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# Trends among young fishers and their characteristics during a depression

- Statistical analysis based on fisheries census -

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## Summary

Trend analysis of fishers by age cohort clarifies that the number of young fishers started to show an increasing trend in the late 1990s and early 2000s. The background of the increasing trend is the deteriorating employment environment during a depression. The increase of young fishers is more conspicuous in the coastal fishery than in the offshore and ocean fishery, and employed young fishers increased more than independent young fishers. This means that an increasing number of companies employed young fishers in the coastal fishery. Although starting as an employed fisher is the first step for youths to get involved in fishing, supports from the regional fisheries cooperative and municipality are vital to settle them in the fishing village and let them develop into independent fishers.

### 1 . Introduction

Some point out that the number of young workers in agriculture increased during the depression after the 1990s, and that the routes through which they achieved employment grew diverse.<sup>1)</sup> In fishing, the trend of fishers by age cohort indicates that the number of youths engaged in fishery started to show an increasing trend in the mid-1990s and early 2000s, though the increase was slow.<sup>2)</sup>

However, the Fisheries Agency's 2011 White Paper on Fishery and other publications emphasize a "decreasing number of fishers and progress of aging" every year,<sup>3)</sup> and it is generally believed that, to date, young fishers have been continuously decreasing in number. For these reasons, the new trend of young fishers mentioned above has hardly attracted attention.

I clarify the employment trends among young fishers and their characteristics during a depression using data from the fishery census published every five years.

### 2 . Method of Analysis

Male fishers under 39 years old are defined as

young fishers in this paper. I analyzed them using two indicators: increase and decrease of the young cohort (hereafter in this document referred to as "fluctuation") and the rate of change in the same age cohort (hereafter in this document referred to as "rate of change"). Table 1 shows the definitions of these two indicators and the method used to calculate them using the number of independent fishers in 1998 and 2003.

As shown in Table 1, I calculated the fluctuation of each age group under 39 years old between two census years and summed up the number of fish

Table1 ; Definition about Number and Rate of Young Male Fishers Cohort Fluctuation  
 -Total Amount of Japanese Independent Male Fishers-

(Age Bracket)	Number of Young Fishermen		Number of Cohort Fluctuation
	1998	2003	
15-19	845	779	779
20-24	2,884	2,464	1,619
25-29	4,357	3,273	389
30-34	5,835	4,477	120
35-39	7,968	5,913	78
Total	21,889	16,906	2,985
	A		B
Rate of Cohort Fluctuation = B / A (%)			13.6

Souarce ; Fisheries Census

ers in the two census years. For example, there were 845 fishers in the age group between 15 and 19 years old in 1998. If these individuals all remained fishers, and no new members of their age cohort had become fishers, there should have been 845 fishers in the age group between 20 and 24 years old in 2003. However, there were 2,464 fishers in the age group between 20 and 24 years old in 2003. This means that this age cohort saw an addition of 1,619 fishers in these five years. The cohort fluctuation is therefore 1,619. The summation of the cohort fluctuation of each age group is 2,985, which is the fluctuation of the number of fishers under 39 years old.

The rate of change is the ratio of fluctuation to the total number of young fishers of the previous census year. As Table 1 shows, the total cohort fluctuations of 2,985 is divided by the total number of fishers, 21,889, and the answer is multiplied by 100 to get a percentage rate. In this case, the rate of change is 13.6%. That is,  $2,985/21,889 \times 100 = 13.6\%$ .

Table2 ; Trend of Young Male Fishers Cohort Fluctuation

	(Age Bracket)	Period			
		1988-93	1993-98	1998-2003	2003-08
Number of	15-19	2,290	1,640	1,534	1,253
Fluctuation	20-24	3,881	3,036	3,337	3,581
(peoples)	25-29	-2,030	199	995	2,436
	30-34	-2,624	-595	368	2,159
	35-39	-2,723	-731	56	2,076
	Total	-1,206	3,549	6,290	11,505
Rate of Fluctuation (%)		-1.4	6.5	16.1	36.4

Source;op.cit.

Table 2 shows the results of the calculations for four census periods between 1998 and 2008. Here, I used the value of all fishers, including employed fishers. As shown in Table 2, the number of fishers decreased by 1,206 between 1988 and 1993, but subsequently increased greatly by 11,505 between 2003 and 2008. Accordingly, the rate of change recorded a rapid increase. It was minus 1.4% between 1988 and 1993, but it grew by 6.5%, 16.1%, and 36.4% in the following three census periods - 1998, 2003, and 2008, respectively. Young fishers temporarily decreased in number during the bubble

economy when Japan enjoyed a strong business environment. The number of young fishers started to increase in the late 1990s when the Japanese economy became depressed, and the increasing trend has been growing more conspicuous since the late 1990s.

However, as the 12th Fishery Census in 2008 used a different method to aggregate the number of fishers, its values are not as reliable as those in other census years. In this paper, I conducted analysis using the data collected between 1988 and 2003.

### 3 . Analysis by Pattern of Employment and Type of Fishery

Table3 ; Number and Rate of Young Male Fishers Cohort Fluctuation by Type of Employment and Type of Fishery

Type of employment	Type of Fishery	Period			
		1988-93	1993-98	1998-2003	
Number of Fluctuation (persons)	Independent	A	1,899	1,673	3,050
		B	-328	84	-65
	Total	1,571	1,757	2,985	
Employed	A	A	1,163	1,581	2,720
		B	-4,980	211	585
	Total	-3,817	1,792	3,305	
Rate of Fluctuation (%)	Independent	A	4.5	6	14.9
		B	-10.9	4.6	-4.7
	Total	3.5	5.9	13.6	
Employed	A	A	7.9	14.4	30.5
		B	-17.7	1.7	7.1
	Total	-8.9	7.6	19.3	

Source;op.cit

Notes ; 1) A : Coastal Fishery

2) B : Offshore and Pelagic Fishery

First, let me look into the trend of young fishers by pattern of employment for two types of fishery: the coastal fishery and the offshore and ocean fishery. As Table 3 shows, there was a great increase in the number of independent young fishers in the coastal fishery, but there was a greater increase in the number of employed fishers in both the coastal fishery and the offshore and ocean fishery. That is, the fluctuations in employed fishers were minus 3,817 ( $-4,980 + 1,163 = -3,817$ ) in the 1988 - 1993 period, 1,792 ( $1,581 + 211 = 1,792$ ) in the 1993 - 1998 period, and 3,305 ( $2,720 + 585 = 3,305$ ) in the 1998 - 2003 period. The rates of change indicate that the number of employed fishers increased far more rapidly than the number of independent fish-

What should be noted is that the number of young employed fishers increased in the coastal fishery. Traditionally, young fishers first get involved in the offshore and ocean fishery. However, with the decline in the offshore and ocean fishery, the coastal fishery now employs more young fishers. This presumably means that fishery companies capable of taking on employees are increasing in number in the coastal fishery.

Next, let me examine the trend by type of fishery. Figure 1 shows the fluctuations by type of fishery and by type of employment in the 1998 - 2003 period, when the number of young fishers underwent a notable increase. The total fluctuations in the 15 types of fishery in Fig. 1 account for 79% of total fluctuations for independent fishers and 81% of those for employed fishers. In other words, these 15 types cover almost all types of fishery that witnessed the most drastic fluctuations.

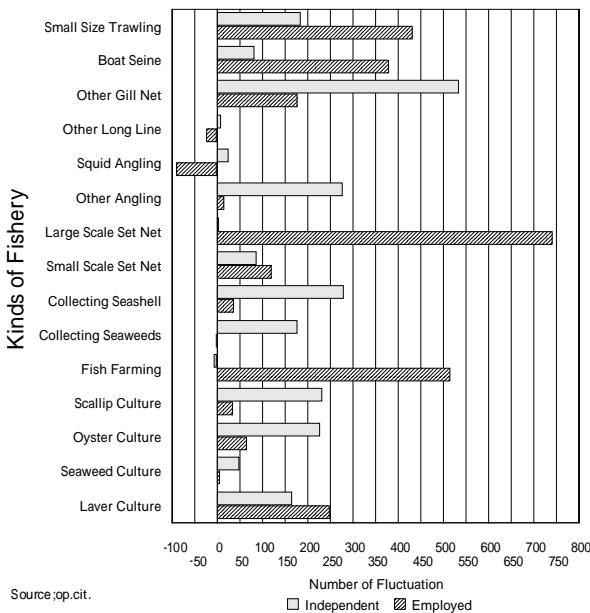


Fig1 ; Number of Young Male Fishers Cohort Fluctuationby Type of Fishery and Employment between 1998-2003

As shown in Fig.1, a conspicuous increase in the number of young fishers was recorded in such relatively profitable types of fishery as small-scale trawl net fishing, scallop culture, and oyster cul-

ture. However, what deserves attention is that the number of young fishers also increased greatly in some less profitable types of small fishery, such as other types gill net, other angling, collecting sea-shells, and collecting see weeds.

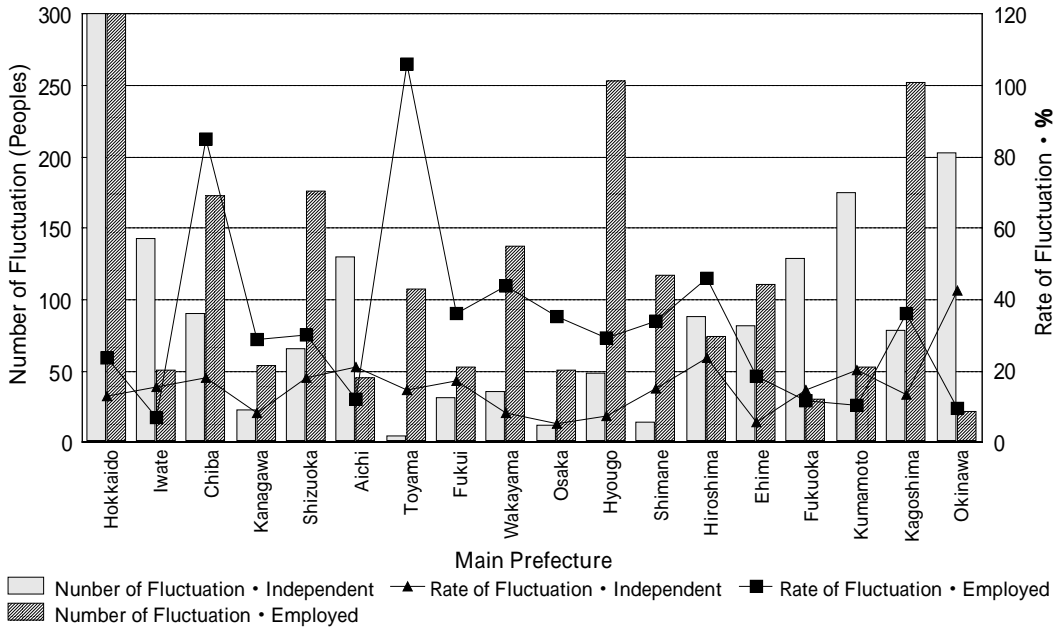
The number of young fishers also increased significant in large-scale set net and fish farming. As these two types of fishery are mostly managed by companies that have the ability to offer employment, it is natural that their numbers of young fishers increased in this period. However, the number of young fishers has been increasing greatly in such types of fishery as small-scale trawl net fishing, boat seine, and laver culture, in which few management companies are involved. It is likely that management companies will gradually become increasingly involved, even in these types of fishery.

#### 4 . Analysis by Area

The increasing trend in the number of young fishers is observed across the country, but varies greatly by region. The fluctuations and rates of change by prefecture in the 1998 - 2003 period were very low in Tokyo and Tokushima prefectures and some prefectures on the coast of the Japan Sea such as Akita, Yamagata, and Tottori. However, it is necessary to note the areas that recorded a high value in both indicators.

I set up two standards for this analysis: (1) The average rate of change in the 1998 2003 period is higher than 16.1%, and (2) The real fluctuation is more than plus 100 people. Using these two standards, I picked out the prefectures that showed a remarkable increase in the number of young fishers. Figure 2 shows the results.

As shown in Fig.2, even the prefectures that recorded a great increase in the number of young fishers had different patterns by type of employment. That is, they can be divided into three patterns: (1) prefectures with a great increase in



Source;Op.Cit.

Note;Hokkaido, Number of fluctuation is particularly higher than others. (Indepenndent 401Peoples, Employed 726peoples)

Fig2 ; Number and Rate of Young Male Fishers Cohort Fluctuationby Main Prefecture and Type of Employment (Period 1998-2003)

the number of independent fishers (Iwate, Aichi, Fukuoka, Kumamoto, and Okinawa), (II) prefectures with a great increase in the number of employed fishers (Shizuoka, Toyama, Wakayama, Hyogo, Shimane, and Kagoshima), and (III) prefectures with the same degree of increase in the numbers of both independent fishers and employed fishers (Hokkaido, Chiba, Hiroshima, and Ehime).

Type I prefectures are assumed to have secured a relatively large number of successors in the independent fishery. Okinawa, in particular, experienced the nation's highest rate of change in the number of independent fishers, while the number of employed fishers did not increase much. In Okinawa, the fishery employment situation deteriorated drastically with the worsening economic conditions, and Okinawa's results are assumed to have been affected by the deteriorated fishery employment situation. Type II prefectures in are assumed to have expanded employment in such fisheries as large-scale Set Net, fish farming, and hand-operated

trawl fishing. Even in the areas on the coast of the Japan Sea, which face a decrease in the number of fishers and the rapid aging of fishers, Toyama and Shimane, where large-scale Set Net and round haul fishing are prevalent, saw a clear increase in the number of young fishers. Type III prefectures are assumed to have both fishery companies and highly profitable family-owned fishers. Young fishers starting the fishing profession in these prefectures are likely to become independent fishers in the future.

## 5 . Summary and Analysis

Based on the above analysis results, I indicate the following five points

- 1 ) The number of young fishers started to increase in the depression after the late 1990s.
- 2 ) The number of employed fishers showed a more remarkable increase than that of independent fishers in terms of employment pattern, and the coastal fishery recorded a significant increase in terms of type of fishery.

- 3 ) In terms of fishing type, various kinds of small fishing operations showed an unexpectedly high increase in the case of independent fishers. The number of employed fishers increased notably for large-scale set net and fish farming, but the coastal fishery also saw an increase in the number of young fishers in several types of fishery.
- 4 ) In terms of age group, there was a large increase in the number of fishers in their early and late 20s. This means that a decreasing number of high school graduates are working for their family fishery businesses on graduation, even when they are the successors.
- 5 ) The prefectures that recorded a remarkable increase are classified into three groups. They are (I) prefectures that saw a great increase in the number of independent fishers, (II) prefectures that recorded a great increase in the number of employed fishers, and (III) prefectures that experienced the same amount of increase in the numbers of both independent fishers and employed fishers.

In the last part of this paper, I give several analyses of how to understand the above-mentioned results.

The first analysis examined the reason why the number of young fishers increased during the depression. Clearly, the increase can be attributed to the deteriorated employment environment. In Japan, the unemployment rate has increased since the late 1990s and employment of youths became unstable. Decreasing opportunities for regular employment and increasing opportunities for unstable employment decreased the income standard of youths. Simultaneously, the average age at first marriage went up and the birth rate became even lower. Under these circumstances, an increasing number of youths decided to seek employment in the fishery because they were not able to find any other favorable employment environment.

The second analysis examines the size of the in-

crease in the number of young fishers. As Table 1 shows, the number of young fishers greatly decreased despite the increased total number of fishers. Accordingly, the increase in the number of young fishers remains small. However, attention should be paid to this point as a new trend to decelerate the decrease in the number of young fishers. The third analysis examines the increase in the number of employed fishers in the coastal fishery. The increase is assumed to reflect a decline in the offshore and ocean fishery and an increase of company management in the coastal fishery. At the same time, youths other than successors of fishing families have difficulty joining the fishery as new fishers without any background in fishing, and they presumably joined the fishery as employed fishers.

The fourth analysis examines the relationships between employed fishers and independent fishers. As discussed above, youths normally join the fishery as employed fishers. However, they do not necessarily remain employed fishers for the long term. New young fishers can settle into the fishery more easily if they get an opportunity to become independent fishers with a high-income standard than if they have to remain employed fishers. If this analysis is true, regional educational plans to help youths who join the fishery as employed fishers develop into independent fishers and flexible plans for fishing ground utilization that allow them to start more profitable fisheries are strongly suggested.

#### Notes

- 1 ) On this point, see Yanagimura [1] and Sawada [2].
- 2 ) See Miyazawa [3].
- 3 ) The 2011 edition of the "White Paper on Fishery" concerns the decreasing production capacity of fishing due to the accelerating rate of aged fishers, decreasing number of fishers, and developing aging of fishers (Reference [4], p. 32).

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