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Trends in Seafood Products Exports from Odisha: Issues and Challenges.

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Abstract

Odisha's coastline of 785 kilometers offers sufficient surplus of fish and fishery products for external trade after catering to the domestic demand. Though compared to the global volumes, fishery products of Odisha origin are being relished by a substantial majority in the rest of the world. Fishery products, thus, have long been serving as an important source of foreign exchange to India's exchequer through substantial amount of exports all over the world. The global trade environment has undergone a drastic change after the entry of WTO as an international regulatory body on transnational trade of goods and services that had its impact on India's exports of marine products too. Marine products industry alone has a share of at least 6 per cent in world exports in which Odisha is the fourth largest exporting state after .The present study was initiated with the objective of analyzing the export performance of marine products in Odisha. The study is based on the secondary data i.e., quantity of export of marine products from **2009-10Marchto 2019-20march** compiled from official website of Marine Products Export Development Authority of India The study also investigate the instability of market in terms of quantity and value. Adding to these, the study is also a forecast of the marine product export in terms of amount and market needs.

Keywords: Direction of trade, Export competitiveness, Marine products, Structural changes, Instability.

Introduction

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Marine Economy was first proposed by Professor Gunter Pauli in 1994, but it wasn't until the 2012 Rio+20 Conference that it received widespread notice. The term "marine economy" encompasses an expansive and multifaceted field. It spans both established sectors of the ocean economy like shipping and fishing, as well as newer ones like offshore aquaculture, sea bed extractive activities, bio prospecting, and marine biotechnology. Among these, the fisheries sector is crucial to India's national economy in numerous ways and marine sector alone providing livelihood, contributing to economic growth, and generating employment opportunities. It is not only to about 16 million fisher folk and fish farmers at the primary but also food security problems and poverty reduction. In this paper, the major focus will be the Economic growth of India with reference to the marine economic sector. Broadly, the core activities of the marine Economy seek to address critical areas which are divided into four main categories as follows:

1. Harvesting of living resources
2. Extraction of non-living resources
3. Commerce, tourism, and trade
4. Non-market / indirect contributions to the economic activities and environment. (OECD, 2016; Economist Intelligence Unit, 2015)

To each of these four categories, key economic sectors and industries are providing unique ocean services. Essentially, all these sectors combined are critical to the broad components of Blue Economy with potentials for more impactful contributions in the future.

1.2 The Key Drivers and Sectors of Marine Economy

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The blue economy is driven by many important factors and facilitated through various sectors. Some of the most important drivers and critical sectors are hereunder briefly discussed:

- **Harvesting of living resources**: the essential ocean services provided through this activity is the provision of seafood with the critical sectors relevant to this being the **fisheries and aquaculture industry**, and the provision of marine biotechnology with the active industry being the **pharmaceutical/ chemical industry**.
- **Extraction of non-living resources**: this activity involves four major sectors namely, mineral sand and gravel for **sea bed mining**, the energy sector for **fossil fuel/ oil and gas** exploration, the energy sector for **renewable and clean technologies**, and freshwater for the **desalination** and purification of water resources.
- **Commerce tourism and trade**: essentially, relevant ocean services involve tourism and recreation with the key sectors being **tourism and coastal development** and transport, and trade with the active sectors being **shipping, port infrastructure, and services.**
- **Indirect contribution to economic activities and environment**: this involves the non-market-based ocean services and the relevant sectors are carbon sequestration through blue carbon, ecosystem habitat protection, and restoration, waste disposal for land-based industry through assimilation of land-based effluents, and the existence of biodiversity through protection of species habitat.

1.3 Significance of Marine Fishery Sector:

Among these, the fisheries sector is crucial to Odisha's national economy in numerous ways. alone providing livelihood, contributing to economic growth, and generating employment opportunities industry. The fishing industry is an important part of the national economy and a major source of revenue for the government abroad.. In 2019, Odisha would account for 5.41 percent of the India's total marine fish output. When it comes to global fish production, Odisha is in second place. Aquaculture in Odisha has become an important contributor to the nation's food supply. At the present time, fisheries and aquaculture are responsible for 0.83 percent of the national GDP and 4.75 percent of agricultural and allied activities. Over the past decade, Odisha's marine product output has increased annually. The marine fish export which was 129542 Mt in 2009-10 has increased

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to 700504 Mt in 2019-20. This reflects the potential for increasing marine fish exports from Odisha. Due to the great importance of marine fish, it is important to analyse its export performance and the factors affecting it. There is concern about the impact of World Trade Organisation (WTO) and trade liberalisation measures on export performance and competitiveness and about how the fisheries sector especially marine will respond to a free market economy and liberal trade regime. This paper discusses some of these issues. Specifically, the study examines the (i) temporal changes in the growth and composition of exports of marine fish, (ii) magnitude of growth in exports of marine products and determinants of marine fisheries export, (iii) Instability of export market in terms of quantity and value.

Data and Methodology

The present study uses time-series data pertaining to the period 2009-10 to 2019-20. The data on the value of exports of Marine fish from Odisha were compiled from different volumes of official portal of Marine Products of the Export Development Authority (MPEDA),Kochi,India. The issues of Economic Survey published by the ministry of finance, supplemented the main sources of data. . To study the composition of exports of different fishery products, per cent shares were worked out on a triennium basis to take into account the problem of wide fluctuations in the value of exports. The growth rates were calculated for the period 2009-10 to 2019-20. The study uses common statistical tools like compound growth rates, instability.

Analysis of Annual Growth rate was used to measure the past performance of economic variables. It was used to find out the trend in the export of major marine products during the above said period periods.

Annual growth= $\{(X\ t/X_{t-1} - 1)\}*100$

Compounded Annual growth rate formula (CAGR)

$Y_t = Y_0\ (1 + r)^t$

Y_t = Export of marine fish year t

Y_0=initial (i.e., 2009-10) Export of marine fish year

r = the compound growth rate of growth of Y_t. Where stands for the year

Index of Instability

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The advantage of Coppock's instability index is that it evaluates price volatilitin respect to the trend, providing a good approximation of the average year- over-year percentage variation trend- adjusted. Instability increases as the index value increases. Coppock's Index is calculated as the antilog of the square root of the logarithmic variance using the following formula:

$$CII = \{[Antilog\ (Vlog)] - 1\} \times 100$$

Where, Vlog=logarithmicdifferenceoflogxt+1andlogx_t

Framework for Selection of Variables and Measurement

Determinants of"Marine Export product" in Odisha. In_MarineExport = α +β_1 MARINE_PRO~T + β_2 In_PCI + β_3 Neer + β_4 Marine_fishinglanding centre+β5Sea_food_proces_plant units in Odisha + μ In_MarineExport =Ln Marine Exportln_Marine Product = Logarithim Marine Product Ln_PCI=Log of Percapita income of export country Ln-Neer=Log of nominal exchange rateLn-Marine_fisinh_landing = No of Marine fishing landing centre Ln_Sea_food_proces_plant= No.of Sea food Process plant in Odisha The analysis was carried out for a time span of 10 years, from 2009-10-2019-20,using the Ordinary Least Squares (OLS) method in log-linear form.

T a b l e 1: Odisha's Share in India'sTrade of Selected Fisheries Products

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Year	India			Odisha			Share Of Odisha (in Percent)		
	Inland	Marine	Total	Inland	Marine	Total	Inland	Marine	Total
2009-10	4570	3290	7860	253.22	129.34	382.56	5.54	3.93	4.87
2010-11	4981	3249	8230	252.71	133.48	386.19	5.07	4.11	4.69
2011-12	5410	3271	8681	267.83	114	382.56	5.54	3.49	4.87
2012-13	5910	3321	9231	292.14	118	382.56	5.54	3.55	4.87
2013-14	6340	3442	9782	293.79	120	382.56	5.54	3.49	4.87
2014-15	6690	3570	10260	341	136	477	5.10	3.81	4.65
2015-16	7161	3600	10761	380	141	521	5.31	3.92	4.84
2016-17	7810	3630	11440	451	150	601	5.77	4.13	5.25
2017-18	8910	3600	12510	532	152	684	5.97	4.22	5.47
2018-19	9580	4180	13760	512	250	762	5.34	5.98	5.54
2019-20	10441	3731	14172	661	158	819	6.33	4.23	5.78

Source: Authors analysis by compiling data from differentannul Reports, Directorate of Fisheries of Odisha

Fish are a rich source of quality protein, important micronutrients, and fatty acids and are often considered as most affordable and frequently consumed animal source food. Odisha is one of the major maritime States, offering vast scope for the development of inland, brackish water, and marine fisheries. The State has 6.86 lakh Ha of freshwater resources, 4.18 lakh Ha of brackish water resources, and 480 km of long coastline for fisheries development Odisha is the 4th largest fish producing state in India with 8.73 lakh MT in 2020-21. It contributed to 6% of the total fish production in India.

Fig1: Trends of Inland and Marine Fish Production in Odisha

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Source: Author's calculation by compiling data from Annual Reports, Directorate of Fisheries of Odisha

Figure 1 shows the trend of different types of fish produced in Odisha during a given study period.The figure revaled that during the period of 2009-2020 the production of fresh water not only contribute highest percentage to total fish production but also increasing its share in total fish .In contrast to this the contribution of marine fish excluding crab contribution 34.89% in 2009 -10 declined to 19.79% in 2019-20. In the year 2009, in paradip their a ship "BLACK ROSE" had sinked and for which in that area fish production will be reduced due to oil linkage. The year from 2010 to presents year there will be an increasing production through which our state export level will also increases in the international market. Most of fishing activities are carried out in coastal waters without disturbing deep waters. Marine fish production in Odisha has recorded a sluggish growth in recent years and the export of marine product is almost stagnant compared potential. The fisheries sector suffered from for inadequate infrastructure facilities like lack of cold storage, poor processing and packaging as well as bad transportation facilities to reach markets.

Fig 2: Annual Growth of Production Of Different Types of in Odisha

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Source: Author's Calculation Annual reports of ministry of fisheries, Odisha

From the above figure it is revealed that there is a fluctuation in the production in Odisha. The more growth fluctuations is found in marine fish which declining after 2014-15 to 2019-20. But during the above period the growth of production marine fish increasing as compared to inland fish. One of factors responsible for positive growth is allowing deep sea fishing which is an incentives to marine fishermen and entrepreneurs. From the above discussion it can be concluded that production of marine fishery in Odisha is improving and it will also be a source of income earning and foreign exchange earnings. Therefore, in order to increase the production potential of the sector, some uniform and performable fisheries policies need to be implemented.

Fig: Compound Growth of Marine fish Coastal District wise in percent

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Source: Author's Calculation Annual reports of ministry of fisheries, Odisha

The above figure revealed that the compound growth of production of Marine fish is highest in Kendra Parawhere as in Bhadrak district has least compound growth. The main reason behind of this the diversified freshwater fish fauna of Kendrapara is really useful for it and introduction in-situ & ex situ cultivation techniques for conservation sustainable management of fish genetic resources. In case of Bhadrak and Ganjam which show the least compound growth of production of marine fish is hit by climate changeand cyclone. Due to illiteracy and non-mechanization of crafts and gears, the fishermen in this district arelying behind in fish production. Fishermen are also not having technical knowledge of operating of boats. Due to lack of implementation of pisci culture and capture by scientific methods and utilization of modern equipment in the field.

Table: Composition of Exports of Marine Fish From Odisha (Value in Percent)

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Marine Item Exported From Odisha	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20
FROZEN SHRIMP	84.15	74.43	79.53	84.92	84.31	88.98	82.72	91.30	90.86	95.22	96.97
FROZEN FISH	11.59	18.33	16.02	11.41	12.78	8.19	13.05	6.31	6.86	3.40	1.85
FR CUTTLE FISH	1.82	4.31	3.12	3.45	2.43	2.50	2.94	1.87	1.94	1.28	1.15
FR SQUID	0.25	1.69	0.98	0.00	0.37	0.12	0.57	0.27	0.22	0.08	0.01
DRIED ITEM	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LIVE ITEMS	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CHILLED ITEMS	0.12	0.00	0.00	0.00	0.02	0.15	0.05	0.18	0.03	0.02	0.03

Source: Author's own calculation by compiling data's from various annual reports MPEDA Govt of India

The details of the principal products exported are shown in the above figure, together with the quantitative percentage share. Frozen prawns remained the leading export quantity exported in both time periods. Rather it has increased from 84.99 percent in 2009-10 to 96.97 percent in 2019-2. Frozen fish included 22 product forms. Frozen shrimp continued to be the principal item exported to US which is the largest marine export market of Odisha. From above figure it is revealed that the marine product is not diversified as only one product is dominating in the trade composition. The major reason of this the trade policy toward s the Frozen shrimp by international market especially by USA. The anti-dumping tax on frozen prawns in the United States has been cut from 10.17% in 2004 to 1.69% in the current period.

Table . : Product wise growth rate analysis of Marine Product exports from Odisha (in percent)

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Major Product(in Q)	*2009-10*	*2010-11*	*2011-12*	*2012-13*	*2013-14*	*2014-15*	*2015-16*	*2016-17*	*2017-18*	*2018-19*	*2019-20*
Frozen Shrimp	0	16.88	18.14	16.22	26.17	16.24	12.55	16.89	33.64	19.52	7.21
Frozen F ish	0	108.89	-3.36	-22.48	42.31	-29.41	-15.45	27.71	-36.89	-36.07	8.07
FR Cuttle Fish	0	212.35	-19.93	20.31	-10.60	13.73	-17.94	21.51	-15.56	4.98	-65.00
FR Squid	0	790.43	-35.87	-100.00	0!	-65.10	148.18	-4.47	-50.83	-88.09	387.99
Live Items	0	0	0	0	0	0	0	0	0	0	0
Chilled Items	0	0	0	0	0	0	0	0	0	0	0
dried item	0	-100.00	0	0	0!	683.94	35.00	-78.35	-25.22	55.33	225.16
others	0	-20.45	-68.92	-30.25	-42.48	-29.27	1.65	64.60	-100.00	0	0
Over all maMarine Product	0	32.14	10.56	8.84	27.09	10.14	9.68	17.46	27.53	17.37	6.49

Source: Author's Calculation compiling data from Annual reports MPEDA, Government of Odisha

There are four major marine products exported from Odisha. Above reveals that Frozen prawns is the most important export item, accounting for 60235 metric tonnes of marine products exported, followed by frozen fin fish, frozen squid, dried items, frozen cuttlefish, chilled items, live items, whereas the highest annual growth registered in case of dried items. Apart from the dried items all other marine items show negative growth in 2021. The above table also revealed that except dried items all other items show negative annual export growth after 2018-19.The annual growth of export of overall marine products was 32.14% in 2010-11 declined to 6.49% in 2019-20. During the first part of the year, the pandemic had a significant impact on seafood exports. Aside from that, as a result of the WTO's SPS and technical barriers to trade (TBT) agreements, quality and environmental concerns became trade barriers. Odisha marine exports were frequently prohibited or refused due to a lack of quality, including non-freshness and the presence of alien components.

Fig : Annual growth rate of Marine Products export from Odisha (in percent)

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Source:

The above figure revealed that the trend of growth rate of export of marine fish from Odisha to other countries is increasing in contradictory export to other states decline continuously. The annual growth of export from Odisha to other states is decline continuously from 14.58% in 2009-10 to -30.44% in 2019-20 where as in case to other countries it though it has declined from 35.25% to 6.62% but still in positive growth rate. The major factor responsible is the export subsidies given to the marine producer while the export to other states do not received any type of incentives. However, the accompanying table shows that the pace of growth in exports to other nations and states is lower and declined basically after 2018-19.The major reason of decline trend of growth during these period is due to covid-19.

Table: Change in Direction of Export of Marine fish From Odisha (in percent)

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YEAR		2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20
Japan	**Q**	7.94	8.22	8.45	8.17	8.36	8.25	8.12	8.08	8.30	8.44	8.71
	V	21.14 (21.58, 22.08, 14.47, 11.10, 10.55, 8.70, 7.31, 6.88, 6.71, 8.01, 11.16)	21.58	22.08	14.47	11.10	10.55	8.70	7.31	6.88	6.71	8.01
USA	**Q**	7.29	7.50	7.59	8.27	8.27	8.22	8.58	8.56	8.78	8.99	9.08
	V	28.75	33.90	29.17	50.84	44.55	36.26	46.12	39.75	38.34	42.42	42.53
EU	**Q**	8.62	8.60	8.26	8.05	8.00	8.31	8.40	8.46	8.15	8.3	8.43
	V	2.58	3.85	0.40	0.75	2.49	1.81	2.29	1.43	1.07	11.09	32.41
CHINA	**Q**	8.08	8.77	6.49	6.84	7.88	7.32	7.69	7.61	7.54	9.97	11.11
	V	5.19	6.75	2.52	4.13	8.25	7.78	8.10	7.52	7.47	12.64	15.16
SOUTH EAST ASIA	**Q**	6.26	7.16	8.13	7.80	8.49	8.76	8.67	9.15	9.47	9.32	8.11
	V	3.46	5.41	19.78	9.66	22.29	29.71	25.49	39.65	44.75	31.80	8.52
MIDDLE EAST	**Q**	8.24	8.73	8.38	8.42	8.33	8.48	8.27	7.89	8.16	8.15	8.30
	V	7.02	8.02	7.68	8.26	9.28	9.28	8.6	7.93	8.13	8.1	8.61
OTHERS	**Q**	8.24	8.28	8.59	8.48	8.54	8.69	8.49	8.02	8	7.8	8.44
	V	14.22	13.07	13.93	10.48	9.24	10.05	6.87	3.76	3.22	2.23	2.80
TOTAL	**Q**	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
	V	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00

The above tabe revealed that during initial period (2009-10) Odisha marine export market is dominated by USA, Japan and EU which imported more than 75% of marine products. But gradually with passage of time the direction of marine export has changed. During the period of 2020-21, the export market is dominated by USA, China and ASEAN countries which import more than 70 percent of marine fish. During the study period it is found that the share of EU and Jpan has declined whereas the new market ASEAN and China has emerged. The implementation of sanitary and phytosanitary (SPS) measures and Technical Barriers to Trade (TBT), particularly by Japan and EU countries, is one of the key factors responsible for the shift in direction during this era. Odisha's look east strategy has been in place since the late 1990s, with the creation of the ASEAN Odisha Free Trade Agreement (AIFTA) and the implementation of the ASEAN-Odisha Trade in Goods Agreement. (AITIGA) not only boost of trade but also change the direction of trade from western countries to ASEAN countries.

Table4.16: Growth rate and Instability analysis of Marine Fish Exports from Odisha

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(Commodity-wise)

Item	CGR (%)	CII (%)
	2009-19	2009-19
Frozen shrimp	20.50	24.41
Frozen Fish	3.42	22.62
Fr Cuttle Fish	5.28	9.14
Fr Squid	11.19	12.64
Dried Items	1.44	13.28
Live Items	5.07	35.58
Chilled Items	5.53	14.21
Others	10.71	22.68
Total	14.30	18.09

Source: Author's own calculation by compiling data's from various annual reports MPEDA, Govt of India

Factors responsible

In the post-WTO period, marine fish have become environmentally regulated products. Due to this, the country's trade performance, especially those exporting marine products should have to take environmental measures at international levels. Among all the exported marine fish exported from Odisha, the four major marine fish, namely Frozen shrimp, Frozen cuttlefish, and Frozen squid constitute more than 80 percent of total exports during the above said periods, but gradually the other marine products export increased. The major factors responsible for this are due to the reason of diversification of marine fish exports by adding pomfrets, ribbonfish, seer fish, and, snapper to the frozen fish category. During the second phase of the time period, the growth of export of all marine fish declined but there is negative growth of export in chilled items and due to limited air cargo connectivity as a result of the Covid pandemic crisis Frozen shrimp still dominates among the various commodities marine sea foods exported from the country, and the USA continues to be a preferred destination for shrimp exports. In terms of marine fish, less instability was found in the export of non-shrimp products like frozen fish

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(22.62%), Cuttlefish (9.14), and squid items (12.64) as compared to other items. The primary reason for less instability is the export diversification a reduced average and Most wealthy countries have import duties on marine goods ranging from 105 to 4.5%. During the same period, the intensity of instability is more for frozen shrimp. The primary reason for this may be due to the ban on imports by USA and EU, citing environmental concerns. As Odisha is facing tuff competition from south east Asian countries like Thiland, Vietnam in export of marine fish specially in shrimp fish there is a drastic reduction of export of marine fish to Japan. Adding to this due to presence of antibiotics in Odishan preserve marine fish, Japan has restricted marine exports from Odisha.

Table : Market-wise compound growth rate and Instability analysis of Marine Fish exports from Odisha

Export Market	CGR(%)	CII(%)
	2009-21	2009-21
Japan	8.08	1.13
USA	29.90	6.88
EU	6.50	0.92
China	13.06	8.06
ASEAN	11.45	4.31
Middle East	11.56	2.18
Others	11.61	1.89
Total	14.30	3.31

Source: Author's own calculation by compiling data's from various annual reports MPEDA Govt of India

The exports growth of marine fish in terms of volume were found to be highly positive during the period from 2013-17 as compared to the period 2017-20. The United States had the highest rate of export growth in the first period, while China had the highest rate of growth in the second. During the second phase, there is negative growth in the export of marine fish due to the reason of import restrictions imposed by Japan on shrimp because of higher levels of ethoxyquin

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an anti-oxidant and also an ingredient found in shrimp feed. The major reason for the slowdown of export growth in EU may be decline in overall export due to the financial crisis in 2008-09 which adversely impact on mostly EU countries. The factors responsible for increase in marine exports are hike in international price of the frozen shrimp and lobster, and the Infrastructure development like introduction of deep sea fishing vessels at fishing harbors and different marine fish landing centers for seafood processing industries.

Determinants of Export of Marine Fish

Table : Determinants of "Factors of Marine Export product" in Odisha.

Variable	Value of Coefficient
ln_pci_odisha	-1.635
Neer	0.002)
Marine_fishing_landing	-0.004)
Sea_food_processing_plant	-0.007
Constant	-7.545
R^2	0.98
N	12

Source: Own estimation

*** p<0.01, ** p<0.05, * p<0.1 The quantities in parentheses are the heteroskedasticity-robust t-values.

This regression result has produced after checking the multicollinearity in the model.

The dependent variable is marine export product of Odisha. The cross-section OLS regression results are reported in Table 4. The results indicate that log of per capita income of the state is statistically significant. The effects of log of per capita income of the state, If the per capita income increases the value of marine export also increases on an average by 1.63 per cent points. This indicates that per capita income and marine export are highly correlated. Over time the value marine export of the state is increased, due to better infrastructure for shipping and fisheries, the amount of capital goes to facilitates the market for marine product. On the other hand, the marine fishing landing and sea food processing unit are showing negative relationship indicating that the state of affairs for marine fishing and fishing landing is not good.

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