Supplementary material

In order to better understand the meaning of the different principal components in this study, it is necessary to analyze the partial contribution of variables.

Firstly, the three principal components of the choice of the Chinese fisherfolk's income were investigated (Table S1). All four types of fisherfolk's income make a significant contribution to Prin1 in 2010 and 2020, demonstrating that HOI (Household operating income), SI (Salary income), PI (Property net income), and TI (Transfer income) are all plausible contributors to Chinese fisherfolk's income, this is credible. The largest contributor to Prin2 in 2010 was SI (Salary income), indicating that it is plausible that salary income was an essential component of Chinese fisherfolk's income in 2010. In 2020 Prin2, the highest contribution is made by the HOI (Household operating income), which proves that what we mentioned before about income from operating fisheries is still the primary source of income for Chinese fisherfolk's households and that it is plausible that Chinese fisherfolk are still relying on traditional production methods for their income. The largest contributor to Prin3 in 2010 was TI (Transfer income), with most of the transfer income coming from various recurrent transfers from the government, institutions, and social teams to fisherfolk. The highest contributor in Prin3 in 2020 is PI (Property net income). Property net income includes net interest income, dividend income, net savings insurance income, and net rental income from the transfer of contracted land or water rights, and these are important for Chinese fisherfolk's income.

Secondly, the first four principal components in 2010 and the first three principal components in 2020 of the choice of the environmental factors affecting Chinese aquaculture production were investigated (Table S2). The study found that the highest contributor in Prin1 in 2010 was TFA (typhoons and floods) and in Prin1 in 2020 was DA (disease), an infectious or parasitic disease caused by fungi, bacteria and viruses that kills fish products and is one of the environmental factors affecting fisheries and aquaculture. In addition, the highest contributor in Prin2 in 2010 was OA (Other), and in Prin2 in 2020, TFA (Typhoons and floods) and PA (Pollution) were the highest contributors, with typhoons, floods and pollution also being important factors affecting fisheries and aquaculture. The highest contributor in Prin3 in 2010 and 2020 is DRA (drought), which triggers evaporation of pond water, leading to increased aquaculture intensity and deterioration of water quality, which has a serious impact on fisheries and aquaculture production, in line with the reality of the situation at hand. This study also included Prin4 in the 2010 study, and the highest contributor in Prin4 in 2010 was PA (pollution).

Table S1. Eigenvalues and partial contribution of variables of Chinese fisherfolk's income in 2010 and 2020.

	2010				2020			
	Prin1	Prin2	Prin3	Prin4	Prin1	Prin2	Prin3	Prin4
Eigenvalues of Chinese fisherfolk's income.								
Eigenvalue	3.2496	0.3988	0.2574	0.0941	2.3958	0.7827	0.4512	0.3703
Percent	81.24	9.971	6.436	2.353	59.895	19.566	11.28	9.258
Cum Percent	81.24	91.211	97.647	100	59.895	79.462	90.742	100
Partial contribution of variables.								
HOI	89.64549	0.01398	5.56218	4.77834	50.24627	34.47098	12.98273	2.30001
SI	71.42968	24.49156	3.96447	0.11429	61.98912	19.78066	0.77716	17.45306
PI	88.59896	1.18797	5.75013	4.46293	63.55749	9.18208	24.52586	2.73457
TI	75.28478	14.19147	10.46819	0.05557	63.78839	14.83156	6.83581	14.54424

Source: Authors' own calculations based on data from *China Fisheries Statistical Yearbook 2011* and *China Fisheries Statistical Yearbook 2021*.

Table S2. Eigenvalues and partial contribution of variables of aquaculture environmental conditions in different Chinese regions in 2010 and 2020.

	2010	2020

Eigenvalues of aquaculture environmental conditions in different Chinese regions.										
	Prin1	Prin2	Prin3	Prin4	Prin5	Prin1	Prin2	Prin3	Prin4	Prin5
Eigenvalue	2.5202	1.0559	0.9842	0.3039	0.1359	2.8559	0.7572	0.7161	0.4157	0.2551
Percent	50.403	21.117	19.684	6.079	2.717	57.118	15.145	14.322	8.314	5.101
Cum Percent	50.403	71.52	91.204	97.283	100	57.118	72.263	86.585	94.899	100
Partial contribution of variables.										
TFA	79.69745	7.94573	4.74396	0.00195	7.61091	51.92785	31.9667	0.00094	15.53571	0.5688
DA	73.63843	12.70611	2.15493	6.90254	4.59798	76.96425	0.01985	0.28455	10.88693	11.84442
DRA	1.09615	21.74012	76.95953	0.17749	0.02671	59.6003	0.06276	30.19133	1.90869	8.23693
PA	73.87821	8.12841	0.2679	16.64617	1.07931	45.48449	43.49458	0.03512	10.88064	0.10516
OA	23.70506	55.06549	14.29436	6.66493	0.27016	51.6146	0.1788	41.09659	2.36015	4.74986

Source: Authors' own calculations based on data from *China Fisheries Statistical Yearbook 2011* and *China Fisheries Statistical Yearbook 2021*.

According to the eigenvector matrix of the principal component analysis of Chinese fisherfolk's income, HOI (household business income), SI (wage income), PI (net property income) and TI (transfer income) are set as Y_1, Y_2, Y_3 and Y_4, and the principal component models of Chinese fisherfolk's income in 2010 and 2020 can be obtained as follow:

$$\begin{cases} V1_{2010} = 0.525Y_1 + 0.469Y_2 + 0.522Y_3 + 0.481Y_4 & \text{(S1)} \\ V2_{2010} = 0.019Y_1 + 0.784Y_2 - 0.173Y_3 - 0.597Y_4 & \text{(S2)} \\ V3_{2010} = -0.46481Y_1 + 0.392Y_2 - 0.473Y_3 + 0.638Y_4 & \text{(S3)} \end{cases}$$

Similarly, research can lead to the 2020 principal component model of Chinese fisherfolk's income:

$$\begin{cases} V1_{2020} = 0.458Y_1 + 0.509Y_2 + 0.515Y_3 + 0.516Y_4 & \text{(S4)} \\ V2_{2020} = 0.664Y_1 - 0.503Y_2 + 0.343Y_3 - 0.435Y_4 & \text{(S5)} \\ V3_{2020} = 0.536Y_1 - 0.131Y_2 - 0.737Y_3 + 0.389Y_4 & \text{(S6)} \end{cases}$$

It is also based on the matrix of eigenvectors from the principal component analysis of the environmental factors affecting Chinese aquaculture production, by setting TFA(Typhoons and floods), DA(Diseases), DRA(Droughts), PA(Pollution), and OA(Others) as K_1, K_2, K_3, K_4, K_5, the 2010 principal component model of environmental factors affecting Chinese aquaculture production can be obtained:

$$\begin{cases} U1_{2010} = 0.562K_1 + 0.541K_2 + 0.066K_3 + 0.541K_4 + 0.307K_5 & \text{(S7)} \\ U2_{2010} = 0.274K_1 + 0.347K_2 + 0.454K_3 - 0.277K_4 - 0.722K_5 & \text{(S8)} \\ U3_{2010} = -0.220K_1 - 0.148K_2 + 0.884K_3 + 0.052K_4 + 0.381K_5 & \text{(S9)} \\ U4_{2010} = 0.008K_1 + 0.477K_2 - 0.076K_3 - 0.740K_4 + 0.468K_5 & \text{(S10)} \end{cases}$$

Similarly, research can lead to the 2020 principal component model of environmental factors affecting Chinese aquaculture production:

$$\begin{cases} U1_{2020} = 0.426K_1 + 0.519K_2 + 0.457K_3 + 0.399K_4 + 0.425K_5 & \text{(S11)} \\ U2_{2020} = -0.650K_1 + 0.016K_2 - 0.0288K_3 + 0.758K_4 - 0.049K_5 & \text{(S12)} \\ U3_{2020} = -0.003K_1 - 0.063K_2 - 0.649K_3 + 0.022K_4 + 0.758K_5 & \text{(S13)} \end{cases}$$