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Analysis of the gross profit and gross margin of sea-fish marketing near coastal market sites of Purba Medinipur District, West Bengal, India

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Abstract

The present study deals with the gross profit, gross margin and interrelation between effective variables on sea-fish marketing near the coastal part of Purba Medinipur district. This geographical area is remarkably potential for sea-fish collection. Many trawler switch points or sea-fish harbors are located in this area. Wide-spread continental shelf made this area for large sea fetch towards the sea. Only four sea-fish harbor sites were considered for this study. These are Digha Mohana (21°37'50.6"N/ 87°32'36.4"E), Shankarpur (21°38'17.8"N/ 87°34'45.9"E), Junput Market (21°43'29.0"N/ 87°48'42.4"E) and Petuaghat fishing harbor (21°47'43.7"N/ 87°52'50.2"E) site respectively. The edible sea-fish list was prepared which are popularly collected from this coastal zone and verified the list with ZSI (Kolkata) reference. 200 sea-fish selling market sites were considered for this study which is closely located or adjacent to the coastal site and interviewed the concern marketers with standard questionnaires. Eleven directly related societal variables were considered to make the relative performance on market profit or loss. Robust and faithful statistical methods were used to estimate the gross profit and gross margin and multi linear regression model of Pearson, Spearman and Kendall test were employed on the concerned surveyed data. The result reveals that, gross profit as well as gross margin is very high for the sea-fish business over the considered market sites. If the high investment owned by the retail marketers or fishmonger, then the marginal profit should be increased for this society.

Keywords: Sea-fish marketing, gross profit and gross margin analysis, variance analysis.

Introduction

Open sea surface is a gift of god from where; human society meets their food demand, as well as socioeconomic opportunity. Mainly, the coastal part of the country gets their maximum economic support from the coastal sea shore resources. Different edible sea fishes are vital resource in our daily diet system. So the economic benefits of the edible sea fishes are increasing day by day. Consequently, some local fish markets are also being increased over the coastal belt area. The coastal part of the Purba Medinipur is also a potential economic zone due to sea fish markets. Professional and efficient markets also carried out by private trading as well as commercial trading activities. Large number of rural populations engaged in sea fish trading system by direct participation or by mediators. It's an emerging system of economic activities where the infrastructure and physical facilities are inadequate now[1].

According to the annual report of FAO, 2014, per capita consumption of sea fish is being increased in different states of the India and ranked first followed by the state of Kerala and West Bengal. Many researches have been carried out over India coastal area and tried to find out the actual progress of the sea fish collection and marketing. Moreover, West Bengal has a major contribution in this purpose. The literature suggests that, marketing of sea fish and its products may vary in respect of different states or regions and marketing or selling price also vary among species across different coastal region over India[2-4]. On the contrast, it has been emphasized that different efficient policy and system could help the economically backward society by supplying sea fish at reasonable prices near the coastal belt[5,6]. The popularity and demand of sea fishes has increased in present situation, so the marketing system and management should be reframed now. Researches established that, the fisherman participation and marketing efficiency are the key factors on cost-margin ratio[7] and higher the ratio indicates higher the marketing efficiency and vice-versa[8]. If we look into the present scenario of sea fish business over the coastal part of the Purba Medinipur district, it would be clear that, the fish markets are unique in its own nature both organized or unorganized in system. Different countries or regions have different opportunity in respect of their own marketing system, so yield reference values are different[9-12]. The coastal part of Purba Medinipur has a unique scenario, while both permanent and temporary marketing system has been practiced. Some daily or weekly permanent markets are present; also some street vendors or head load fishmonger are active additionally. Moreover, the loss profit ratio or market efficiency is not equal all over. So the markets are quasi typical in nature.

Study area: In this study, coastal part of Purba Medinipur is selected along with its 200 market sites. All the market sites

spread over the Purba Medinipur district started from coastal tract to mainland inside. Among them, some markets are permanent (daily or weekly) and some of them are temporary site. A GIS application has ran over the selected market sites to measure the nearest positional agglomeration and this figure is given below.

Data base and sampling techniques: A scientific research design was used along with framed several questionnaires. To make the questionnaires easy and comfortable I have prepared a popular edible sea fish chart with the help of ZSI, Kolkata (Zoological Survey of India, Appendix-1)[13] sea fish report, 2010. The entire considered market site has been selected by random sampling process. The survey questionnaires mainly contents selling types of fishes, source and supply, economic loss and profit components, distance of market, demand and supply balance etc.

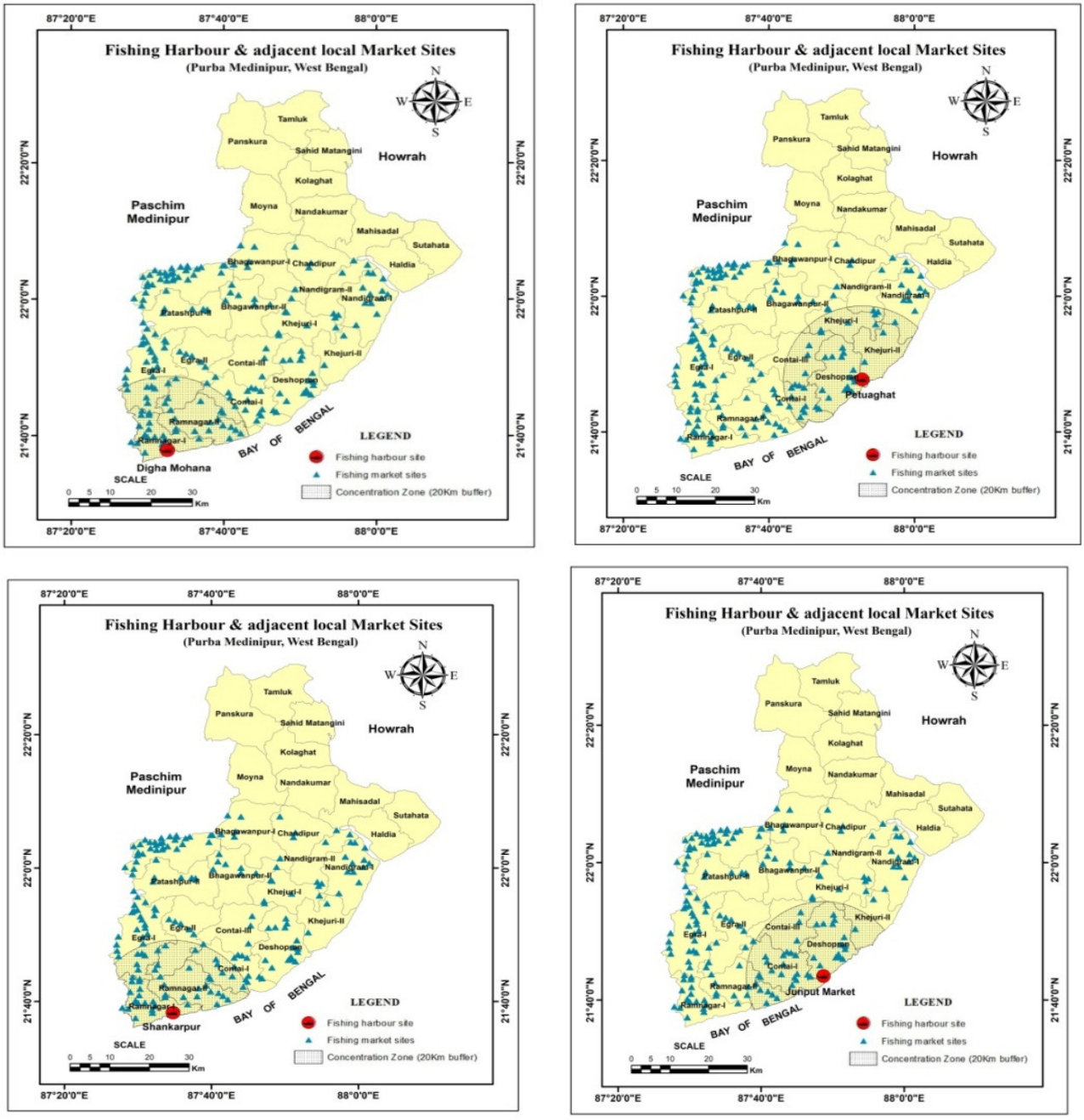

Figure-1: Location of Fishing harbor and local market sites.

Methodology

This study was conducted for edible sea fish marketing and profitability along the coastal zone of Purba Medinipur district. All the random sampled data were directly collected form 200 nearby daily or weekly market (Hat). Collection of proper geographical co-ordinate were conducted by spot verification and obtained the values by high accuracy GPS device. A buffer concentration zoning process has run by Arc-GIS software around 20 kilometer radius each for selected four fishing harbor site. To estimate the gross profit and gross margin, the following formulas are used:

$$GP = \text{Revenue} - \text{Cost of fishes} = \sum_n Q_n\ (P_n - C_n) \quad (1)$$

$$GM = \frac{GP}{\text{Revenue}} = \frac{\sum_n Q_n(P_n - C_n)}{\sum_n Q_n P_n} \quad (2)$$

Where,
GP=Gross Profit, GM= Gross Margin, P= price of specific fish excluded other marketing tax, C= Cost of specific fish per unit quantity, Q= Total quantity of specific species of fish sold, Value of Gross Margin (GM) is multiplied by 100 to get the percentage amount.

Following Olayemi (1998)[14], the multiple linear regression models is used to determine the relationship among considered variables. Mainly, Pearson, Spearman and Kendal regression model were applied to estimate the correlation coefficient at considered level of significance:

$$Y_i = \alpha_i + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 \ldots\ldots\ldots\ldots + \beta_{11} X_{11} \quad (3)$$

Where: Y_i = Quantity of Seafish supplied to the market site, α_i = Intercept, β_1 = Coefficient of the independent variable, X_1 = Housefold Size, X_2 = Age of fisherman or whole seller, X_3 = Gender or Sex, X_4 = Educational status or Qualification, X_5 = Marital Status, X_6 = Mode of Job, X_7 = Source of Investment, X_8 = Year of Experience, X_9 = Distance from the Market, X_{10} = Income Status, X_{11} = Market Management.

Major considered variables: Some major contributory variables estimated which influence the dependent variables, these are:

Household Size: family size of the considered area is different in the sense of number of family members. During the market survey it has been found that, the number range of family members are in between 3 to 10 on and average. So, the household size characters have been framed with four major categories. The more number of family members have more ability to perform marketing activities.

Age of fishmonger/whole seller: Age of the fishmongers and whole seller are effective variable because maturity gets more settled business in this concern. During the market survey, it has been found that, the performance is very high for middle age group persons among the other and they have more patience to sell the sea fish through whole day or long week.

Gender/ Sex: Rural economic sectors always depend upon both male and female community. According to the conducted survey, on different market site, it has been found that, participation of female members is remarkable in fishmonging job. Basically, middle aged rural women are quite expert in direct selling of sea fish at daily market site.

Educational Status: Educational status of the marketers is one of the important variable, that directly related to modern marketing system. School final level educated person always get some additional support to understand the marketing system easily. So this study carried out along with this parameter accordingly.

Mode of job: According to the sea fish collection system, all the trawler return to the port at late night or at early morning. So the business activities have started at that time. All the whole sellers, retailers or fish vendors purchase sea fish as early as possible according to the market demand. Ultimately, selling to the consumers has started at morning. Most of the daily market or Hat (Weekly market in Bengali term) runs during morning time. So, the peoples those are engaged in this marketing system are remain free after the morning. So, most of the people has considered this business as part time mode.

Source of investment: Business strength and loss profit relation depends upon the magnitude of demand as well as on investment amount. The sea fish marketing is also a large scale industry that depends upon the amount of investment. Mainly, whole sellers are entirely bounded to invest the large capital for more economic profit in short period of time.

On the other hand, small investment also gives the daily earn and bread for marginal marketers, vendors and fishmonger. So it is also a important component for this study.

Year of experience: Experience is the important continuous variable measured in number of years spending in fish marketing. More experience has some ability to manage the market system in present concern. It always enhances the marketing efficiency and directly helps the entire society.

Distance to the market: Distance to the market is inversely related to the loss- profit relation. Though, the fish marketing has a risk factors due to rotten possibility, the marketers always try to manage the quality and quantity by applying local freezing process. So this study has an opening pole to the respondent including this variable.

Market management: This variable is also a key factor for this study. The market management has identified by four basic categories which are effective for additional revenue to the retail price.

Results and discussion

Variables and respondent's relationship: The major effective variables or characteristics are selected and given in Table-1, which actually builds the potential or economic status of the considered study area. If we look into the given table, it should be noticeable that, the small to medium number of rural household size highly engaged in this activity. The family member up to 1-3 and 4-6 category indicates 41 and 39 percent engagement among 200 respondents. Some people of the considered sets of interview, their opinion resolves one statement, that is "it's a local resource and have an easy marketing management", so many people are selected this business for their livelihood. Age of fishmonger or whole seller is one of the important variable in this study. The result shows that, the young people groups are interested in this job. Among 200 respondents, 36.5% and 30.5% people have their age group 15-25 and 26-35 year group respectively. The percentages of aged or old people are remarkably less in numbers according to this study. Male and female are similarly interested and engaged themselves in sea fish business.

During the survey, it has been found that, some markets sites are present in this study area where female fishmonger dominates the whole selling as well as retail activities. Ultimately, the percentage of male respondents is quite more than the female seller. Educational qualification of the marketers is also considered as a variable here. But the result shows that, maximum marketers belongs to primary level of education only. In ascending order, the primary level educated persons are higher in number, and then secondary and higher educated persons respectively. One important variable marital status considered here. Socio-economically this parameter always control the economic activeness effort of marriage couple. Being the rural society, after getting marriage, the earning stakeholder forced to engage themselves in earning activities as early as possible. Moreover, they try to make their family economically strong and healthy basement. The respondent chart shows that, the percentage is higher for married persons than the other selected categories like single, separated and widow.

The coastal part of the Purba Medinipur district is a resource potential zone in respect of coastal resource and agricultural performance. Onshore rural population fringe bound to do the sea fishing related activities but offshore population fringe have some different job options. 20 kilometer buffer concentrated inhabitants for the fishing harbor give the priority in sea fish business mainly; on the other hand, the inhabitants far from the fishing harbor got the supplementary opportunity as sea fish business activities. Because, they have agricultural activity as prior to the sea fishmonging or any stage of this business. So the mode of job in this regard is divided into two categories like part-time and full-time job. Majority of the respondents actively perform the sea fish business as part-time slot, during early morning or in the morning time. While, they invest remain active time into other economic opportunity, daily or weekly. The respondents chart also indicates that, some persons are also treated as assistant or helper in this market sites. Source of investment and capital values also an important key factor in every business. The given table shows that, 53% marketers fulfill their investment by own fund, 10.5% marketers invested by share with their friends, 21.5% have drawn loan from authorized bank branch, 9% marketers invested money by helping of co-operative society and 6% people invested from other sources. The interviewed report indicates that, the respondents are not highly satisfied by this job. So the satisfaction level subdivided by four categories like satisfied, semi-satisfied, unsatisfied and poor respectively. From the given result, 38% of respondents are said satisfied, 23% are called semi-satisfied, 21.5% along with unsatisfied and 17.5 % remain poor satisfaction in this job.

Profitability analysis: This study examines the gross profit and gross margin over the considered sea fish marketing sites. Formula (1 and 2) were used to calculate the gross profit and gross margin respectively. Individually 81 species categories of sea fish are popular as edible. Among them 16 selective categories (five species in each group) were clustered to analyze the gross profit and gross margin values. The result of this analysis is given in Table-2. Profit of this business is usually satisfied because demand of sea-fish always remains at moderate level. Seasonally, the entire demand may fluctuate, but demand become increase during winter season. Some categories of species like Pomfret, Potol, Chokbarolali, Bhola, Shila, Tapra, Bawl, etc. are very popular through the year and their market demand is very high. So these types of sea fish already occupy a demand slab as regular fish species. The gross profit of sea fish marketing is around 40 to 60 percent at high level, 25 to 35 percent at moderate level and below 20 percent is the poor level. The gross margin for the marketers is also exhibit moderate to high in level. The given result table indicate that, the highest gross margin is showing 70% for 15^{th} five categories of fish marketing and lowest gross margin is 38% for 9^{th} five categories of fish markets. The average gross margin always remains at 42% level. This type of profitability indicates that, the sea- fish marketing is one of the small scale and shot span economic activity.

Factors affecting to the considered variables: Multi linear regression model has performed among the interdependent considered variables to estimate the correlation-coefficient by using formula-(3). Degree of freedom of the sampled data is different for different considered variables because the numbers of sample are not equal in each case. The result of this estimation is given in Table-3. The results are separately plotted in different column against each specific category. According to the Pearson format, Age of Fishmonger, Educational Status, Marital Status, Source of Investment, Year of Experience, Distance to the Market and Income Status have indicated statistically significant at 5% level of confidence. Their correlation–coefficient values are 0.96, 0.907, 0.805, 0.511,-

0.804, 0.942 and 0.743 respectively. In case of the Spearman statistic, the statistically significant variables are Marital Status, Source of Investment and Market management at 5% level of confidence. Correlation-coefficient values of them are 0.60, 0.80 and 0.20 respectively. For the Kendall statistic, only two variables indicate statistically significant result at 5% level of confidence. These two variables are Source of Investment and Market Management. The variable Year of Experience is only, that negatively significant for Pearson statistic at considered level of significance.

Table-1: Socio-economic characteristics of respondents (Sea fishmonger / marketers). Interview Report for 200 respondents.

	Characteristics	Frequency	Percentage (%)	Mean/ Average
Household Size	1-3 persons	82	41	25
	4-6 persons	78	39	
	7-9 persons	21	10.5	
	> 9 persons	19	9.5	
	Total	200	100	
Age of fishmongers'/whole sellers	15-25	73	36.5	20
	26-35	61	30.5	
	36-45	34	17	
	46-55	20	10	
	>55	12	6	
	Total	200	100	
Gender/Sex	Male	123	61.5	100
	Female	77	38.5	
	Total	200	100	
Educational Status/Qualification	Primary	104	52	33.33
	Secondary	68	34	
	Higher	28	14	
	Total	200	100	
Marital Status	Single	52	26	50
	Married	112	56	
	Separated	17	8.5	
	Widow	19	9.5	
	Total	200	100	
Mode of Job	Part time	83	41.5	66.66
	Full time	57	28.5	
	As assistant	60	30	
	Total	200	100	

	Characteristics	Frequency	Percentage (%)	Mean/ Average
Source of investment.	Personal investment	106	53	40
	Share with friends	21	10.5	
	Bank loan	43	21.5	
	Co-operative lone	18	9	
	Others sources	12	6	
	Total	200	100	
Year of experience	1-3 year	21	10.5	40
	4-6 year	22	11	
	7-9 year	31	15.5	
	10-12 year	54	27	
	>12 year	72	36	
	Total	200	100	
Distance to the Markets	0-5 km	58	29	20
	6-10 km	51	25.5	
	11-15 km	34	17	
	16-20 km	20	10	
	>21 km	37	18.5	
	Total	200	100	
Income Status	Satisfied	76	38	25
	Semi-satisfied	46	23	
	Unsatisfied	43	21.5	
	Poor	35	17.5	
	Total	200	100	
Market Management	Manage by market unit	40	20	25
	Manage by wholesale unit	49	24.5	
	Manage by own	75	37.5	
	Manage by Bazar committee.	36	18	
	Total	200	100	

Table-2: Gross profit and Gross margin in respect of total quantity selling.

Category of fishes	Weekly Average input and output					
	Quantities of fishes (kg)	Price (Rs.)	Cost per unit (Rs.) Average	Sales (Rs.)	Gross Profit (Rs.)	Gross Margin (%)
1st five categories	4759	380720	80	571080	190360	50
2nd five categories	3489	209340	60	314010	104670	50
3rd five categories	5014	361008	72	501400	140392	38.8
4th five categories	3587	175763	49	269025	93262	53
5th five categories	2648	193304	76	251560	58256	30
6th five categories	4610	378020	82	553200	175180	46
7th five categories	4789	407065	85	598625	191560	47
8th five categories	4651	362778	78	558120	195342	53
9th five categories	5410	508540	94	703300	194760	38
10th five categories	3987	322947	81	518310	195363	60
11th five categories	3589	294298	82	466570	172272	58
12th five categories	4579	384636	84	572375	187739	48
13th five categories	4615	359970	78	599950	239980	66
14th five categories	4687	323403	69	515570	192167	59
15th five categories	3981	314499	79	537435	222936	70
16th five categories	4793	397819	83	599125	201306	60

Table-3: Descriptive Test Statistics with One Sample *t* Test.

Variables	t-Test	df	P Value	Correlation -coefficient		
				Pearson	Spearman	Kendall
Household Size	2.882	3	0.063	1.00	1.00	1.00
Age of Fishmongers	3.411	4	0.027	0.96*	1.00	1.00
Gender/Sex	4.347	1	0.143	1.00	1.00	1.00
Educational Status	3.037	2	0.093	0.907*	1.00	1.00
Marital Status	2.255	3	0.109	0.805*	0.60*	0.33
Mode of Jobs	8.117	2	0.014	0.458	0.50	0.33
Source of Investments	2.310	4	0.081	0.511*	0.80*	0.66*
Year of Experience	4.014	4	0.015	-0.804*	-1.00	-1.00
Distance to the markets	5.996	4	0.003	0.942*	1.00	1.00
Income Status	5.572	3	0.011	0.743*	1.00	1.00
Market Management	5.704	3	0.010	0.350	0.20*	0.00*

*=Significant at 5% level of confidence ($p=\leq 0.05$). Source: Calculation done by the above stated methods.

Table-4: Descriptive Statistics of One Sample Test of Variance.

Variables	Mean/Avg.	SD	Variance
Household Size	50	34.68	1203.33
Age of Fishmongers	40	26.22	687.50
Gender/Sex	100	32.52	1058
Educational Status	66.66	38.01	1445.33
Marital Status	50	44.33	1966
Mode of Jobs	66.66	14.22	202.33
Source of Investments	40	38.71	1498.50
Year of Experience	40	22.28	496.50
Distance to the markets	40	14.91	222.50
Income Status	50	17.94	322
Market Management	50	17.53	307.33

Source: Calculation done by the above stated methods.

Conclusion

The gross profit and gross margin are directly proportional to each other in business strategy. After this analysis, it should be concluded that, sea-fish marketing in the considered study area is economically rewarding as well as profitable. If the high investment owned by the retail marketers or fishmonger than the marginal profit should be increased. I think government participation in sea fish marketing should be encouraged in the area to boost the quantity of gross profit. On the other hand, installation of cold storage, chilling point, and smooth communication should be helped the sea-fish marketing potential.

Appendix-1: Categories of Sea fishes and crabs available around West Bengal Coastal area.

Zoological Survey of India (ZSI), Government of India Ministry of Environment, Forest and Climate Change, Kolkata. Report in 2010.

Order	Group	Local Name	Scientific Name
Perciformes	Pomfret	Pomfret	*Chinensis*
		Pomfret	*Pampusargenteus*
		Baul	*Apolectisniger*
	Silver Bellies	Coin chanda	*Leiognathussp*
		Coin chanda	*Secutor*.sp
	Robbon Fish		*Trichiurus.*Sp
			*Eupleurogrammus.*sp
	Mackerel	Patol	*Rastrelligerkanagurta*
		Horse mackerel	*Magalaspiscordyla*
	Seer Fish	Para	*Scomberomoruscommersonianus*
		Mackerel	*Scomberomorusguttatus*
	Hump Head		*Kurtusindicus*
	Bat Fish		*Platax orbicularis*
	Drepani	Dai chak	*DrepaniPunctata*
	Big Eye	Chokbarol ali	*Priyacanthushamrur*
	Thread Fin	Karua	*Eleutheronematetradactylum*
	Grouper		*Epinephaluschlorostigma*
			Epinephalusbleekeri
			*Epinephalus*sp
	Thread Fin Bream	Lali	*Nemipterus japonicas*
		Chamcham	*Nemipterus.*Sp
	Grunter	Kunkuni	*Teraponjarbua*
	Scad		*Selar.*sp
	Croaker	Silver Thikri	*Atrobuccasp*
		Bhola	*Daysciaenaalbida*
		Bhola	*Johniussp*
		Tele Bhola	*Johniussp*
		Koi Bhola	*Johniussp*
		Shila	*Otolithussp*
		Minikit	*Otolithuscuvieri*
		TikaBhola	*Pterotolithussp*
		MusraBhola	*Nibea.*sp
	Indian Whitings	Karma	*S. panijus*

		Baruna	*Sillagosihama*
	Snapper	Bansuli	*Lutjanusfulviflamma*
		MathaMotaThikri	*Lutjanus.*sp
	Grunt	Kurkura	*Pomadasysmaculates*
		Ratan	*Pomadasysargenteus*
	Carangids		*Carangoidesmalabaricus*
		Ram Chanda	*Alectisindicus*
			*Alepes.*sp
			*Alepes.*sp
Siluriformes	Cat Fish	Shimul Kanta	*Arius.* sp
		Taml Kanta	*Arius.* sp
		Medh Kanta	*Arius.* sp
		Hagua Kanta	*Arius.* sp
Pleuronectiformes	Sole	Banshpata	*Cynoglossus.*sp
		BinshPata	*Zebrias.*sp
Clupiformes	Pellonas	Patli	*Ophisthopterus.* Sp
	Oil Sardine	Kokila	*Sardinella.*sp
	Anchovies	Ruli	*Coilia.dussumieri*
		Jute ruli	*Coiliaramcarati*
		Tapra	*Setipinna.*Sp
	Ilish	Ilish	*Teneulosaillisa*
		Mukundi	*Anodontostomachacunda*
	Herring	Chela	*Chirocentrussp*
Scopilifformes	Lizard Fish	Kanua	*Sauridatumbil*
		Nihare	*Harpodonnehereus*
Athiriniformes	Needle Fish	Gangtara	*Platybelone.*sp
Anguiliformes	EEL	Bam	*Anguilla.*sp
		Sap Bam	*Muraenesox.*sp
Laminiformes	Shark	B_3	*Carcharhinusgangeticus*
		Kuki	*Scoliodonsorrakowah*
		Kuki	*Scoliodonsp*
	Guitar fish		*Rhynchobatus.*sp
Rajiformes	Sting rays	Palta	*Gymnura*sp
		Chil Sankar	*Rhinoptera*sp
		shankar	*Dasyatis*sp
Phylum: Molluscs	Cuttle fish	Sipi	*Sepia.*sp
		Loligo	*Loligo.*sp
Phylum: Artropoda	Prawn	Brown	*Metapenaeusmonoceros*
		Karikadi	*Parapenaeopsistylifera*
		Flower tiger	*Panaeussemisulcatus*
		Tiger	*Panaeusmonodon*
		White Rani	*P. indicus*
		Chamni	*Metapenaeusbrevicornis*
	Spiny Lobstars	Lobstar	*Panulirus*spp
	Sand Lobstars	Poka	*Thenus*spp
Artropoda	Crab	Shimp	*Neptunus*(*Neptunus*)*pelagicus*
		3 spot crab	*Neptunus* (*Neptunus*) *sanguinolentus*
		LalKankra	*Charybdis cruciata*
			*Charybdis.*sp

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