nepal
[3]Directorate of Agricultural Research, Lumbini Province, Banke, Nepal
*Correspondence: meenakharel77@gmail.com
*ORCID: https://orcid.org/0000-0002-2759-4967

ABSTRACT

This study was conducted to understand the challenges and prospects of rice marketing by taking case of central Nepal. Two focus group discussions along with eight key informants' interviews were conducted in Bara and Parsa districts of Nepal. Also, secondary information was collected by reviewing the related literatures. The study revealed that the consumer price of rice is almost double than the farm gate price, possibly due to the presence of several intermediaries in different nodes of the supply chain. Key market actors like large collectors, millers and wholesalers have a dominating role in price negotiation and supply of rice in the market. The rice value chain is not strong enough, which might be due to poor vertical and horizontal as well as backward and forward linkages among the key players. The demand of fine and aromatic rice is gradually increasing due to changing food habits of the consumers and their access to purchasing capacity as well. The high yielding short duration varieties of fine and aromatic rice need to be identified and developed to meet the growing demand of consumers. In addition, to boost productivity and profitability of rice, a better investment climate, risk sharing mechanism and strengthened value chain with efficient research and extension services are required.

Correct citation: Kharel, M., Timsina, K., Adhikari, S. P., Ghimire, Y.N., Gairhe, S., Devkota D., & Poudel, H. K. (2022). Issues in rice marketing system: a case of central terai. *Journal of Agriculture and Natural Resources,* 5(1), 164-174.
DOI: https://doi.org/10.3126/janr.v5i1.50712

INTRODUCTION

Rice is cultivated in 1473 thousand hectares with the productivity of 3.81 mt per hectare (MoALD, 2022). About 73% percent of rice is produced in Terai, an extension of Indo-Gangetic plain in South Asia region of Nepal, while 24% is produced from mid hill and 4% from the high hill region (Joshi *et al.,* 2020). It contributes nearly 20% to the Agricultural Gross Domestic Product and around 7% to Gross Domestic Product of Nepal (MoALD, 2022). Rice is the major staple food in Nepal and a prime source of calorie for rural people providing more than 40% of total calorie requirement (Khanal & Badal, 2015). Mainly three types of rice are grown; coarse, fine and aromatic. Fine rice varieties have better taste quality and have 50-100 percent premium price in market and high demand in the Nepalese market

(Sah *et al*., 2002) whereas coarse rice has high milling recovery (Gurung *et al.*, 2010). Nepalese rice consumption behavior is gradually shifted towards the fine and aromatic from coarse rice. To solve the increasing demand of fine and aromatic rice, the government has launched the "Fine and Aromatic rice" mission program in 2015 AD in 20 districts (MoALD, 2015). The coarse and medium rice varieties cover almost 76% and medium fine and fine rice varieties share 17% and 7% of the total milled rice respectively in Nepal (Joshi *et al*., 2020; NAPREC, 2021). Joshi *et al*. (2021) reported that total 133 basmati type rice also called aromatic rice landraces are grown in 60 districts of Nepal and only four basmati type of rice landraces have been registered in National Seed Board. The aromatic rice is highly reputed and very costly. The demand of fine and aromatic rice is gradually increasing due to changing food habits and purchasing capacity of consumers.

Nepal used to export rice including aromatic rice before 1980 (Joshi *et al.,* 2021; Mallick 1981; Gauchan, 2002) to India, China, Singapore and Bangladesh. However, changing rice consumption behavior led to a high demand of rice. Rice grain demand is increasing every year and import of rice is also increasing because of inadequate domestic production, preferences to fine rice, increased road access in hilly areas and increased income level (Gairhe *et al.,* 2020; 2021). Despite various plans and programs, production and productivity of rice is still very low in comparison to other Asian countries. There are many limitations associated with production techniques and marketing mainly on knowledge of grading, market information, excessive intermediaries and price seasonality.A large number of market actors are involved in the rice value chain performing different activities in input supply, production, collection, processing and distribution. A weak marketing system affects the farmers as well as the consumers but also the total economy of the country (Kharel*et al.,* 2021). Each actor utilizes their capital in purchasing paddy/rice and they share price risks and risks of quality losses, storage losses or damages. Rice has marketing issues like grain quality and market price during harvest, milling and storage due to which many intermediaries are involved in the chain.The rice value chain is characterized by a large informal market system (Adhikari *et al.,* 2017). Farmers have to sell their products to the intermediaries immediately after harvest on their offer price because of immediate need of money and lack of storage facilities. Large traders and rice millers play a dominant role in the rice value chain (Dooren, 2005). They have the ability to buy large quantities of rice and store them for a long period of time. In this context, this study was carried out to identify issues related to marketing of coarse, fine and aromatic rice in the study area.

METHODOLOGY

The study was based on a value chain approach. Primary data were collected in November 2019 through Focus Group Discussion (FGD) and Key Informants Interviews (KII). The study was conducted in the Bara and Parsa districts of Nepal. Two FGDs were conducted with the involvement of 23 farmers. Different value chain issues of coarse, fine and aromatic rice from production to marketing were discussed. The discussion particularly focused on the source of inputs (seeds, fertilizers and machineries), cost of production, storage, packaging, drying, market information, selling price, and issues in rice farming and marketing. The checklists were prepared for discussion. Eight KII's were done with paddy collectors (3 KII), millers (2 KII), wholesalers (1 KII) and retailers (2 KII) from both Bara and Parsa districts. KII was focused on input and output prices, cost of handling, transportation, drying, processing, packaging, storage, selling price, and issues and challenges of each actor. Secondary data were collected from Central Bureau of statistics (CBS), Statistical

Information on Nepalese Agriculture 2020/21 and from relevant literature. For the study, both qualitative and quantitative data were used.

RESULTS AND DISCUSSION

The actors in a value chain consist of persons involved in the production, processing, trading and selling of a product. The term value chain refers to a chain of activities that a firm operating in a specific industry performs to deliver a valuable product or service for the market (Porter, 1985). The Sustainable Food Value Chain Development (SFVCD) Framework considers value chain (VC) actors as those who produce or purchase from the upstream level, add value, and sell to the next level along the value chain (FAO, 2014).

In Nepal, the rice value chain actors are the input suppliers who supply inputs to the farmers, farmers who grow rice, paddy traders who collect paddy from farmers from different locations, processors who perform milling activities, rice wholesalers who collect rice and sell, and retailers who sell to consumers. Each actor utilizes their capital in purchasing paddy/rice and they themselves share price risks and risks of quality losses, storage losses or damages. The rice chain involves and includes farmers, small and large traders, rice millers, wholesalers, retailers and consumers. Rice has a long value chain as it involves issues like grain quality and market price during harvest, milling and storage due to which many middlemen are involved in the chain who try to explore possibilities of making individual profits (Adhikari *et al.,* 2017).

In the rice value chain map, the value of the product increases at each stage until it reaches the consumer. Every stage of the value chain depends on goods and services to reach its final stage. At various stages of rice value chain goods and services include land, labor, input suppliers, machinery, transport, energy and finance. The value chain map of rice shows the major functions, actors and their relationship. The rice value chain is characterized by a largely informal market system. The process of rice value chain in Nepal involves production, trading, processing and distribution. Actors and activities involved in each stage of the value chain are discussed below with evidence derived from field study in November, 2019.
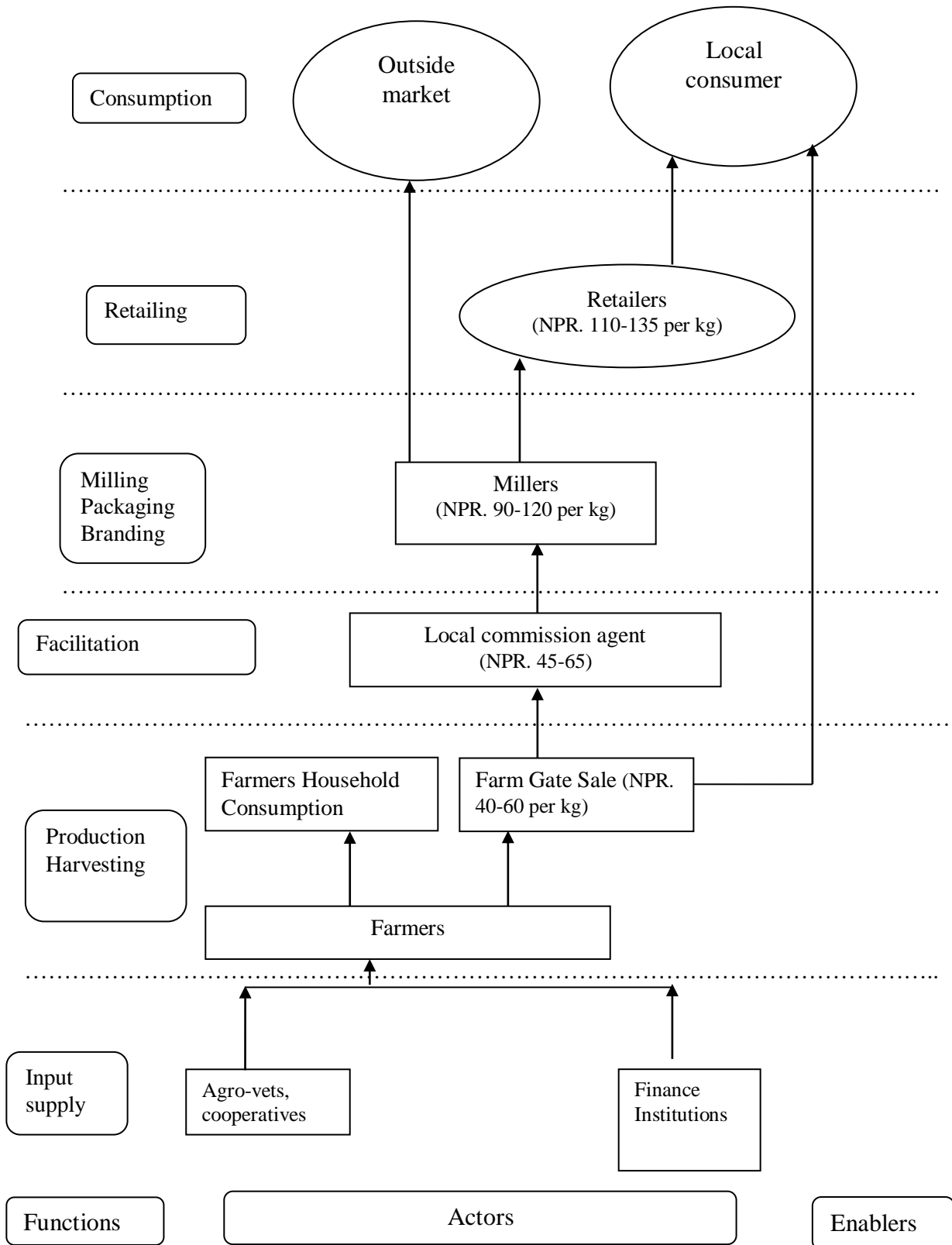
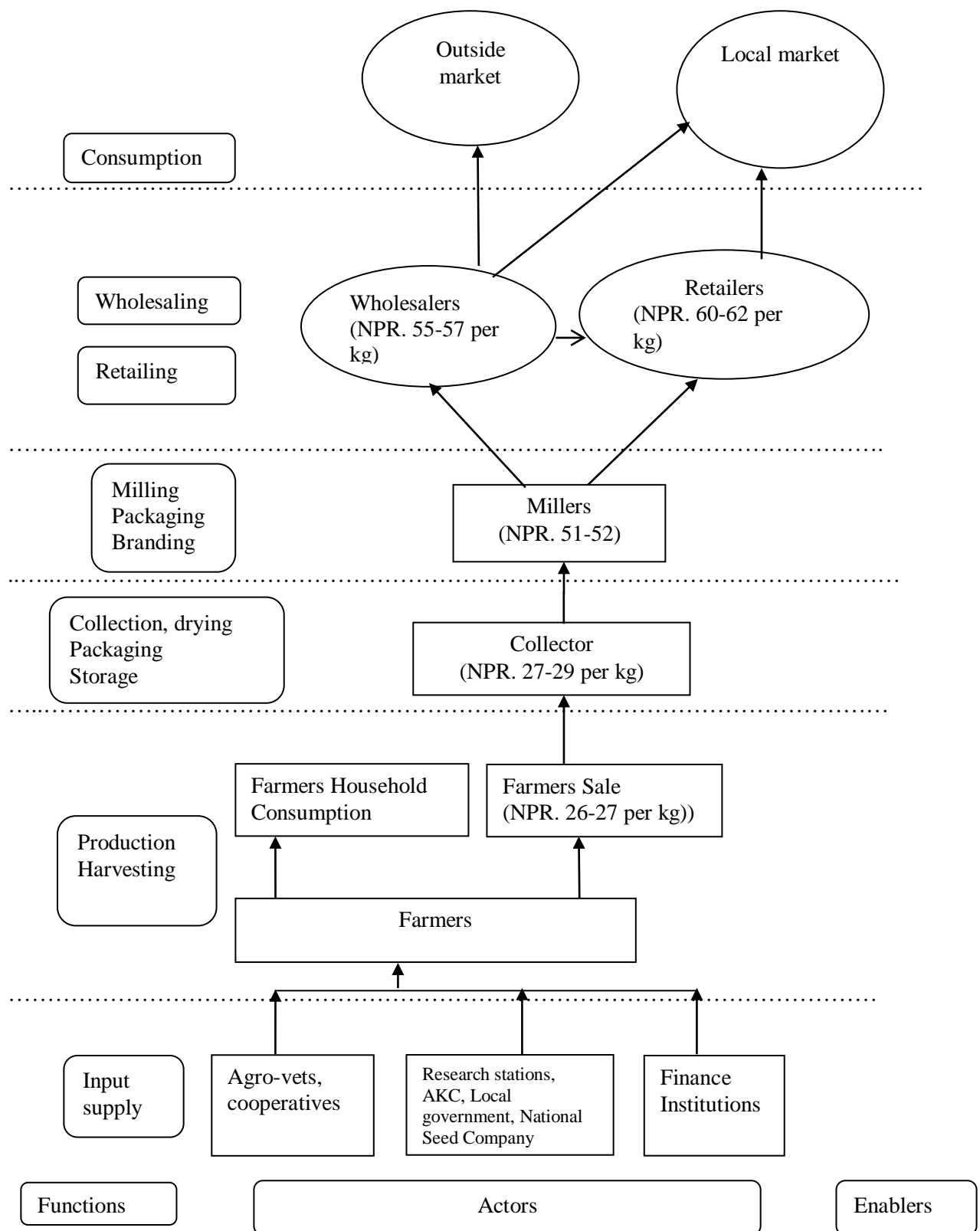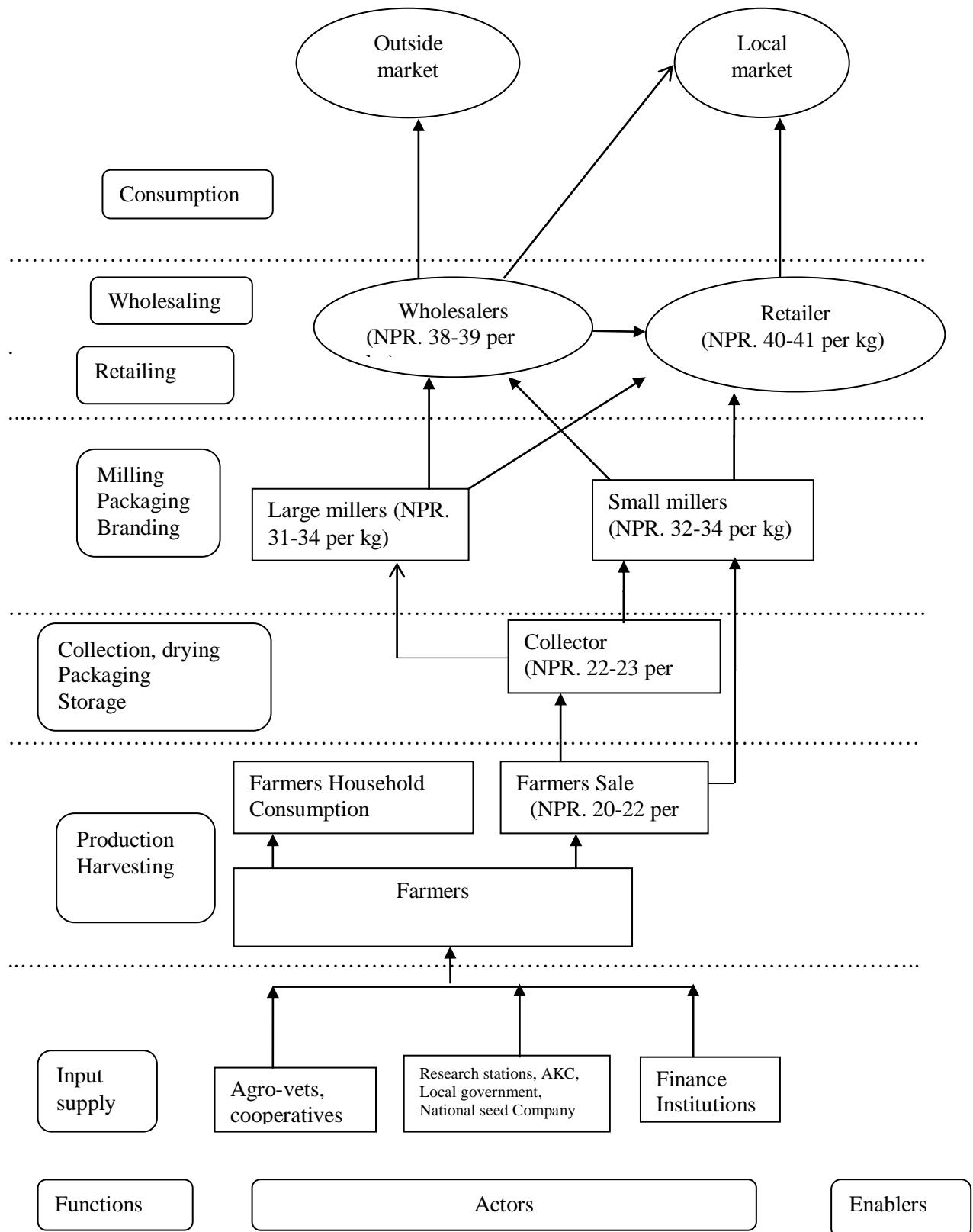**Figure1: Value chain map of aromatic rice in Nepal**

Figure 2: Value chain map of fine rice

Figure3: Value chain map of coarse rice

Producers

FGD participant farmers purchased seeds of coarse and fine paddy varieties from Agrovets whereas they used their own seeds of fine and aromatic paddy varieties. Fertilizers were purchased from cooperatives but in case of shortage, they bought fertilizers from across the Indian border. Farmers used tractors for tillage and thresher on hire basis.

The coarse varieties cultivated were Sona masuli, Sona saru and Hardinath-1, fine variety was Sawamasuli (Kattarni) and aromatic varieties were Kalanamak (Kasturi), Rato Basmati and Seto basmati.Productivity of coarse variety (Sona masuli and Sona saru) was 3.6 t/ha, fine variety (Sawamasuli) was 3 t/ha and aromatic variety (Kalanamak, Rato basmati and Seto basmati) was 1.8 t/ha. Farmers sold Sona masuli to local traders. Most of the farmers sell immediately after harvest while few of them store in locally made storage bins (*Bhakari)* for 7-8 months to fetch higher market price. Farm gate price of coarse paddy was NPR. 20-22 per kg, fine paddy was NPR. 26 per kg while the price of aromatic paddy was NPR. 50 per kg. No packaging required for farmers as traders provide sacks to them. Harvesting is done using reapers and farmers leave harvested crops in the field for drying for a week. Market price is fixed by the traders. Major production constraints were timely unavailability and high price of fertilizers, rain-fed irrigation, disease-pest infestation and lower market price.

In case of aromatic paddy, there is no availability of improved seeds along with other problems like lodging, sheath blight, zinc deficiency and mealy bug infestation. Aromatic paddy is late cultivated after harvesting spring rice. So, harvesting of aromatic paddy coincides with wheat planting causing labor shortage and also obstructs machineries movement to-and-from the wheat field planted after harvesting early rice varieties of neighboring farmers. Therefore, aromatic paddy has been planted only on the road-side plots. At the time of harvesting of aromatic varieties there is high humidity and less sunshine that creates problems in drying. There is uncertain market demand and price of aromatic varieties due to low and sporadic production. So, most of the production is sold directly to the local and distant consumers and in few cases to the millers. Yadav (2018) reported that the development of fine and aromatic rice varieties is essential to meet the present national demand.

Collectors-KII

Mostly the local collectors are found in study sites. Coarse paddy variety (Sona masuli) was mostly procured by the collectors. The collectors bought at the price ranged from NPR. 20-22 per kg. Collectors usually store for 6-9 months which cause quantity loss up to 5 kg per quintal. The value addition activities performed by them were drying, winnowing and storage. Total cost incurred by the collector was NPR. 0.35 per kg. The selling price for collectors is NPR. 23 per kg in harvest season and NPR. 27 per kg after storage. The collector sells to large traders and millers as well.

Millers/Processor-KII

Paddy processing is performed by millers. They perform various functions such as drying, grading, storage, cleaning, husking, paddy separation, polishing, grading, weighing, packaging and branding (Adhikari *et al.,* 2017). Rice milling involves the removal of the husk and the bran layer to produce the edible portion for consumption. Millers also have storage facilities for collecting paddy during harvesting period for processing. The storage

facility is also used for storing milled rice. Millers deliver milled rice to the wholesaler. Some small millers also sell to a retailer or directly to the consumer. Rice bran is used in livestock feed whereas husk is used as bedding material for poultry and livestock.Small scale millers are not directly involved in the marketing; they only take charges of processing or de-husking of paddy grains. However, large scale millers are completely engaged in the buying of paddy and selling fine and coarse rice grains.

The main infrastructure influencing the rice value chain in Nepal is rice milling industry (Joshi *et al.,* 2020). Recently, the government and private sectors are working under rice mill model (RMM). The federal and provincial Governments are planning to replicate the rice mill model in Lumbini and Sudurpaschim Provinces from MOLMAC resources and in Province 1 and Province 2 from PMAMP resources (USAID, 2022). The idea of RMM is based on the reduction of the intermediaries and decrease the margin. The research on the effectiveness of rice mill model is necessary so that it can be scaled up in other provinces in future.

The millers procured coarse, fine and aromatic paddy varieties. Buying price of coarse paddy was NPR. 22 - 23 per kg in harvest season and NPR. 27 per kg for 6-9 months stored rice; fine paddy was NPR. 27-29 per kg and aromatic paddy was NPR. 45-65 per kg. Loss quantity is 5 kg per quintal. Value addition activities were drying, milling, packaging and branding. In case of large millers, other value addition activities include stoning, steaming, whitening, silking, grading and color sorting. Milling cost NPR. 1.25 per kg. Packaging cost NPR. 0.52 per kg. Recovery percentage of coarse varieties is 58 and remaining 42% include bran (9%), broken rice (8%), husk (22%) and inert materials (3%). Selling price for bran is NPR. 31- 32 per kg, broken rice NPR. 32.5 per kg, husk is NPR.7.25 per kg including packaging. Millers sold coarse rice at NPR. 31-34 per kg, fine at NPR. 51-52 per kg and aromatic rice at NPR. 90-120 per kg. in the study sites, millers complains for 3 month only demand is fulfilled by domestic paddy production whereas for rest of the period, domestic production can fulfill only about 60-70% and remaining 30-40% is fulfilled by importing paddy from India. Out of the total paddy imported from India, 60% is fine and 40% is coarse rice.

Wholesalers –KII
Wholesalers buy only coarse and fine rice grains from millers and sell it to local retailers or outside the district. Some of the wholesalers import rice, especially fine and aromatic rice from the border areas and supplies to the urban areas. Wholesalers purchased coarse rice at NPR. 31-34 per kg and fine rice at NPR. 51-52 per kg.

Retailers-KII
The wholesalers sell to retailers. The purchased price of coarse rice was NPR. 38-39 per kg, fine rice at NPR. 55-57 per kg and aromatic rice at NPR. 90-120 per kg. They sold coarse grain at the price of NPR. 40-41 per kg, fine rice at NPR. 60-62, and aromatic rice at NPR.110-135 per kg to the consumers.

Import and export
The domestic production of rice is not sufficient to meet its growing demand. In the year 2021 the rice accounts 0.001% of total export from Nepal. The value of export was $ 26 thousand in the same year. On the other hand, the import value is $ 451 million. The export destinations in 2021 were Canada, Korea and India whereas the imported 99 % from India and others from USA, China, Thailand and other countries (Trendeconomy, 2021). NAPREC

(2021) revealed that the increase in per capita income is the major driver of increasing rice imports in Nepal and the country cannot attain self-sufficiency until 2050 under the current rice productivity growth and population growth of 1.47% and 1.3% per annum respectively over three decades (Timsina *et al.*, 2022).

CONCLUSION

The production and productivity of rice is increasing over the years; however, the import of fine and aromatic rice is increasing continuously due to changing food habits, urbanization, and city dwellers towards the preference of fine aromatic rice for Nepalese consumers.The demand for aromatic rice is growing these days also due to the increasing purchasing capacity of the consumer. To narrow down the gap of demand and supply of fine and aromatic rice its production and productivity needs to be increased. There are several intermediaries and actors involved in the rice value chain and even in its marketing. Farmers are weak in price negotiation as the local traders are more dominant in fixing the market price of rice. It is also due to the inadequate storage facilities and access to market information system. In addition, it is observed that consumer price is almost double than farm gate price of coarse, fine and aromatic rice, which might be due to the presence of several intermediaries in the supply chain. To reduce the gap between farm and consumer price, and to address drying problem; rice mill model might be an effective solution to promote domestic production through ensuring market. Therefore, further research on effectiveness of rice mill model is suggested to identify the best practices before scaling out the model. Hence, there should need to strengthen research and extension coordination for increasing the productivity of fine and aromatic rice varieties in the different agro-climate regions. Moreover, it is equally importance to increase access towards proper storage facilities to get higher price of rice.

Authors' Contributions
All authors were involved in designing the research plan. MK, SPA, DD and HKP collecteddata. MK drafted the manuscript. KPT, SPA, YN and SG critically revised the manuscript for the finalization of the paper.All authors listed have made a substantial, direct and intellectual contribution to the study, and approved it for publication.

Conflict of Interest
The authors declare that there is no conflict of interest regarding the publication of thismanuscript.

REFERENCES
Adhikari, S.P., Shrestha, H.K., & Lamichhane, J. (2017). Anlaysis of Rice Marketing Systems in Eastern Nepal. *Proceedings of the 12th National Outreach Research Workshop*, 18-19 June, 2017. Outreach Research Division, NARC, Khumaltar

Dooren, Ir. CV. (2005). Rice Value Chain Analysis. https://lib.icimod.org/record/11985/files/5197.pdf

FAO. (2014). A regional strategy for sustainable hybrid rice development in Asia. Food and Agriculture Organization of the United Nations Regional Office for Asia and the Pacific Bangkok

Gairhe, S., Gauchan, D., & Timsina, K. (2021). Temporal dynamics of rice production and import in Nepal. *Journal of Nepal Agricultural Research Council*, 7:97–108. https://doi.org/10.3126/jnarc.v7i1.36932

Gairhe, S., Shrestha, H., & Timsina, K. (2018). Dynamics of major cereals productivity in Nepal. *Journal of Nepal Agricultural Research Council*, *4*(1), 60-71. https://doi.org/10.3126/jnarc.v4i1.19691

Gairhe, S., Yadaw, R.B., & Timsina, K. (2020). Status of rice after NARC establishment in Nepal. **In**: Proceedings of 29th National Summer Crops Workshop (Bhandari D, HK Upreti, R Shrestha, J Tripati, HK Shrestha, KK Mishra, BK Joshi, AR Ansari, BP Tripathi, S Baidya, J Shrestha, M Tripati, P Paneru eds), held on 17-18 June, 2018 at Regional Agricultural Research Station (RARS), Lumle, Kaski, Nepal. Nepal Agricultural Research Council.519-531

Gauchan, D., Rijal, D., Mudwari, A., Shrestha, K., Joshi, M., Gyaweli, S., Sthapit, B., Upadhyaya M. & Jarvis, D. (2003). Benefits from on-farm conservation of crop diversity: experience of Nepal's in situ agrobiodiversity conservation project. In: Gauchan, D., Sthapit BR, Jarvis DI, editors. Agrobiodiversity conservation on-farm: Nepal's contribution to a scientific basis for national policy recommendations [Internet]. Rome, Italy: IPGRI; 2003. p. 32–36.

Gurung, G.B., Khanal, N.P., Sapkota, A., Bhandari, B., &Upreti, A. (2010). Value Chain Analysis of Rice in Rupandehi District. Bharatpur-2, Kshetrapur, Chitwan: Forum for Rural Welfare and Agricultural Reform for development.

Joshi, B.K., Ghimire, K.H., Bista, P.R., Yadaw, R.B., Shrestha, R.K., Kharel, G.K., Paneru, P., KC, R.B & Bhandari, D. (2021). Intellectual Property Right on Basmati Rice: Current Scenario and Evidences of Origin, Diversity, Cultivation and Use Values of Basmati Rice in Nepal. *Nepal Journal of Biotechnology, 9,* 93-108. 10.3126/njb.v9i1.38671.

Joshi, K., Upadhyay, S., Chaudhary, P., Shrestha, S., Bhattarai, K. & Tripathi, B. (2020). The Rice Processing Industry in Nepal: Constraints and Opportunities. *Agricultural Sciences, 11*, 1060-1080. doi: 10.4236/as.2020.1111069.

Khanal, S., & Badal, M. (2015). Characterization of Available Rice Varieties through Diversity Block in Makwanpur and Sarlahi Districts, Nepal. EC Agriculture 2.2, 307-316. :https://www.researchgate.net/publication/313720259

Mallick, R.N. (1981). Rice in Nepal. Kathmandu: Kala Prakanshan.

MOALD. (2015). Rice Varietal Mapping In Nepal: Implication for development and Adoption. Hariharbhawan, Lalitpur, Nepal: Crop Development Director.

MoALD. (2022). Statistical Information on Nepalese Agriculture 2020/21. Ministry of Agricultural Development. Agriculture Statistical Section. Singh Durbar, Kathmandu.

NAPREC. (2021). Annual Report 2077/78 (2020/21). National Agricultural Policy Research Centre. Nepal Agricultural Research Council (NARC), Khumaltar, Lalitpur, Nepal.

Porter, M.E. (1985).Competitive Advantage: Creating and Sustaining Superior Performance. New York: Simon and Schuster

Sah, R.P., Bhandari, H.S., Thapa, B., & Ghimire, K.H. (2002). Development of fine and aromatic rice in the western hills of Nepal. Lumle Seminar Paper, Agriculture Research Station, Lumle.

Timsina, KP., Gauchan, D., Gairhe, S., Subedi, SR., Pokhrel B.B., Upadhyay S., & Joshi, K. D. (2022). Can Nepal be self-sufficient in rice production to meet future demand?

TrendEconomy.(2021).Annual International Trade Statistics by Country (HS). https://trendeconomy.com/data/h2/Nepal/1006

USAID. (2022). Nepal knowledge-based integrated sustainable agriculture in Nepal. Kisan II project, Provisional plan for coordination with the government of Nepal Feed the future. https://pdf.usaid.gov/pdf_docs/PA00X1T8.pdf

Yadav, R.P., Tiwari, D.N., Yadav, R.B., Shah, P., & Akhtar, T. (2018). Fine and Aromatic Rice Improvement for Central Terai of Nepal. Proceedings of the 29th National Summer Crop Workshop (17-18 June, 2018)