

Price Increment Analysis of Some Small Indigenous Freshwater Fish Species (SIFFS) In Coastal Belts of Odisha Using Laspeyres Price Index

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Abstract: *There has been dramatic increment of prices of different Small Indigenous Freshwater Fish Species (SIFFS) in different Coastal districts of Odisha in past years. The price curve climbs much stiffer than expected. Laspeyres price index(LPI) was used to calculate price increment and hence inflation rate for the year 2008 and 2016. It is demarcated that the inflation is rising dramatically in past seventeen years from 1999 to 2016. The base year taken for reference as 1999. Laspeyres price index in the year 2008 is 226.23% and in the year 2016 is 560.65% with an increase of inflation rate of 334.42%. It indicates an increasing trend of rate of inflation year after year.*

Keywords: Laspeyres price index, SIFFS, Price, Inflation

1. Introduction

Earliest human civilization was rooted near the natural water bodies due to direct access to the water so called „soul of life“. Fish is the pioneer species of the most precious aquatic resources. Which occupies a significant position in the diet of human civilization since ancient times due to its taste, availability, abundance, accessibility, economy, nutritional enrichment and medicinal values. Many fish species has got specialized status in “gourmet par excellence”(Lad, 2014).In India fish is included in the category of staple foods along with rice(Lad et al.,2013).

Among the wide varieties of fishes consumed by human population, Small Indigenous Fresh water Fish species(SIFFS) are gaining considerable significance in the platter of rural, semi urban and urban population. Once considered as trash fish by a large community is now gaining consumer acceptance as a front liner due to its nutrient density and health related significance. The consumer demand is scaling high as they are eaten as whole with bone, Head, Viscera and hence the richest source of protein as well as large numbers of micronutrient including Zinc, Calcium, Vitamins, Iron (Roos et al., 2002) and highly effective in preventing child blindness and infant mortality and also nourishing diet for pregnant women (Roos et al.,2007).

Small fishes plays a very significant role in the life of rural poor in coastal Odisha as small fishes not only satisfies the palatability and nutrient security but also provides seasonal income and hence a key naturally available resource for providing socio - economic benefits. Small fishes inhabiting ponds, pools, ditches, beels, low land areas and rice fields play a central role in boosting the livelihood of rural poor in the state (<http://www.downtoearth.org.in/coverage/small-fish-big-net-40438>). So SIFFs provide a considerable return without investment. Although the production of SIFFS from natural resource base was higher in earlier times but consumers were few and consumption is mostly limited to

traditionally rural fish eating population as a mode of direct food security. But rising consumer demand and alteration in the supply chain resulted in large scale cost increment in past years.

The quanta of any food prices are related its abundance, consumer demand and overall acceptance or nutritional values. But price increment of the fishes in the current trend is very high due to many fold increase in the prices in each level starting from fishermen level to reach at the ultimate consumer level after passing through a long chain of wholesalers and retailers

(Sathiadhas et al., 1994). It is viewed that there is a cost enhancement at every stage i.e. transport, on site loading unloading etc. (Bishnoi 2005). The functional role of intermediaries such as Commission agents, Hawkers and Traders is not documented properly or studied and their multi faceted role across the boundary is not analyzed scientifically. Finally, Fish trading is quite unplanned and non technical in India (Ganesh Kumar et al.,2008).

Inland fish prices increased by 5% during 2015-16(ASSOCHAM, 2015) and there is an increase of fish prices by about 131% in five years between 2008-09 to 2012-13(ASSOCHAM, 2013) and the main contributing factors are urbanization, rising per capita income, growing appetite for the consumption or changing eating pattern, and quantum scale depletion or resource and also overexploitation. Estimation further clarifies a rise of index value from 126 to 291 between same period due to pollution induced declination in fish catch and other contributing factors such as dumping of plastic and other toxic materials, post harvest losses, rise in transportation cost etc. This is further clarified by the declination in growth of fish production from 7% in 2008-09 to just 3.5% in 2012-13(ASSOCHAM 2013, <http://www.orissadiary.com>).

Fresh water habitat further degraded by rampant use of fertilizers and pesticides killing aquatic fauna including fishes (Halwart 2008).

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The Population of Odisha according to the 2011 census stands at about 41 million, making it the 11th most populated state in India (<http://www.census2011.co.in>). Population growth has got considerable influence on the prices of commodities like fishes. This is reflected in the increasing trend of overexploitation of the valuable fishery resources (Upadhyay and Pandey 2016). The prices of Small Indigenous Fresh water Fish species has been increased several fold in past years in comparison to other category of fishes. There are many bottlenecks existing in production and supply chain resulting in untoward price hike in past decades. That is correctly assessed after the first hand data collection from Fishermen communities and retailers or stakeholders. Although price increment analysis of many marine fishes and fresh water fishes has been documented by researchers but no documentation is available with reference to SIFFS. Our research gives a basic outline of the inflation rate of some SIFFS in successive years between 1999 to 2016.

2. Materials and Methods

A pilot survey was conducted in fish markets of eight coastal districts of Odisha including Balasore, Bhadrak, Cuttack, Kendrapara, Jagatsinghpur, Khurda, Puri and Ganjam to investigate the prices of SIFFS. Ten Species of Small Indigenous Freshwater Fish (SIFF) are considered for price increment analysis between the month of June 2015 to May 2016, that is for about 12 months. Ten different species are taken for investigation. These are *A.mola* (Maurali), *P. sophore* (Kerandi), *A.testudineus* (Kau), *M.gulio* (Kantia), *C.batrachus* (Magur), *H.fossilis* (Singhi), *S. bacaila* (Jalha), *Ompok sp.* (Pabda), *C.punctata* (Gadisha), *M.aculeuteus* (Tori).

For data collection PRA tools are used. Data collection, modeling, matrix scoring are the ways of visualization through participatory method. After adequate PRA facilitation, economical scientific data gathering and generation become easier (Townsend 1993; Sahoo et al., 1999).

Data collection is mainly based upon questionnaire and interviews with the fishermen or people involved in fish catching or trading activities and individuals associated in different retail outlets. Participatory, qualitative and quantitative interpretation was performed. In the point of initiation of data collection by Farmers Participatory research (FPR). PRA tools was used as it is very significant in terms of technological focus for investigating „agro – ecological“ „low-input“ and „sustainable“ production systems (Chambers and Jiggins, 1986; Chambers et al., 1989; Woodhouse 1991; Reijntjes et al., 1992). Further PRA tool gives both qualitative and quantitative results.

The price rise and inflation of the Small Indigenous Freshwater Fish Species is calculated by using Laspeyres price index.

The Laspeyres price index formula is as follows:

$$I = \frac{\sum P_n Q_0}{\sum P_0 Q_0}$$

Where I is the Laspeyres price index. P = Price of the Commodity, Q = Quantity of the Commodity, o = Base year

and n = Current year under study. (Santhanam S. et. al., 2010).

3. Results and Discussions

The base year for the study under taken to investigate the price increment of SIFFS using Laspeyres price index as 1999. Then the Laspeyres price index in the year 2008 is 226.23% (Table 2) and in the year 2016 is 560.65% (Table 3). There is an increase in the inflation rate of 334.42% between these years (Table 4). The price inflation percentage for commercially important fresh water fishes such as Rohu, Catla, Mrigal, Tilapia and Cat fishes together is less i.e. 78.57% between the year 2006 to 2014 as compared to the SIFFS. That is mainly due to improvement of aquaculture production to meet the increasing consumer demand (Lad et al., 2014), which is not generally happening in case of SIFFS as they are the integral component of natural ecosystem, which is disturbed by the negative change of the fresh water dynamics in past decades due to alteration of architecture of coastal ecosystem. That brings the prices of common commercially important fresh water fishes under control but not that of the SIFFS.

Price increment or fluctuation is related to production volume, quantity of supply, perishable nature of the fishes (Chourey et al., 2014), which is most common in case of SIFFS. Demand and supply directly influencing the prices of SIFFS (Chart 1). *A.mola* fish has got highest consumer demand but the supply somehow matches with the demand, so the price lies within Rs. 240 per kg even if in lean season. But in comparison *C.batrachus* has got deficient supply (Based on market survey) but has got highest consumer demand due to its medicinal values i.e. consumed by Heart patients and peoples with cardiovascular anomalies due to their high HDL or good cholesterol content (Debnath, 2011).

Supply of the SIFFS further regulated by certain anthropogenic variables which runs through environmental factors. Which can be visualized by severe decline in production of SIFFS from the natural water channels including low lying rice field ecosystem due to rampant application of pesticides to substantiate the already introduced High Yielding Varieties (HYVs) (Gupta et al 2002). Rain fall also has got paramount importance for influencing the productivity of the freshwater ecosystem (Dore, 2005). Deficient rainfall in coastal district in recent years decreases the water depth in fresh water system including ponds, pools, rivers and reservoirs and hence productivity of fresh water components chiefly fishes and hence influencing retail prices of fishes. This base line investigation will help in the advancement of the study by further data accumulation and manipulation. Price increment although benefitting the traders or retailers but the nutrient dense SIFFS are vanishing from common man platter due to high inflation rate year after year debarring them from getting the much valued dietary material and many species are facing serious threat of extinction from Coastal ecosystem. Many species are seems to be vanishing from natural open water ecosystem such as rural ponds and marshy places. Extreme river pollution, sewages, water scarcity resulted in the loss of biodiversity of fishes. Breeding of small fishes also adversely affected by chemical

fertilizers. Many species are becoming endangered or vulnerable. http://odisha.gov.in/e-magazine/Orissareview/jan2006/engpdf/Water_Pollution.pdf. Fish is the easily accessible and affordable commodity that provides nutritional security it must be available in reasonable prices to reach the mouth of even the poorest of the poor (Rao, 1983). But in vain this at stake in current trend, adversely affecting food, nutritional and economic security of the poor.

4. Conclusion

Our present study truly reflects the price increment and hence the inflation percentage of Ten varieties of SIFFS in past years. Further it will help in quantitative assessment of the different species. So correct documentation in advance level will not only carry forward this base line research but also influence the formulation and implementation of strategies and policy decisions for adequate production, supply of this resource for fulfilling consumer requirement in sustainable manner towards a nutritionally secure society. As the resource is over exploited its conservation strategies can also be planned through creation of awareness among different social layers such as Fishermen communities, Fish farmers and consumers.

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Fig.-1 India Map

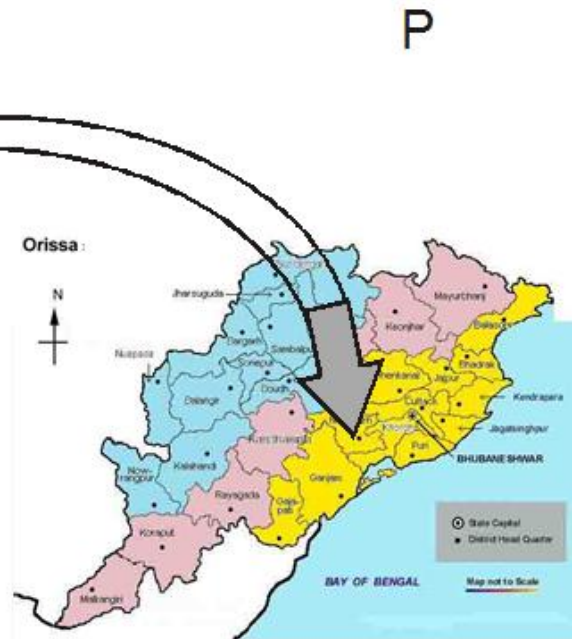


Fig.-2- Odisha Map

Table 1: Price changes through years (1999 - 2016)

| Fish species | 1999 | | 2008 | | 2016 | |
|----------------------|----------------|-----------------|----------------|-----------------|----------------|-----------------|
| | Quantity in KG | Price in Rupees | Quantity in Kg | Price in Rupees | Quantity in Kg | Price in Rupees |
| <i>A.mola</i> | 1 | 50 | 1 | 150 | 1 | 240 |
| <i>P. sophore</i> | 1 | 40 | 1 | 70 | 1 | 120 |
| <i>A.testudineus</i> | 1 | 60 | 1 | 140 | 1 | 400 |
| <i>M.gulio</i> | 1 | 60 | 1 | 100 | 1 | 220 |
| <i>C.batrachus</i> | 1 | 70 | 1 | 200 | 1 | 600 |
| <i>H.fossilis</i> | 1 | 70 | 1 | 160 | 1 | 500 |
| <i>S. bacaila</i> | 1 | 60 | 1 | 160 | 1 | 320 |
| <i>Ompok sp.</i> | 1 | 80 | 1 | 200 | 1 | 600 |
| <i>C.punctata</i> | 1 | 40 | 1 | 80 | 1 | 120 |
| <i>M. aculeuteus</i> | 1 | 80 | 1 | 120 | 1 | 300 |

Source: The above data is based on survey on Fish markets of eight coastal districts of Odisha

Table 2: Laspeyres price index between the years 1999 – 2008

| Fish species | 1999 | | 2008 | | $P_n Q_0$ | $P_0 Q_0$ |
|----------------------|---------------------------|------------------------|---------------------------|------------------------|-----------|-----------|
| | Q_0 (Quantity in Kg) | P_0 Price in Rs.) | Q_n (Quantity in Kg) | P_n Price in Rs.) | | |
| <i>A.mola</i> | 1 | 50 | 1 | 150 | 150 | 50 |
| <i>P. sophore</i> | 1 | 40 | 1 | 70 | 70 | 40 |
| <i>A.testudineus</i> | 1 | 60 | 1 | 140 | 140 | 60 |
| <i>M.gulio</i> | 1 | 60 | 1 | 100 | 100 | 60 |
| <i>C.batrachus</i> | 1 | 70 | 1 | 200 | 200 | 70 |
| <i>H.fossilis</i> | 1 | 70 | 1 | 160 | 160 | 70 |
| <i>S. bacaila</i> | 1 | 60 | 1 | 160 | 160 | 60 |
| <i>Ompok sp.</i> | 1 | 80 | 1 | 200 | 200 | 80 |
| <i>C.punctata</i> | 1 | 40 | 1 | 80 | 80 | 40 |
| <i>M. aculeuteus</i> | 1 | 80 | 1 | 120 | 120 | 80 |
| Total Price in Rs. | | | | | 1380 | 610 |

Laspeyres price index between the years $I = 226.23\%$

Table 3: Laspeyres price index between the years 1999 – 2016

| Fish species | 1999 | | 2016 | | $P_n Q_0$ | $P_0 Q_0$ |
|----------------------|---------------------------|------------------------|---------------------------|------------------------|-----------|-----------|
| | Q_0 (Quantity in Kg) | P_0 Price in Rs.) | Q_n (Quantity in Kg) | P_n Price in Rs.) | | |
| <i>A.mola</i> | 1 | 50 | 1 | 240 | 240 | 50 |
| <i>P. sophore</i> | 1 | 40 | 1 | 120 | 120 | 40 |
| <i>A.testudineus</i> | 1 | 60 | 1 | 400 | 400 | 60 |
| <i>M.gulio</i> | 1 | 60 | 1 | 220 | 220 | 60 |
| <i>C.batrachus</i> | 1 | 70 | 1 | 600 | 600 | 70 |
| <i>H.fossilis</i> | 1 | 70 | 1 | 500 | 500 | 70 |
| <i>Jalha</i> | 1 | 60 | 1 | 320 | 320 | 60 |
| <i>Ompok sp.</i> | 1 | 80 | 1 | 600 | 600 | 80 |
| <i>C.punctata</i> | 1 | 40 | 1 | 120 | 120 | 40 |
| <i>M.aculeuteus</i> | 1 | 80 | 1 | 300 | 300 | 80 |
| Total Price in Rs. | | | | | 3420 | 610 |

Laspeyres price index between the years $I = 560.65\%$

Table 4: Percentage of Inflation over the years

| Year | Laspeyres price index | Percentage of inflation | Increase in inflation |
|------|-----------------------|-------------------------|---|
| 1999 | 100 | ----- | Increase percentage of inflation between 2008-2016 is 334.42 |
| 2008 | 226.23 | 126.23 | |
| 2016 | 560.65 | 460.65 | |

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