



## RESEARCH ARTICLE

## STATUS OF FISH PRODUCTION IN NEPAL: A REVIEW

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## ABSTRACT

Fish production is one of the fastest developing agriculture sub-sectors in Nepal. Ethnic and indigenous communities were involved in the fisheries. Today it's taken as a profitable enterprise. Secondary information sources about fish and fish products were gathered from online and print sources (articles, journals, official reports) and were reviewed. The trend of fish production in Nepal is increasing. Mrigal carp (*Cirrhinus cirrhosus*) with a production of 29.2 percent is the fish with the highest production in Nepal. Nepal imports fish and fish products mainly from the India, China and Bangladesh. But the export of fish and the fish product from Nepal is negligible. An increasing number of people are getting involved in fish farming in the ponds and lakes and that is resulting in the increase in the production of fish and fish products. Thus, the country is moving towards self-sustainability in fish production.

## KEYWORDS

Aquaculture, Capture Fisheries, Export, Import, Information

## 1. INTRODUCTION

Yearly 77,000 tones (t) of fish are produced in Nepal out of which 28% come from catch fisheries while 72% are from aquaculture (Kunwar, 2020). Its contribution is 1.34 percentage to the GDP of the nation and 4.29 percent to the Agricultural Gross Domestic Production (AGDP) (CFPCC, 2020). Fisheries has a great impact on the economic status of the country (Paudel et al., 2021). Aquaculture is extended to 55 districts of the nation and has generated employment for 584,839 individuals (Rijal and Jha, 2020). Out of the total seed available 81% are from the private hatcheries and the remaining comes from the government sector (Shrestha and Mishra, 2014).

To meet the needs of people in many countries the water resource is being exploited by means of aquaculture and fishing (N'Souvi et al., 2021). Rapid growth in the sea foods from fish farming and aquaculture is increasing due to the production of the wild fish (Hoque et al., 2022). As the population growth is in increasing trend, the sustainability in production is a challenge. Aquaculture and fish farming become sustainable when the environment is friendly and ideal for the fish, society accept rapidly and is economically promising (Hoque, 2021). At present, youths are out-migrating in search of the employment and better opportunities (Zamrodah, 2016). The post-harvest of the fish and the fish products also plays a major role in the development of the fishery industry in Nepal (Dahlia et al., 2021). Nepal, there is lack of consolidated data and information of the number of fish farmers cooperatives (Rajthala et al., 2020).

The contribution of the aquaculture in the GDP is rising resulting from the growth rate two digits number in the past few years. The growth has attracted the farmers towards aquaculture (mainly fish farming) (Ranjan, 2019). Although, aquaculture started around 2000-1000 B.C. in China; in Nepal, organized aquaculture was introduced in 1940s (Production et al., 2014). In 2007, it contributed 43% of aquatic food worldwide and is expected to rise more in the future (Bostock et al., 2010). Snow-fed rivers, ponds, lakes and streams makes Nepal rich in fresh water resources and large rivers like the Koshi, the Karnali, the Gandaki and the Seti are

blessings for Nepal that increases the possibilities of extending fish production (Sharma et al., 2018). The diversity of fish in Nepal is higher compared to other countries with similar geographic areas. Although Nepal occupies only 0.1% of the total land area of the world the native fish occupy 2.6% area of the world and 23.3% of the area of Indian sub-continent (Husen and Sherpa, 2017).

Indian Major Carps, Chinese Carps are the major species with productivity of 4.97 t/ha in the pond aquaculture system. Polyculture is mainly followed for stocking these fishes but Tilapia (*Oreochromis niloticus*), Catfish (*Siluriformes*) and Common carps (*Cyprinus carpio*) have also been found stocked as polyculture (Kunwar, 2020). Many communities that are involved in the fishing depend on the natural sources of water especially lakes and the rivers. In Nepal, 12 communities of ethnic groups are involved in fisheries (Gurung, 2013). Nepal is far behind most of the countries in per capita fish production in the world. To be comparable to our neighbors, fish production should be expanded no less than three-or fourfold. The increase in the production by four or five folds before the industries are affected by the climate change will have a transformational impact in terms of the nation economy. India plays a vital role to fulfill the fish demand in Nepal. Fish which are imported from India are cheaper than the fish of Nepal and live fish get the higher prices in the market (Gurung, 2014).

Aquaculture if done with proper information and technique can be a profitable sector that can contribute to the food and economic security of the country (Koirala et al., 2021). The increase in the culture of the food fish for local consumption is resulting in the increase in the aquaculture production (Giri et al., 2019). Nepal being a landlocked nation, the fish production is mainly based on inland water resource due to which the fish production in the domestic level is unable to meet the demand of the nation (Khanal et al., 2020). The study helps to find the current scenario of the fish production in Nepal. The local people who have the will and interest to produce fish can benefit from the information. The poor farmers can be involved in fish production as agro business if they see the possible profit from the fish farming. The farmers will know where the investment can be made and know which type of fishes are doing well in

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Nepal. The students who are interested in the research work can also get the valuable information regarding the trend and present status of the fish production in Nepal.

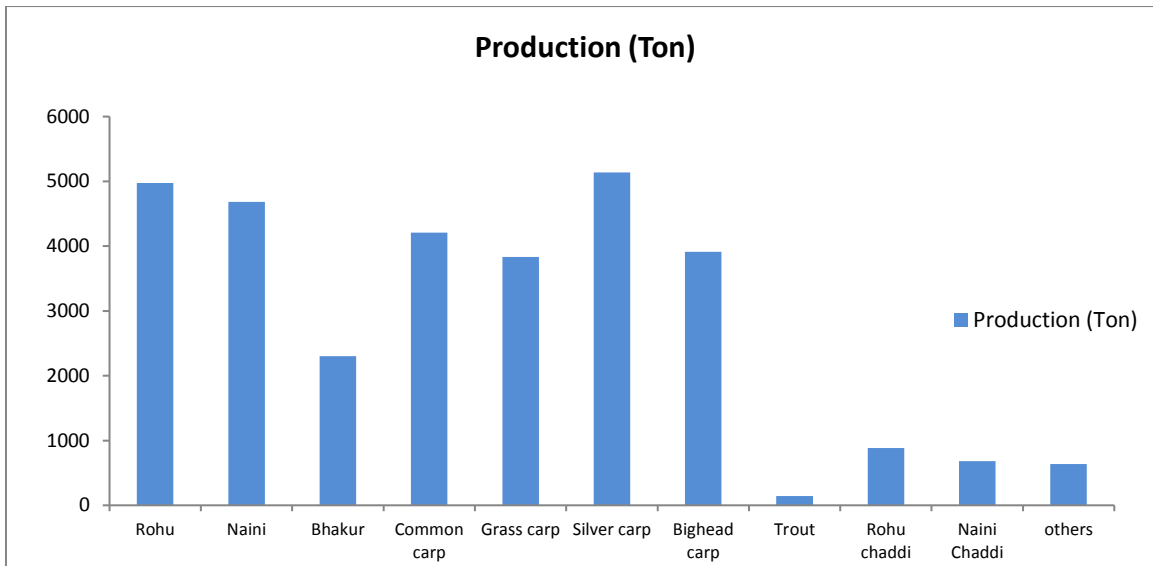
**2. MATERIALS AND METHODS**

The review studies the status of the fish production of Nepal. Relevant information sources (e.g., articles, journals, reports, etc.) about the fish and fish production were gathered from research gate, Google scholar, nature, cell, etc. and were reviewed to collect the required information. Organizations like Ministry of Agriculture Development (MOALD), Nepal Agricultural Research Council (NARC), web-sites were visited for the purpose of finding related information. The reference managers like Mendeley, Zotero were used for the proper citation and referencing of the articles and the Microsoft word and excel were used while collecting, analyzing and presenting the collected data.

**3. RESULTS AND DISCUSSION**

**3.1 Fish Production According to Species**

In the year 2019 Silver carp had the highest production (5138 t) followed by Rohu and Mrigal (4978 t. and 4681 t. respectively) (Figure 1). However, this results have contradicted to the result obtained from DOFD, 2016/17 taken from (Ranjan, 2019). According to this, Mrigal ranked highest with (29.2%) followed by Common carp (19.2%) and Rohu (12.2%). Major purpose behind the study was to have a better understanding of fish production according to the species in Nepal. This will provide clear understanding to the farmers about fish selection and give more emphasis so that they can get a good return by being involved in the fish farming. The difference in the production report may be due to the lack of adequate survey and research being conducted.

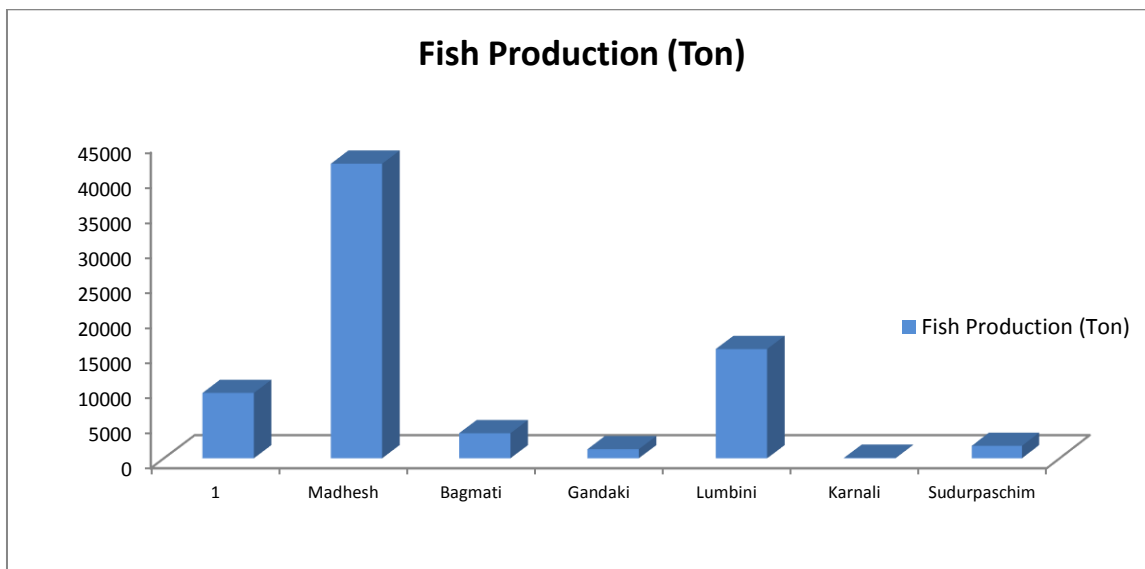


**Figure 1:** Fish Production According to Species (Source: Nepal fishery survey, 2072).

**3.2 Fish Production According to Provinces**

The total fish production in the Madhesh Province is highest with the yearly production of 42,019 t (5,549 Kg/ha) followed by Lumbini Province with the yearly production of 11,349 t (5,346 Kg/ha) where as the Karnali

Province has the least yearly productivity (74 t) followed by Gandaki Province (1,301 t) (Figure 2). The reason for the higher production in the Madhesh Province is also because of the larger water surface area (7,572 ha) whereas the water surface area of Karnali Province is only 33 ha (MOALD, 2022).



**Figure 2:** Fish Production According to Provinces (Source: MOALD, 2022).

**3.3 Trend of Fish Production**

Production reports of different years showed that production of fish in Nepal is in increasing trend. Increase in the involvement of number of people in fish farming in the ponds and lake was the major reason behind it. The youths who out-migrated to the foreign countries are also returning to the country, looking for employment in Nepal itself and fish farming is

becoming a popular source of income generation and employment. Out of 104,623 metric ton of fish produced in the year 2020/21, 20 % of the fish came from the capture fisheries. Additionally, 80% from the aquaculture (MOALD, 2022). This result was similar to the work of author (Kunwar, 2020) that deals with the status and development trend of aquaculture and fisheries in Nepal.

### 3.4 Import and Export of Fish and Fish Products

Fishes are imported in huge quantity as the national production was not sufficient to fulfill the increasing domestic demand. India is the greatest exporter of the fish and the countries like Bangladesh and China are the countries other than India that export fish to Nepal. Due to the huge gap between the demand and production the product what is produced is getting a good price and huge quantity of fish and fish seed are imported from the neighboring countries (Ranjan, 2019). The import of fresh fish, dried fish and fish meal in the year 2014/15 was 11176.87, 825.40 and 376.11 tons (t), respectively which was 2547.38, 74.75, 166.43 t, in the year 2004/05. In 2004/05 949235 fish seed were imported which increased to 14564100 in 2012/13. Nepal exported 0.40 t of fresh fish in the year 2014/15 which was 1.56t in 2004/05. The number of fish seed exported in the year 2008/09 was 25100 which was 233475 in the year 2004/05 (Mishra & Kunwar, 2014). But according to (Ghimire, 2017), Nepal exported fish worth NRS 12.1 million, with the highest 76% to China and 23% India. The huge gap between the import and export is a result of lack of knowledge on the public about the importance of fish and fish product, lack of technical expert and dependence on the foreign market. Nepal, being rich in water resource can promote the production of the fishes in the different sources like river, lakes, ponds.

### 3.5 Employment by Aquaculture

Till 2020 it has provided employment to 122, 772 people directly or indirectly out of which 67% were female and only 33% were male. But this data contradicts to the author who has mentioned 143,241 people are directly involved in the aquaculture. Aquaculture practiced throughout the years in slow rate but also plays a major role in generating the employment (Subedi, 2020). The involvement of more female can be due to the out-migration of most of the male to other area or foreign country for better opportunities.

### 3.6 Employment by Capture Fisheries

Fish-related enterprise provided employment to 462,067 people directly or indirectly out of which 60 were female and only 40 male. But this data contradicts to the author according to who 421,345 people are involved directly or indirectly to the culture fisheries till 2020 (Subedi, 2020). Although the data differs it does not differ in the large numbers. The people involved in the capture fisheries are more than the people involved in aquaculture. It is because the capture fisheries have been practiced since long ago and the aquaculture system is a newer system of fish rearing than the capture fisheries. Along with capturing the fishes, female farmer mostly prepare fishing gears and different equipments and sell in the markets.

### 3.7 Fishes Cultured Commercially in Nepal

Rohu (*Labeo rohita*), Catla (*Catla catla*), Mrigal (*Cirrhinus cirrhosus*), Rainbow trout (*Oncorhynchus mykiss*), Common carp (*Cyprinus Carpio*), Grass carp (*Ctenopharyngodon idella*), Silver carp (*Hypophthalmichthys molitrix*), Bighead carp (*Hypophthalmichthys nobilis*) are cultured commercially in the country. Fishes of both lotic and lentic habitat are found in Nepal (Bhagat, 2002). For the better production and growth of fish and fish market, marketing requirement such as pure water supply, well planned drainage, electricity, deep freezing storage etc are highly recommended (Ali et al., 2015). Mainly three indigenous carps (Rohu, Catla-Catla, Mrigal) are reared in Nepal. Along with the indigenous carp two exotic carps: Rainbow trout (*Oncorhynchus mykiss*) and Common carp (*Cyprinus Carpio*), and three Chinese carps: Grass carp (*Ctenopharyngodon idella*), Silver carp (*Hypophthalmichthys molitrix*), Big-head carp (*Hypophthalmichthys nobilis*) are grown in Nepal (FAO., 2017).

## 4. CONCLUSION

The aim of this review was to study the status of fish production in Nepal was fulfilled to much extent. As the literature on fish farming and fish-based enterprises are scattered in different publications, we have an effort to consolidate the vital information. The trend of fish production was found to be increasing till 2020 necessary to understand the trend of fish production. This article is expected to be of importance to traders, scholars and fish farmers and policy makers, and it can also be a foundation reference material for the future research.

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