

**CLUSTER INDUSTRY, A PROCEDURE FOR FISHERY AND AQUACULTURE
MANAGEMENT IN IRAN**

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Abstract

Management of fisheries and aquaculture is an issue that has received widespread attention in the literature. The particular concern is the relationship among fishermen, fish farmers, management institution and fish resources. This relationship is very important for sustainable development of sea resources in Iran. Overfishing, uncertainty in fish availability and changing Iranian government fisheries management are important challenges for fisheries and coastal management in the south of Iran. In addition, aquaculture in Iran is linked to the fish resources via spawner catch from the coastal area. Iranian governmental fisheries management policy has changed during recent years. Government role in fisheries management changed from direct involvement to the monitoring and indirect management. In addition, there are some kinds of cooperative that available in the region. However, these cooperatives are not effectively involved in fisheries and aquaculture management.

Cluster industry is a new approach that has been introduced recently and applied in some region (e.g. Port Lincoln Aquaculture Cluster in Australia). Industry clusters are groups of competing, collaborating and interdependent businesses working in a common industry and concentrated in a geographic region. This research examines a cluster establishment for Iranian fisheries and aquaculture in the south. The stratified random sampling and questionnaire were used for collecting data and shrimp farmers, fishermen, governmental managers, and distributor's opinions. The result indicated that the cluster form of relationship among coexisting firms (fishermen, farmers and related industries) provides a source of sustainable management of aquaculture, fisheries resource and creates competitive advantage.

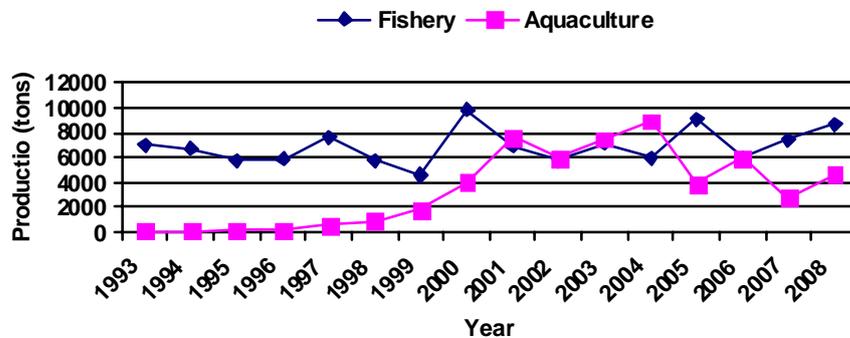
Key words: Cluster industry, Aquaculture, Fishery management, Persian Gulf, Iran

Shrimp Aquaculture in Iran:

In Iran, shrimps are cultured in single cohorts in a semi-intensive way. The post-larvae are transferred from hatcheries to the grow-out ponds from which they are harvested after five months, depending on the price, cost, and desired harvest weight (Esmaeili, 2005).

In 1994, approximately 1% of Iranian shrimp production was farmed; by 2009 this share had increased to 35%. Although in some years shrimp aquaculture was higher than shrimp fishery (Figure 1).

Figure 1. Shrimp industry and shrimp aquaculture in Iran



Source: Iranian Fisheries Company

The aims of Iranian shrimp farming were compensating of the decline in shrimp fishery, earning foreign exchange, enhancing employment opportunities and income for poor coastal communities. Iranian shrimp farming areas had been concentrated in the northern Persian Gulf and Oman Sea. There are about 4300 ha of shrimp ponds in Iran and shrimp farms are located in Khuzistan, Busher, Hormozgan and Balochistan provinces (Esmaeili, 2008).

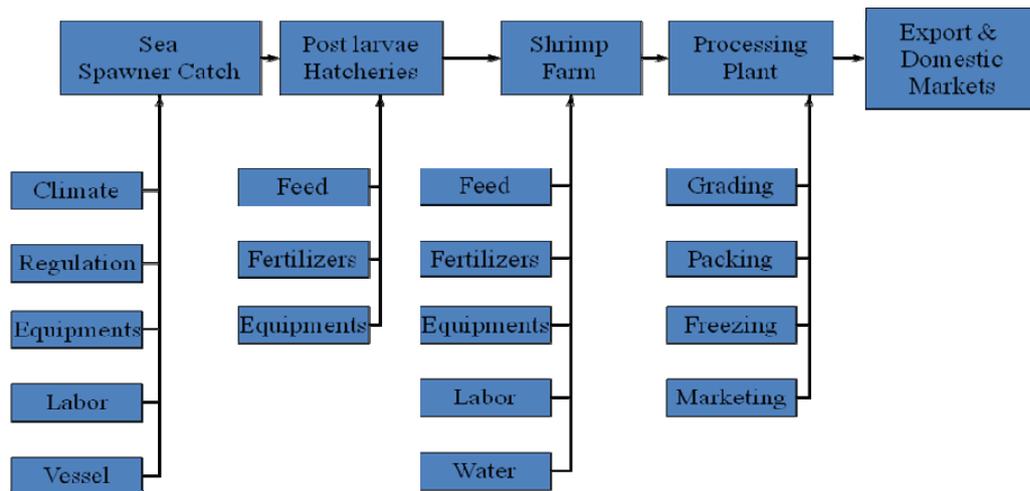
A few thousand hectares of land have been allocated for the establishment of shrimp ponds, and several hatcheries have been built to supply the post larvae from spawners caught from the north Oman Sea. In addition, Iran has 1800 Km of coastlines in the south, which are suitable for shrimp culture.

Several issues are identified as limitations for sustainable development of shrimp aquaculture in Iran, namely, fry supply, feed limitation, production technology, processing and marketing distribution systems.

Although aquaculture in Iran is technologically linked to the fishing, hatcheries, and processing, there is not good relationship between the mentioned chains (Figure 2).

Aquaculture, production levels have not yet realized their potential. One reason for the modest production is attributed to poor feeding practices and the insufficient use of quality feed. This situation undermines the economic sustainability of aquaculture farms.

Figure 2. Shrimp aquaculture flow chart in Iran



Another reason for the aquaculture industry adopting extensive production systems is the lack of access to capital. To intensify production, producers need access to additional capital to support increased level of input such as feed. Capital is also needed for the acquisition of equipment including aerators, pumps, and necessary inputs to improve the management and the control of the production operation. Moreover, the development of the aquaculture sector depends on the availability of capital.

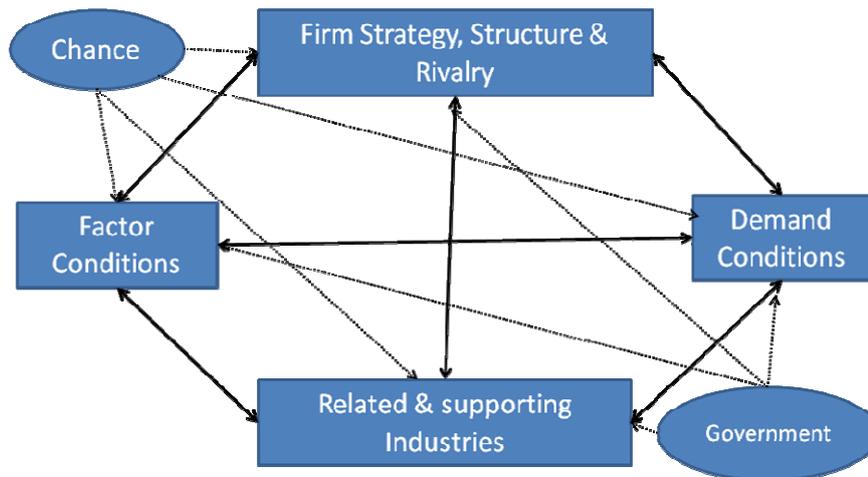
In support of sustainable development, aquaculture production technology should not only be technically feasible and economically viable, but also environmentally and socially acceptable.

Cluster Industry:

The growing importance of the aquaculture sub-sector emphasizes the need for the sustainable development of the shrimp aquaculture sub-sector. Michael Porter proposed The Competitive Advantage of Nations in 1990 and brought about an upsurge of research on the diamond model. The four interlinked advanced factors for competitive advantage for countries or regions in Porter's diamond framework are (1) factor conditions (i.e., the region's position in terms of factors of production, such as skilled labor and infrastructure); (2) demand conditions (i.e., the proportion of sophisticated customers in the home market); (3) firm strategy, structure and rivalry (i.e., conditions for organization of companies and the nature of domestic rivalry that

impels firms to work for increases in productivity and innovation); and (4) related supporting industries (Figure 3).

Figure 3. Porter-type Cluster Industry



Source: Hsieh and Li (2009)

The Porter-type cluster is important for industrial policy in many countries in North America, Europe, and Asia. The European Commission established a number of programs supporting research and development and set up several priorities for 2007–2013 to create and develop regional clusters (Del Campo et al., 2008). Other cases include Shanghai, Kunshan, Shenzhen, and Dongguan in China, Hsinchu in Taiwan, Milano in Italy, and Cambridge in the United Kingdom (Hsieh and Li, 2009)

Clustering is the process of development of locally rooted value-creating systems. Clustering can happen because one value-creating system can impose itself already at the beginning of an industry life cycle or because most companies of an industry, except the members of the strongest cluster, go out of business over time (Steinle and Schiele, 2002)

However, Porter suggested cluster has been criticized on the grounds that this clustering-approach would not fit for those industries centered on raw materials and offers little insights for strictly domestic industries or those producing non-tradable goods (Steinle, and Schiele, 2002; Yetton et al., 1992). It becomes clear that not all industries are equally affected by the process of clustering.

The paper is organized as follows. In Section 2, the data and method used are discussed. In Section 3, the broad evolution of aquaculture and related industries is reviewed. In Section 4, the findings are discussed and various policy-related questions are raised and considered.

Methods

The research was a descriptive-analytical study of the survey type. The target population in the study consisted of 154 shrimp fisheries, 120 shrimp farmers, 12 shrimp processors and 5 governmental agencies. Using stratified random sampling technique, 62 samples from region have been chosen. The research instrument was a structural questionnaire consisted of open and close-ended questions that its validity and reliability were tested.

Questionnaires are designed on the base of interviewer's conditions. The questionnaire has four types of questions, including surveyor's personal basic information, flow track, current employer's information and opinion of influence factors.

Results

This research is based on information collected via in-depth formal and informal interviews. This is the best strategy to gain insights into socio-economic phenomena from the perspective of the constituents. The dearth of reliable quantitative information available also influences the choice in favor of in-depth interviews.

As mentioned above questionnaire was used to collect data from the shrimp farmers, processors and governmental agents. The cross sectional data were collected in 2008 from personal interviews with 62 randomly selected shrimp fishery, shrimp farmer, processor and governmental agents.

Table 1 summarizes descriptive statistics on farmer, processor and governmental agents about industry problem. From the data in Table 1, it appears that interviews are most concerned about shrimp sell. It means shrimp marketing is the main problem.

Table 1. Interviewer's response to problem statement

Question	Governmental Agent			Farmers			Processor		
	Sell	Farm Mang.	Input	Sell	Farm Mang.	Input	Sell	Farm Mang.	Input
What is the aquaculture main problem	73	16	11	68	11	21	52	16	11

Shrimp farmers concern more about this selling form (table 2). Shrimp aquaculture harvest happened in a short period so the price is low in the harvesting time.

Table 2. Interviewers response to sell problem

Question	Fishing		Fish Farmer		Processor	
	Yes	No	Yes	No	Yes	No
Are you happy with this selling form	29	71	8	92	57	43

Based on the fact that most of the interviewers are not happy with the current selling form, some of them tried to look for some kinds of share selling. 56 percent of the processors and 58 percent of shrimp farmers had some kind of share selling experience. Table 3 indicates interviewers evaluating regarding to their last experience. According to the Table 3, a big share of interviewers had useful experience.

Table 3. Interviewers response to cooperation experience

Question	Farmers				Processor			
	Very useful	Useful	Not bad	Bad	Very useful	Useful	Not bad	Bad
your experience about sell cooperation	21	15	43	21	25	25	48	2

Most of the interviewers think that cluster relationship is useful for shrimp aquaculture development in Iran (Table 4).

Table 4. Interviewers response to cluster establishment

Question	Govern. Agent			Fish Farmer			Processor		
	useful	May be useful	Not useful	Useful	May be useful	Not useful	useful	May be useful	Not useful
What is your opinion about cluster establishment	93	7	0	77	22	0	75	21	4

However, the majority of interviewers think that cluster is useful, but this kind of relationship did not established. According to the table 5 most of the interviewers has believe that farmer-processor relationship in the main reason.

Table 5. Interviewers response to the reasons that cluster has established

Question	Govern. Agent			Fish Farmer			Processor		
	Cultural	Governmental	Farmers or processors	Cultural	Governmental	Farmers or processors	Cultural	Governmental	Farmers or processors
Reasons for did not established a cluster	32	0	68	13	4	81	37	14	49

In addition, most of the shrimp farmers think that processors don't agree with win-win solution.

With regard to the availability, it is worthwhile noting that in interviews identify that the major constraint on their operation is efficient marketing and the lack of access to inputs. This situation is clearly unsustainable from an economic point of view, particularly, when the prices of the end-products have an actually declined during the same period.

Typically cluster constituents are suppliers, producers, customers, labor markets and training institutions. They also include financial intermediaries, professional and industry associations, university departments and schools, regulatory institutions and bodies of law and the government. The clusters can be a subset of the industry, formed by only some constituents of the industry characterized by a persistent relationship over a period of time (Dayasindhu, 2002). Our suggestion is a subset cluster for shrimp industry in Iran.

Discussion

Aquaculture in Iran is linked to the fish resources via spawner catch from the costal area. Iranian governmental fisheries management policy has changed during recent years. Government role in fisheries management changed from direct involvement to the monitoring and indirect management. In addition, there are some kinds of cooperative that available in the region. However, these cooperatives are not effectively involved in fisheries and aquaculture management.

This research examines a cluster establishment for Iranian fisheries and aquaculture in the south. The stratified random sampling and questionnaire was used for collecting data and shrimp framers, fishermen, governmental managers, and distributor's opinions. The result indicated that the cluster form of relationship among coexisting firms (fishermen, farmers and related industries) provides a source of sustainable management of aquaculture, fisheries resource and creates competitive advantage.

In Iran, Ministry of Agriculture is involved in aquaculture development activities. Based on the Porter cluster model Iran shrimp aquaculture industry has good situation in factor condition but they do not have good related supporting industry and strategy. In addition, shrimp industry is not raw material supplier and produce tradable good. So we do not have restriction to establish a cluster for shrimp aquaculture industry.

The cluster that I suggest for shrimp aquaculture is a subset cluster industry. This cluster starts with shrimp farmers and processors, and then it could be expand to the related industries. This recommendation is in line with Steinle and Schiele (2002) who mentioned that not all industries are presently in the process of clustering at single regions or nations, but in the case the phenomenon applies to an industry, its players should be aware. In the following situation, a

high probability of clustering would be expected: the product or service can be divided into several steps of production.

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