

Fish Marketing System in Nepalgunj Sub-Metropolitan City, Banke Lumbini Province, Nepal

Ankit Kumar Singh^{1*}, Bhesh Raj Chaudhari², Amarnath Prasad³

¹PhD Scholar, Central Department of Zoology, Tribhuvan University, Kirtipur, Kathmandu

²Assistant Professor, Department of Zoology, Mahendra Multiple Campus, Nepalgunj

³Associate Professor, Department of Zoology, Mahendra Multiple Campus, Nepalgunj

¹Corresponding Author: (Email: akssinghankit1@gmail.com)

*ORCID ID: <https://orcid.org/0000-0001-7870-5930>

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Abstract

The fish market is an active and complex industry that involves the purchasing and marketing of fish and related products. It is a crucial part of the comprehensive food system, providing a valuable source of protein and other essential nutrients to humans. The present study was carried out in the Nepalgunj sub-metropolitan city in Banke district, well known for fish varieties and traditional recipes. A total of 72 respondents including shopkeepers and workers from 25 shops were interviewed based on a semi-structured questionnaire, which included marketing structure, literacy of fish traders, knowledge of fish preservation and sanitation, resource preference, transportation system, demand & trade, and constraints of fish marketing. The study reported 14 fish species and one *Penaeus* species belonging to arthropods, also considered locally as a fish variety and imported to the Nepalgunj fish market as 'Jhinggemachha'. The fish marketing system in Nepalgunj was reported poor and unsystematic in the lack of proper market infrastructure and facilities. The local government should develop a proper plan to monitor and improve the market hygiene and quality of products in the current fish marketing system.

Keywords: fish species, marketing system, Nepalgunj, transportation

Introduction

Nepal is a landlocked located in the Himalayan region of Southeast Asia. Its diverse topography ranges from the high Himalayas to the plain Terai, which has furnished a wide range of aquatic habitats (Labh et. al., 2017). The country is well known as the second richest country in the world for water resources, which vary in their forms, size, nature, origin, life, and other physical and biological characteristics. These resources serve as a habitat for a variety of freshwater organisms, including fish species (Gurung, 2003). A diverse group of fish species was known from different parts of the country, where about 230 were native species (Rajbanshi, 2012). Along the Banke district, more than 40 species of fish were known including commercial non-native fishes (Chaudhary, 2022). Native species were well diverse belonging to 104 different genera under 32 families, and 11 orders (Rajbanshi, 2012). Being a common dish in the Nepalese kitchen during festive moments as well as in regular diet, it has a well-spread market in the society. These local markets cover both native fishes and commercial non-native fishes on a regular and seasonal basis. Such a fish market has a composite route including farmers, fishers, wholesalers, and retailers that regulate fish production and consumption (Husen, 2019; Gupta

&Gupta 2008). These markets are typically busy and vibrant, with vendors competing to sell their catch to customers.

In Nepal, fish industries are small but potentially significant parts of agriculture, contributing about 1.7% to the agricultural GDP (Pradhan & Shrestha, 2014; FAO, 2020). Growing public attention on healthy food raised the demand for organic products, which is further enhanced by attractive returns and an advantageous market for income generation to local people.

Research Objectives

to analyze the Fish marketing system of Nepalgunj Sub-Metropolitan City
to explore varieties of fish available in the fish market of Nepalgunj
to find out the fish marketing channels and problems

Limitations of the Study

The study was carried out only in the Nepalgunj Sub-metropolitan city therefore the whole fish market of the district Banke was not included.

Literature Review

Fish production in Nepal increased over the last few years from 46,779 tons in 2006/07 to 83,898 tons in 2015/16 (DOFD, 2016/17). Despite this, the local markets can only meet about 40% of the demand, rest were imported from India (Gurung, 2014; Mishra & Kunwar, 2014). There are about 1700 fish markets, more than 22,000 local farmers, and about 70 live fish-selling stalls in the country (NFS, 2017). With increased supply and demand, fish industries face several challenges in the lack of infrastructure and modern storage facilities, transportation, and market access (Kumari, 2015; Budhathoki & Sapkota, 2018). These factors affect the quality of fish available to customers and make it difficult for farmers and traders to get good prices for their products as well (Husen, 2019).

The marketing system and structure are among the most important determinants of socioeconomic conditions and production systems (Chourey et al., 2014). Fish and fish products are among the highest nutrient-content food in the world that play a crucial role in changing food systems and malnutrition (Tidwell & Allan, 2001; Chan et al., 2019). The fish marketing system has a long chain from cultivars to the customers, where transportation, storage, preservation, and market hygiene play an important role to secure the quality of fish and its products as well as in the expansion of the fishing industry and fish production (Chourey et al., 2014). The major problem in fish marketing was inadequate cold storage, poor water, and ice supply, costly transportation system, and poor sanitary facilities in Jamalpur Bangladesh (Islam et al., 2021).

There was an insufficient study regarding the fish marketing system in Nepalgunj, so the systematic study of these factors is essential to understand fish's market status and quality.

Research Methodology

Study Area

The study was carried out in the Nepalgunj sub-metropolitan city of Banke district, Lumbini province. It relates to the northern border of Bahraich district in Uttar Pradesh, India. It has an area of 2,337 km² and is located at 81°37'-81°42' E and 27°90'-28°20' N. Since the area has easy access to all the services, people from different highland and lowland areas reside for their livelihood convenience. In total, 166,258 people reside in the area with almost equal numbers of males and females living in a mixed community of Brahmin, Chhetri, Madhesi, Tharu, Magar, and others (NPHC, 2021). The major religion was Hindu followed by Muslim, Sikh, and Christian. Agriculture is the major occupation followed by poultry farming, fish farming, clinical business, construction, and others. (NPHC, 2021).

Data Collection & Analysis

The data was collected over one month from November 20th to December 20th, 2021. Field surveys were done for the data collection. By using questionnaires, interviews, and direct observation primary data were collected and considered authentic and reliable information. A total of 72 shopkeepers from 25 shops were interviewed based on semi-structured questionnaires, which included marketing structure, literacy of fish traders, traders' interest in fish marketing, knowledge of fish preservation and sanitation, resources preference, transportation system, demand & trade, and constraints of fish marketing. Data were entered, analyzed, and presentations (tables, charts, diagrams, figures) were prepared in Microsoft Excel 2011.

Result and Discussion

Fish Variety in Nepalgunj Market

The present study included 72 respondents from 25 shops of fish sellers. All the respondents were male and involved in the fish trade directly either as wholesalers or retailers. In total 15 species of fish were known to be marketed in the Nepalgunj city area (Table:1) in both dried and fresh form. All the species were belonging to different genera and were known in the local market by their vernacular names (Table:1). The people in the lowland area of the country were connoisseurs of unique taste in fish variety and dishes as a special part of their traditional and cultural recipes mainly among indigenous people (Pathak, 2007). To meet the preference of customers, markets provide these varieties of fish instead of one. A similar study from the other part of the country also revealed more than 10 species of fish common in their local market (Pradhan et al., 2017; Husen, 2019; Koirala et al., 2021). These diverse varieties of fish show more similarity with species of lowland and some are even common to that of highland (Khanal et. al., 2020).

Table1

List of Fish Species in Nepalgunj Market

S. N.	The scientific name of the species	Local name	Common name	Family	Order
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1.	<i>Labeo rohita</i> Hamilton	Rohu	Indian Major carp	Cyprinidae	Cypriniformes
2.	<i>Cirrhinus mrigala</i> Hamilton	Naini	Indian Major carp	Cyprinidae	Cypriniformes
3.	<i>Clarias batrachus</i> Linnaeus	Mangur	Walking catfish	Clariidae	Siluriformes
4.	<i>Catla catla</i> Hamilton	Bhakur	Indian Major Carp/ Catla	Cyprinidae	Cypriniformes
5.	<i>Cyprinus carpio</i> Linnaeus	Kamal kar	Common carp	Cyprinidae	Cypriniformes
6.	<i>Ctenopharyngodon idella</i> Valenciennes	Grass kar	Grass carp	Cyprinidae	Cypriniformes
7.	<i>Wallago attu</i> Bloch & Schneider	Padhni/ Buhari	Catfish/ Sheet fish	Siluridae	Siluriformes
8.	<i>Hypophthalmichthys molitrix</i> Valenciennes	Silver kar	Silver carp	Cyprinidae	Cypriniformes
9.	<i>Mystus seenghla</i> Saykes	Sujwa	Catfish	Bagridae	Siluriformes
10.	<i>Macrogonathus aculeatus</i> Bloch	Bam machha	Eel	Mastacembelidae	Synbranchiformes
11.	<i>Puntius chilinoids</i> McClelland	Sidra machha	Swamp barb	Cyprinidae	Cypriniformes
12.	<i>Clupisoma garua</i> Hamilton	Baikhi	Jalkapoor	Schilbeidae	Siluriformes
13.	<i>Pangasius pangasius</i> Hamilton	Jalkapoor/ prayash	Pangas catfish	Pangasiidae	Siluriformes
14.	<i>Tor putitora</i> Hamilton	Mahseer	Golden mahseer	Cyprinidae	Cypriniformes
15.	<i>Penaeus</i> spp (Arthropoda)	Jhingemachha	Shrimp	Penaeidae	Decapoda

Fish Market in Nepalgunj

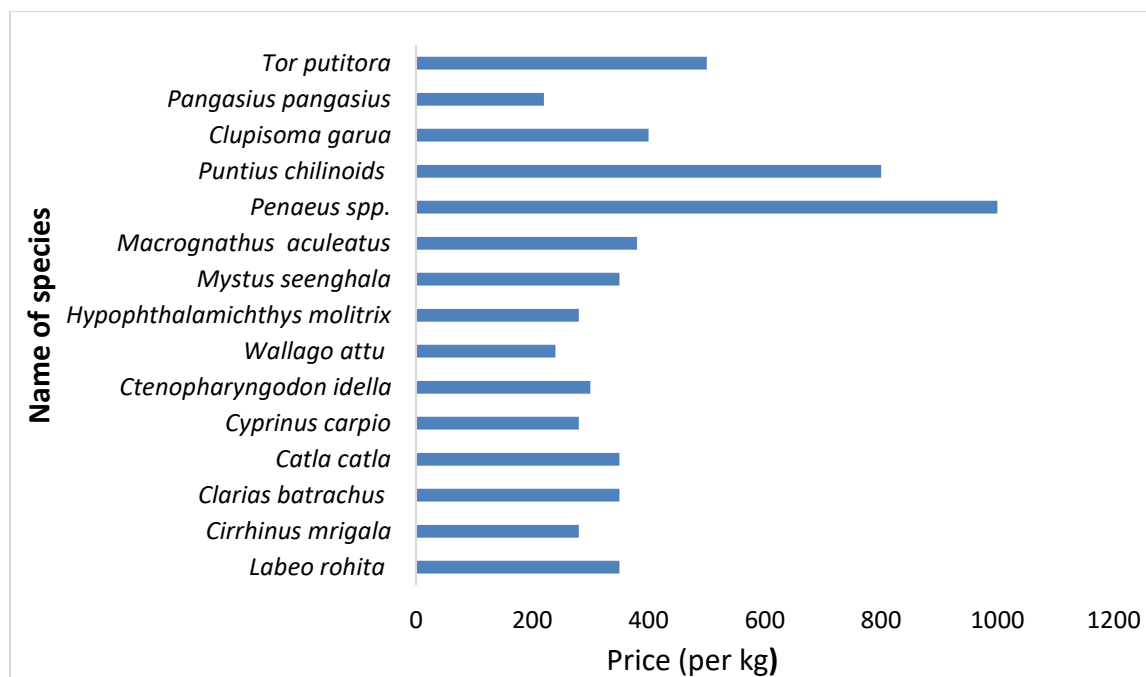
In total 6 wholesale and 19 retail shops were reported with 72 labours in Nepalgunj city, where people work on a daily-wage basis except the owner himself. The market remained open for a few hours in the morning before they move for day work and in the evening from 3 pm onwards. Shops remain closed before 7 pm during winter and open until 8 pm during summer. Although fish farming and trade had occupied a significant market in the study area, it was only a side business which might be due to less payment or profit margin in the market which might be insufficient for the livelihood of the involved people.

Market retail prices for different fish species were different varying from 220 to 1000 NRs (Fig. 1). Arthropod species i.e., *Penaeus* sp, considered as Jhingemachha in the local fish market and sold in dried form, fetched the highest price followed by another dried fish species *Puntius chilinoids* (Sidra machha). *Cirrhinus mrigala*, *Cyprinus carpio*, *Hypophthalmichthys molitrix*, and *Pangasius* spp comparatively fetched lower prices. The taste preference and supply-demand ratio determined the fish price range in the Nepalgunj market. The present fish price in

the market was just after the festive time, in the month of November and December, and more interestingly time of festivals also affected the fish price (Pinnegar et al., 2002). During the festive and winter season demand and supply of fish reached the highest among all other months (Pradhan et. al., 2017). Similarly, the body size and catch weight of fish also determined the fish price (Zimmermann et. al., 2011; Zimmermann and Heino, 2013). The location of the market, form (dry/fresh/live), demand, and access to public transportation might be other determinants of the fish price. Here the highest price of Jhingga Maccha might be due to its dry selling form and very small size.

Figure 1

Per KG Fish Price

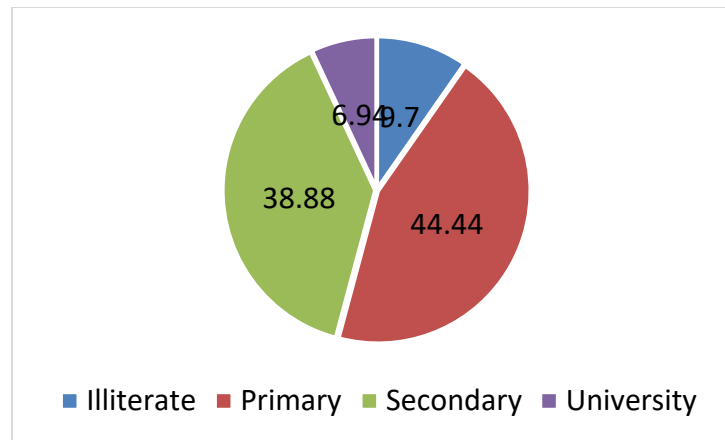


Educational Status of Fish Traders

Among the workers, some (9.72%) were illiterate (could not read and write) and the remaining were literate with the highest percentage (44.44%) of workers completing primary level study followed by secondary level (Fig. 2). Similar result with the highest proportion of primary literacy was reported from Bangladesh (Alam et al., 2015). Both studies revealed a similar literacy proportion which might be because fish markets were growing businesses in the present context of people being aware of health.

Figure 2

Educational Status of Fish Traders



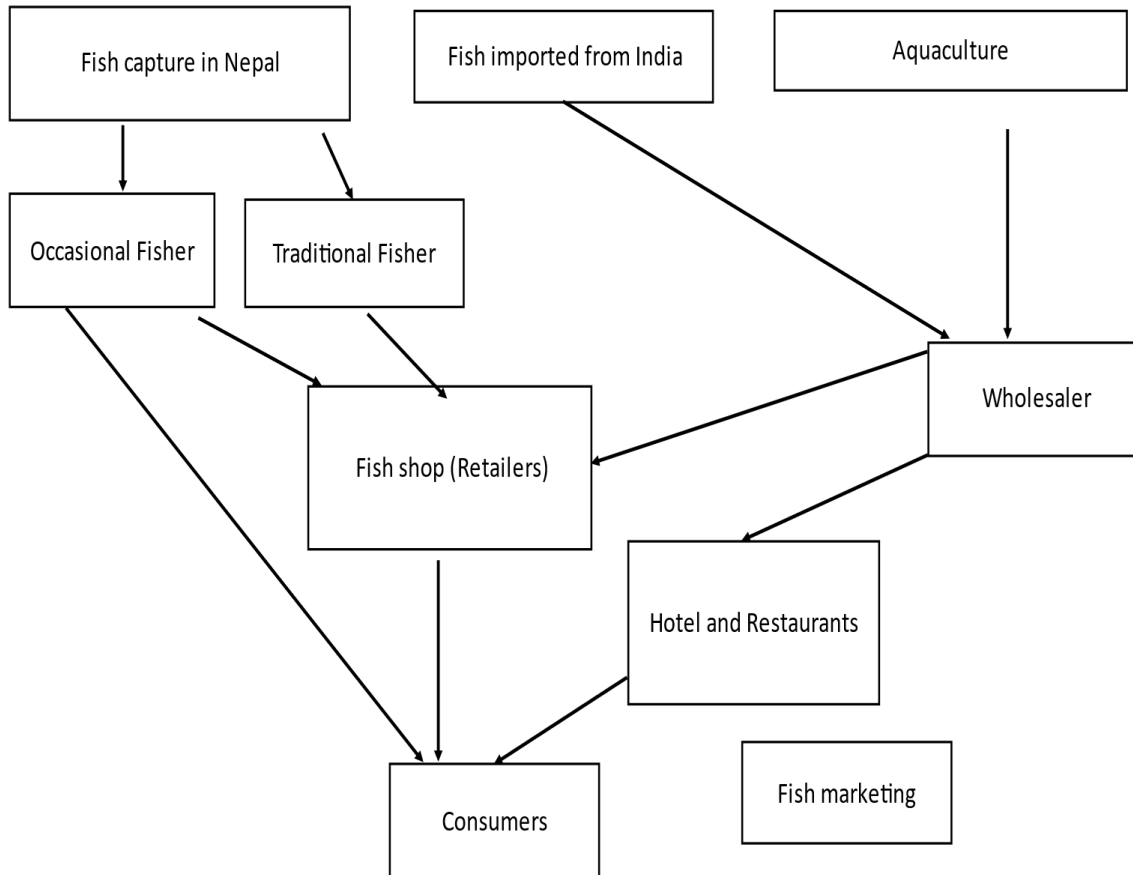
Similarly, most of the fishes were known to be traded from India, the neighbouring country however some are local varieties from farming pools, and freshwater ponds and rivers of Banke, Bardia, and Dang districts. The major species traded in the fish market of Nepalgunj were *Labeo rohita*, *Cirrhinus mrigala*, *Clariabatrachus*, *Catlacatla*, *Cyprinus carpio*, *Ctenopharyngodon Idella*, *Wallago attu*, *Hypophthalmichthys molitrix*, and *Mystusseengahla*. A large volume (80%) of fish consumed in Nepalgunj was marine and imported from India and only about 20 % were freshwater fish species imported from growing pools and rivers of Banke, Dang, and Bardia districts. Previous studies also recorded diverse species of fish from both freshwater and marine sources in the Nepalese market (Pradhan et. al., 2017; Husain,2019). People of the highland also prefer to enjoy the varieties of fishes thereby and have adopted fishing as a traditional occupation in some groups (Swar, 1980).

Fish marketing channel in Nepalgunj

In Nepalgunj, there were basically three routes of fish marketing (Fig.3). Market dealing by middlemen has created somehow easy route for product selling, though it makes a huge difference in production and selling costs in another site. Most of the fish produced were consumed in the local market (Labh et. al., 2017). Contractors were major people involved in large-scale fish marketing (Mishra & Kunwar, 2014; Karki, 2016). However, local farmers and fishermen directly reached the market or consumers based on preference, access, and demand of consumers for selling their products.

Figure 3

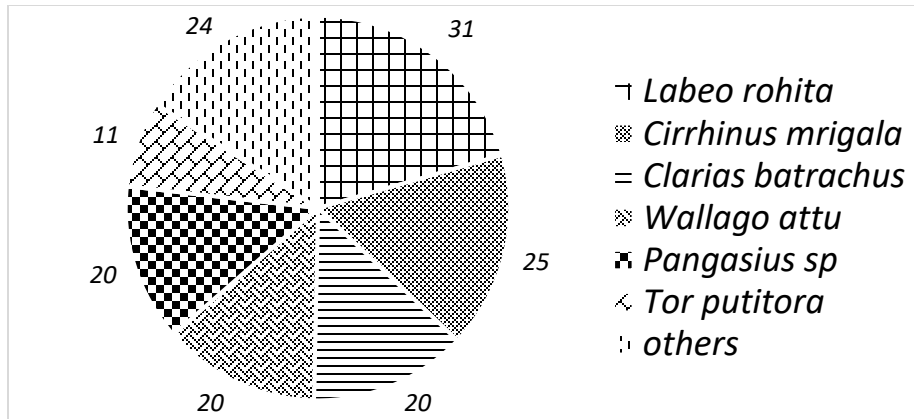
Fish Marketing Channel



Furthermore, comparative analysis revealed a higher (21%) market occupied by *Labeorohita*, followed by *Cirrhinusmrigala* (17%), *Clariusbatrichus*(13%), *Wallgoattu*, *Pangasius spp.*, and *Tor puttitora*. There was the least difference in Consumers’ preferences such that a nearly equal proportion of market sharing was reported (Figure.4). It might be due to taste and price which play the role of major factors in the selection of fish for consumption. Some other species that were least reported in the market (such as shrimp, and Prawns) might be due to their dry form with more abundance and additional properties than a major one.

Figure 4

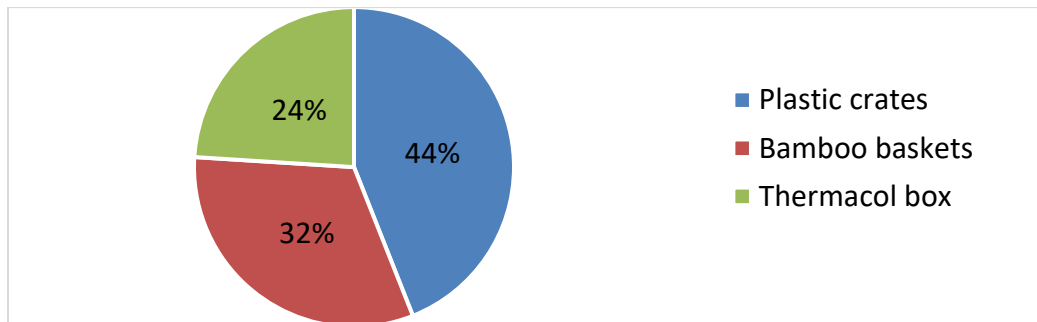
Market share by different fish species in Nepalgunj



The fish varieties were imported from different parts of the country and even outside the country as mentioned in the above finding, which implies the need for proper carrying tools for transportation from one to another place. The study listed three major containers used by local traders (Fig. 5). Plastic crates were commonly used as carrying tools by most traders (44%) followed by bamboo baskets (32 %) and thermacol boxes (24%). The choice of fish packaging might have depended on a variety of factors, including the type of fish being transported, distance, durability, and preservation. For proper and healthy fish packing, preservation, and carrying these varieties of tools have been used in other places as well (Paul et. al., 2016).

Figure 5

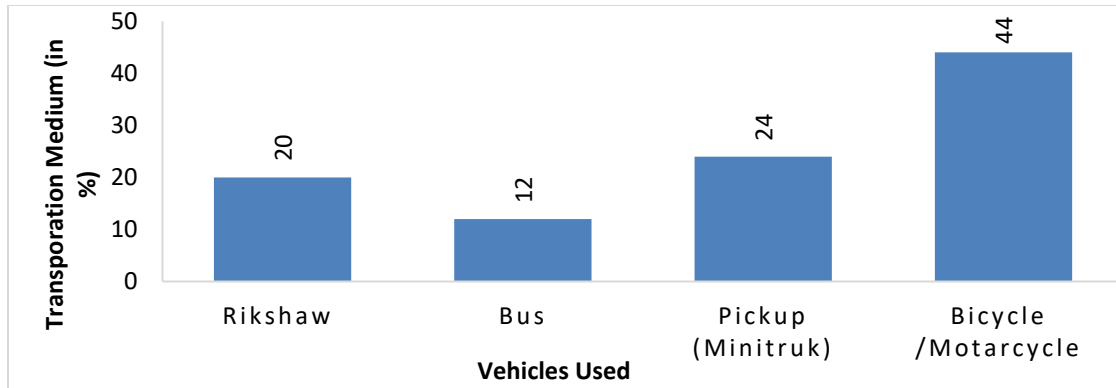
Packing containers used by different shops



Major transportation vehicle was two-wheeler (cycles and bicycles: 44%) followed by four-wheelers and three-wheelers in smaller proportion (12-24%) by minibus, rickshaw, and buses (Fig.6). The result showed that mainly cycles or motorcycles were used for fish transportation in the local market, while pickup or minitrucks were used for long-distance transportation in Nepalgunj. Traditional transportation practice was common for fish transportation in Nepal (Husen et. al., 2021).

Figure 6

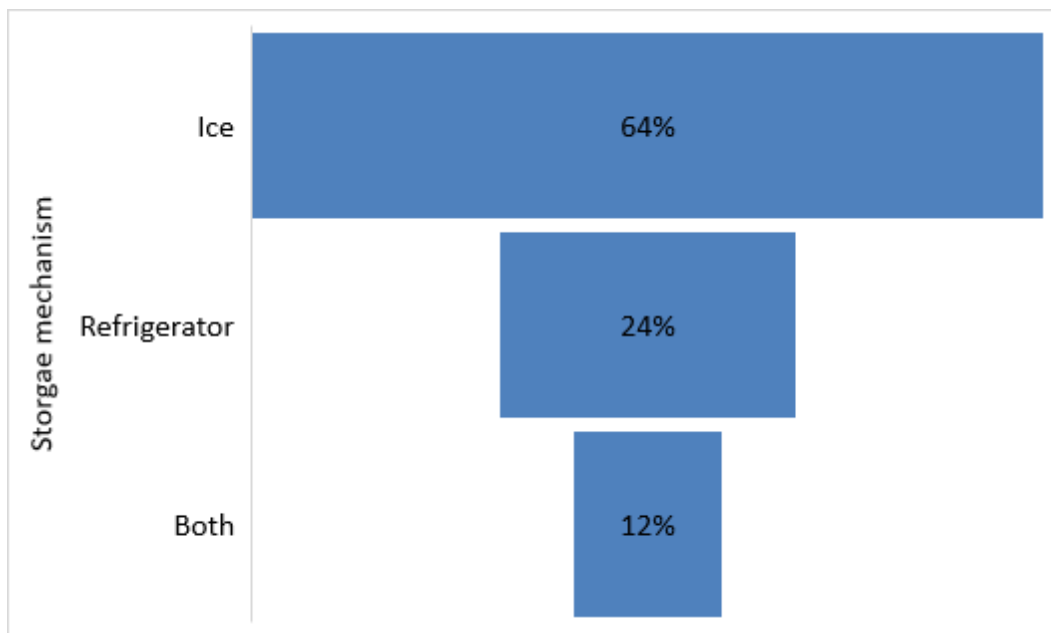
Fish Transportation System



During the transportation and storage of fish, it must be well preserved to protect them from contamination, and decaying. Long-distance carrying in live form creates even more issues of organ damage and death of fish before reached their destination. Mainly storage of fish was in ice bars (64%), however, some were using refrigerators (24%) as well (Fig. 7). Freezing is only a temporary method for the preservation and storage of fish that decreases the microbial action and enzymatic spoilage but could not prevent oxidative spoilage (Ghaly et al., 2010). Surprisingly there was insufficient storage, quarantine, and space for imported fish, and additionally lack of proper monitoring on quality checking of fish.

Figure 7

Fish Storage Mechanism



Fish Marketing Problems in Nepalgunj

The Fish Marketing system of Nepalgunj was reported as unsystematic in the lack of appropriate fish market infrastructure and facilities. Local production was lower than demand in a market that forced the huge import from India. Imported fish had no proper quarantine and storage system, nor any quality checking protocol. Entrepreneurship in fish marketing was of the least interest due to problems in transportation in the absence of insulated vehicles for fish transportation, the lack of separate fish markets, and the lack of a quality assurance plan (Joshi & Tiwari, 1999). The primary barriers to an efficient fish marketing system were insufficient drainage, a washing facility, live cages, an earthen floor, a lack of restrooms, the absence of an auction place, and the lack of mechanical weighing equipment (Nadia et. al., 2022). On the other hand, these problems put the local communities' public health at risk. A similar study conducted in the Bhopal fish market, India and Rajbari Sadar, Bangladesh also highlighted a similar problem faced by the fish market (Chourey et. al., 2014; Nadia et. al., 2022).

Conclusion

Fish marketing is one of the best occupations for traders and farmers, however, in the case of Nepalgunj due to the lack of a proper marketing system, traders as well as consumers were facing problems from cost to the health of fish consumed. Local fish prices were more costly in comparison to imported fish, due to high investment costs but least production in a lack of proper knowledge, investors, and skilled workers; which demotivated the local fish farmers. Harvesting season, cost, market, skill and knowledge, facilities, modern equipment, and technology advancement were major determinants for the fish marketing system. The fish marketing infrastructure should be developed with appropriate transport facilities, quarantine, an ice plant, cold storage, and local fish farming promotion approaches. The Fish traders and workers should be aware of fish packaging, shipping, fish preservation, and handling techniques to ensure the hygiene of fish commodities supplied to consumers.

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