

## Supply Chain Analysis of Salted *Tenualosa ilisha* (Nona ilish) in Bangladesh

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### Abstract:

Hilsa (*Tenualosa ilisha*) is the single largest fishery of Bangladesh and very popular food fish. Chandpur is very famous for Hilsa hence it is called the “City of Hilsa”. The study was conducted from July 2016 to December 2016 with a view to knowing the salting process and determining the supply chain analysis of salted Hilsa for better management of this trade. A structured questionnaire was used during primary data collection and the fishermen, fisher folk, fish retailer and other associated personnel were interviewed directly. From the daily newspapers of Bangladesh both local and national, secondary data were collected. Hilsa is processed in two forms; dry salted and wet salted. The salted Hilsa are then traded in the country mainly to the buyers from Sherpur and Jamalpur districts by truck or pick-up. Depending on the number of boxes, salted Hilsa are transported through mini, medium and big truck in which maximum capacity of each box is 160 kg. From these two districts salted Hilsa are sold to district buyer at 250-300 taka/kg, then to local buyers at 350-400 taka/kg and finally to local consumers. Salted Hilsa are also prepared in Dhaka, Patuakhali, Barishal, Bhola and sold to the buyers of Sherpur, Jamalpur, Mymensingh, Moulvibazar, Rangpur and Thakurgaon districts. Salted Hilsa can become an exportable value added product and foreign currency can be earned by exporting salted Hilsa.

**Keywords:** Hilsa; Salted Hilsa; Nona ilish; *Tenualosa ilisha*; Supply chain; Bangladesh

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## Introduction

Hilsa (*Tenualosa ilisha*) is the single largest fishery of Bangladesh and it plays a vital role in national economy and employment to the people of Bangladesh (Haldar, 2001). The contribution of Hilsa to the total fish production and to GDP is about 12% and 1% respectively. For the livelihood purpose, about 2% of the total population of the country is directly or indirectly involved in the fishery (DoF, 2018). Bangladesh represents about 60% of global Hilsa production in terms of Hilsa catches (Hossain, 2014).

The Bangladeshi people are called “Mache vate Bangali” meaning “Fish-Rice Bengali”. Among the fishes Hilsa fish is a very popular and tasty fish in Bangladesh (Mustafa et al., 2012). Hilsa has mouthwatering flavor and superb mouth feel which made the fish “Macher raja Ilish” which means “Hilsa is the king of fish” in Bangladesh (Mukit, 2016). Hilsa has secured recognition as the second Geographical Indication (GI) product of Bangladesh and globally it is now registered as a fish of Bangladesh (Matin and Shamim, 2018).

Hilsa has been designated as the national fish of Bangladesh and it is species of culture in Bangladesh (Rahman et al., 2017). Nowsad (2007) stated Hilsa has highly preferred taste than most other fishes due to its typical biochemical composition especially fatty acid composition. Because of its excellent flavor and delicatetaste, Hilsa has a universal appeal to the consumer (Rahman et al., 1999).

As Hilsa is too oily for drying it is often processed by salt curing and salted Hilsa is locally known as ‘Nona Ilish’. Because of its characteristic flavour and taste, most consumers prefer the product (AOAC, 1975). Salting is done not only to extend the shelf life of fresh fish but also to provide desirable sensorial changes (Andres et al., 2005).

Chandpur is very famous for Hilsa hence it is called the “City of Hilsa”. Huge Hilsa fishes are landed at Chandpur Fish Landing Center which makes it one of the biggest Hilsa landing centers in the country. Because of both its taste and nutritional quality, salted Hilsa has a relatively high demand of than other fishes in Bangladesh.

No specific research work has been done and very few relevant literatures found on Hilsa salting process and its trade in Bangladesh. The study aims at determining the salting process and analyzing of the supply chain of salted Hilsa for better management of this trade.

## Methodology

### Time period

The study was conducted from July 2016 to December 2016.

### Sampling site

Chandpur district was selected for the study because of huge Hilsa landing and people from different regions comes here to process and buy the salted Hilsa.

## Data collection

A structured questionnaire was used during primary data collection and the fishermen, fisher folk, fish retailer and other associated personnel were interviewed directly about the collection, processing and preservation, transportation, trade channel. From the daily newspapers of Bangladesh both local and national, secondary data were collected for the crosscheck. The following topics were considered during data collection.

### Collection system of Hilsa

The collection system of Hilsa for salting purpose was determined.

### Processing and preservation system of salted Hilsa

The processing and preservation system of salted Hilsa were figured out.

### Transportation system of salted Hilsa

The transportation system of salted Hilsa was also known.

### Trades of salted Hilsa

How trade of salted Hilsa is done and who are involved with the process were figured out.

### Supply chain analysis of salted Hilsa

Supply chain analysis of salted Hilsa was assessed and determined for better understanding of trade channel.

### Trade channel of salted Hilsa in other regions

Trade channel of salted Hilsa in the other regions was also determined.

## Results and Discussion

### Collection system of Hilsa

Chandpur Fish Landing Center (locally known as Mach ghat) located in Boro Station situated at the bank of River Dakatia is one of the biggest landing centers where Hilsa fish exploited from different rivers in different regions and different landing centers are landed in plenty. Considering the quality, some Hilsa fishes are found to be lower grade (Arman et al., 2018). Due to inadequate preservation and improper handling in the fishing boat, those Hilsa fishes are collected and salted for better preservation and benefits which is called Nona ilish (Ahmed, 2016). After the completion of salting process separated eggs are processed in the other trade channel.

### Processing and preservation system of salted Hilsa

One of the traditional methods used for preserving fatty fish is salting because of its ability to create unfavorable environment for the growth of microorganisms by lowering the water activity of the fish muscle. By reducing the water activity (aw) through salting which then inhibits the growth of spoilage microorganisms and inactive the autolytic enzymes (Horner, 1997).

At first, the collected Hilsa fish is scaled and the fins are removed. Then by a sharp fish-knife the fish is cut transversely

from the dorsal to the ventral region. This process is done in such a way that head remains intact with the body. The chunks also remain attached at the abdominal keel bone region. The guts are removed from the abdomen and the eggs are separated if there are eggs. Sufficient amount of salt is added to the fish gills, mouths, eyes and abdomen and in between each chunk. The study concluded that 25% of NaCl of total Hilsa fish body weight was suitable for good quality and maturing of salted Hilsa (Mukit et al., 2016). Then the salted Hilsa are kept stacked in rectangular shape in the room temperature for 7-8 days for drying. The dry salted Hilsa are packed in the sacks which are then packed in the wooden boxes. Each box's holding capacity is about 140-160 kg of salted Hilsa. In case of wet salting, salted Hilsa are preserved in the previously prepared salt-water solution (water: salt=100 kg: 30 kg) for 5-6 months in plastic drum. Each drum can hold about 140-160 kg of salted Hilsa fish. Then this Hilsa fish are sold to the local buyers, consumers etc. In several tin shade rooms in the fish landing center, the whole process is done.

**Table 1:** Transportation System of Salted Hilsa.

Truck Size	No. of Boxes*
Mini	10-15
Medium	30-40
Big	40-50

\*Each Box Capacity- Maximum 160 kg

In some other regions rather than Chandpur, turmeric powder is sprinkled over the cut and degutted Hilsa fish during the preparation of dry salted Hilsa.

#### Transportation system of salted Hilsa

After that, the wooden boxes are transported to districts by truck or pick-up. Depending on the number of boxes, fishes are transported through mini, medium and big truck (Table 1).

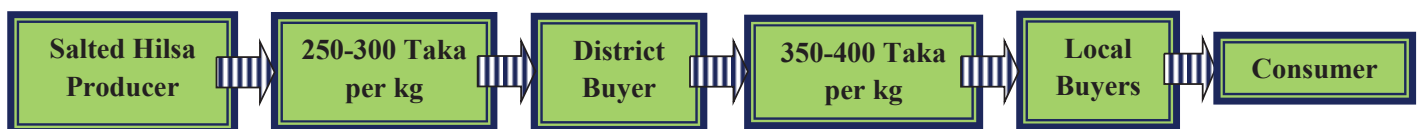
#### Trades of salted Hilsa

The prices of salted Hilsa from producer to consumer is shown in Figure 1

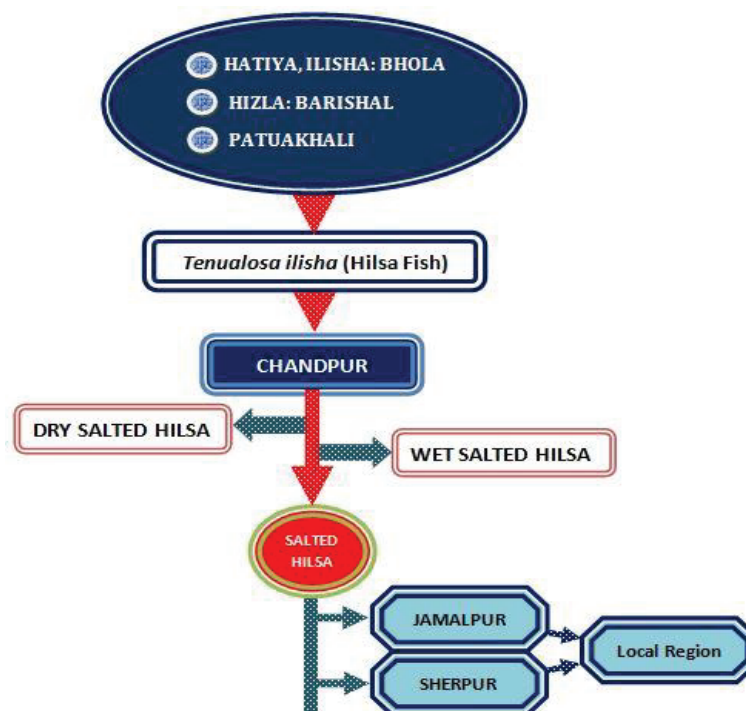
#### Supply chain analysis of salted Hilsa

In the Fish Landing Center of Chandpur, Bangladesh; Hilsa fish (*Tenualosa ilisha*) are landed from Hilsa abundant regions mainly Hatiya, Ilisha: Bhola, Hizla: Barisal, Patuakhali. In downstream areas and especially the inshore waters, Hilsa fishing intensity has been increasing because of sufficient concentrations of Hilsa in these areas (Halder, 2004). Lower graded Hilsa in terms of quality are separated from the landed Hilsa and collected. The collected Hilsa are then salted and traded in the country mainly to the buyers from Sherpur and Jamalpur districts. From these two districts salted Hilsa are sold locally (Figure 2).

Trade channel of salted Hilsa in other regions: Salted Hilsa are also prepared in Dhaka, Patuakhali, Barishal, Bhola and sold



**Figure 1:** Trade Channel of salted Hilsa



**Figure 2:** Supply chain of salted Hilsa in Bangladesh (A)

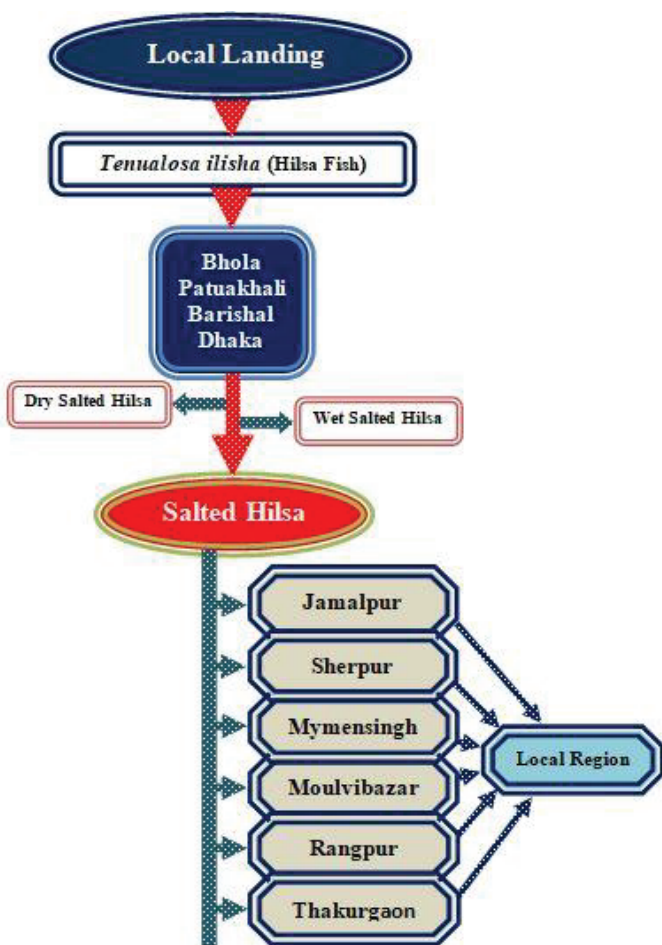


Figure 3: Supply chain of salted Hilsa in Bangladesh (B)



Figure 4: A & B= Chopped, degutted and scale cut Hilsa. C=Dry salted Hilsa. D=Wet salted Hilsa. E=Wooden boxes. F=Packaged salted Hilsa ready for transportation.

to the buyers of Sherpur, Jamalpur, Mymensingh, Moulvibazar, Rangpur and Thakurgaon districts (Figures 3 and 4).

## Recommendations and Conclusion

The country's most important aquatic resource is Hilsa. In Bangladesh the demand of salted Hilsa is good and is traded in some regions. Salted Hilsa can become an exportable value added product and foreign currency can be earned by exporting salted Hilsa.

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