

Effect of water temperature management on the hatching rate and larvae production of white leg shrimp (*Litopenaeus vannamei*) in shrimp hatcheries of Sistan & Baluchistan province, South-east of Iran

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Introduction:

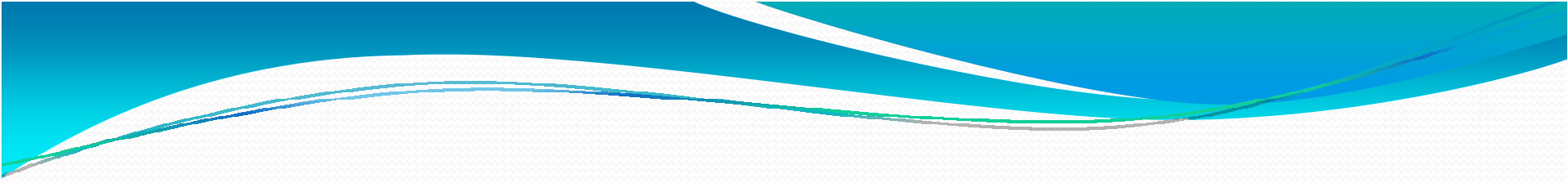
Although Sturgeon (Acipenseridae) caviar is the most significant and famous fishery product of Iran from the Caspian Sea, in the last three decades the country has gained some significant success with other fishery and aquaculture products.

- Iranian fisheries and aquaculture production reached 620,000 metric tons in 2014, of which 70% originated from capture fishery and 30% from aquaculture activities.
- In Iran, aquaculture started with sturgeon breeding and rainbow trout farming in 1929 and 1959, respectively.

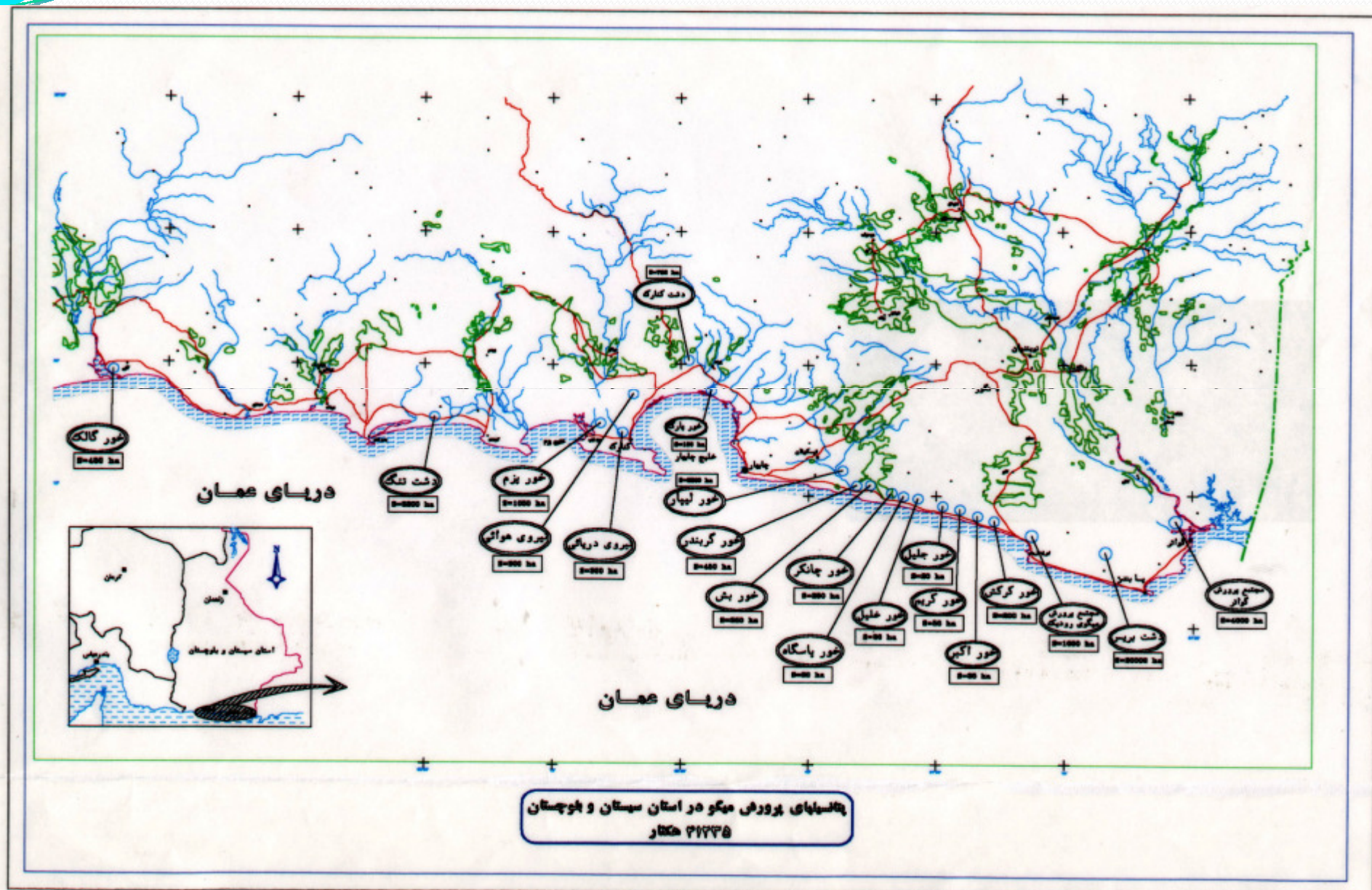
- There are five main aquaculture activities: warm-water fish farming (mostly carp), cold-water fish farming (mainly rainbow trout), fish farming in natural and semi-natural water resources, fish stock enhancement, and shrimp farming.
- The ways in which Iran has been able to make progress in developing aquaculture are as follows:
 - a) optimising the use of climatic diversity in developing both freshwater and saltwater aquaculture activities.
 - b) establishing the required infrastructures for development and extension of aquaculture activities.
 - c) training skilful manpower and educating specialists in the different fields of aquaculture.
 - d) increasing per capita consumption of aquatic products through sensitising public opinion (11 kg).

Shrimp farming operations in Iran, started in 1992 with a rapid extension of farms along 1800 kilometres of flat coastal regions bordering Persian Gulf and Oman Sea.

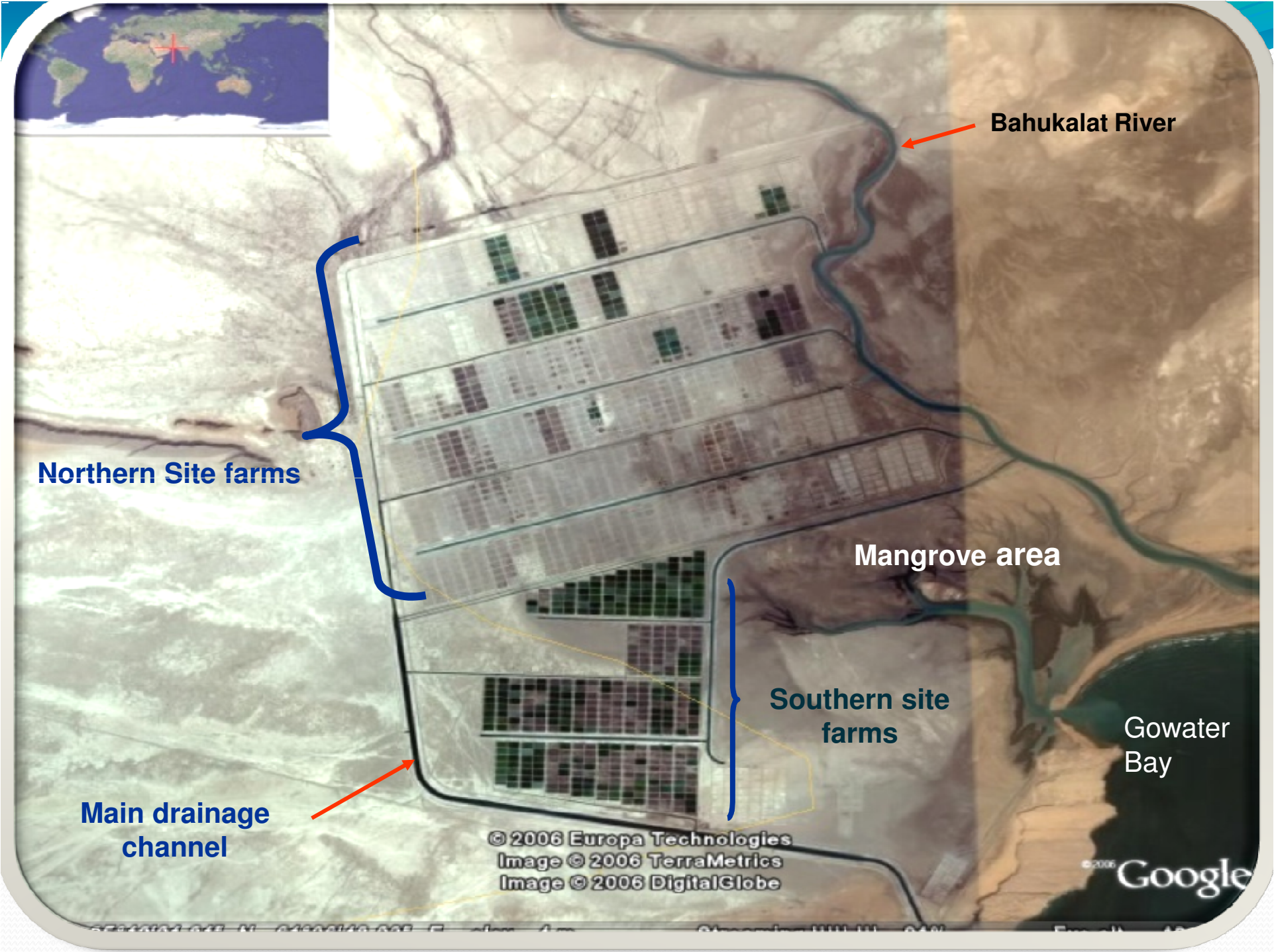


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- So far almost 200,000 hectares of land suitable for shrimp farming is surveyed along the Persian Gulf and Oman Sea and more than 50,000 hectares are distributed among interested farmers.
 - At present there are 10,000 hectares of active farms, producing in average 2500 kg/hectare.
 - In the Sistan & Baluchistan province (South-east of Iran) along 300 kilometres of Oman Sea coast 20 sites with a total area of 55000 hectares were identified for shrimp culture, of which 30,000 hectares are located in Gowater site.
 - In Gowater site we have 4000 hectares of active farms.

Map of suitable areas designated for Shrimp farming along the Iranian coast of the Oman Sea.







Bahukalat River

Northern Site farms

Mangrove area

Southern site farms

Gowater Bay

Main drainage channel

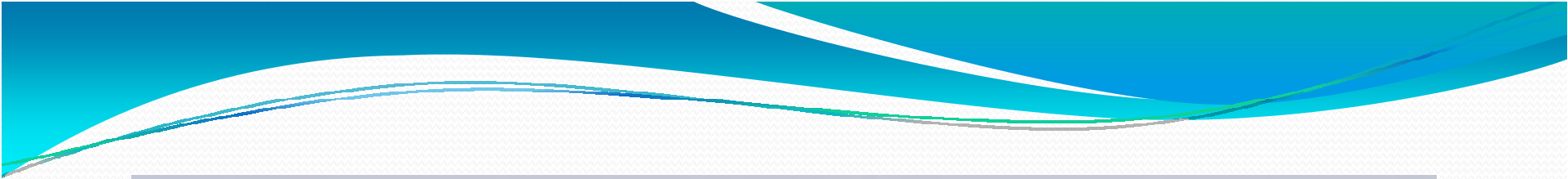
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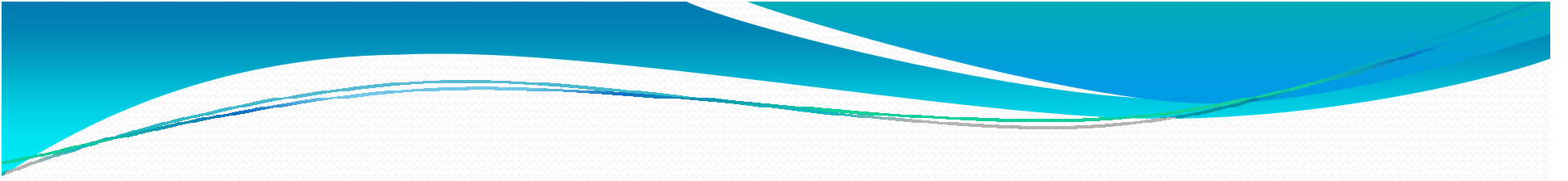
GOWATER, CHABAHAR



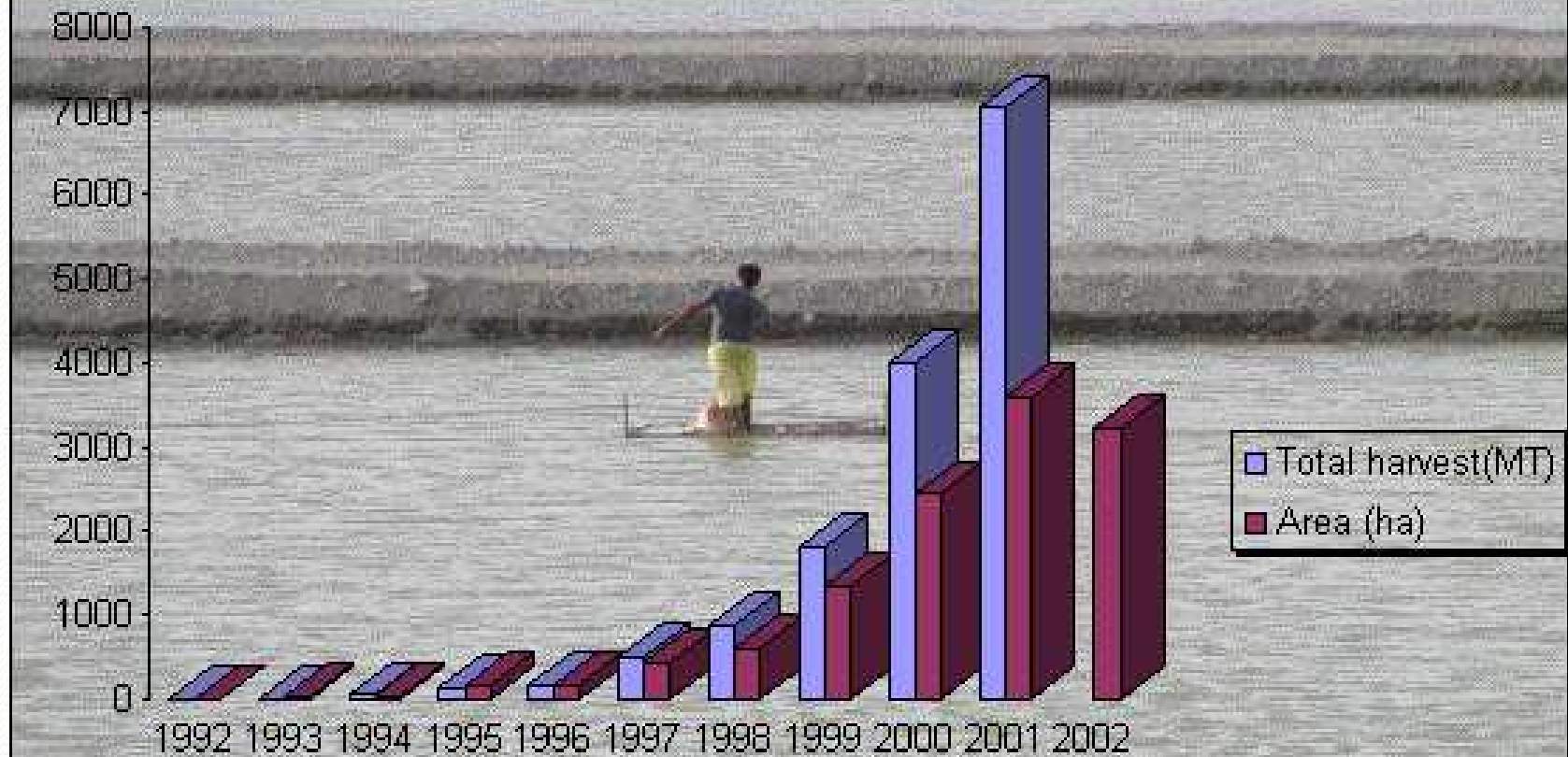







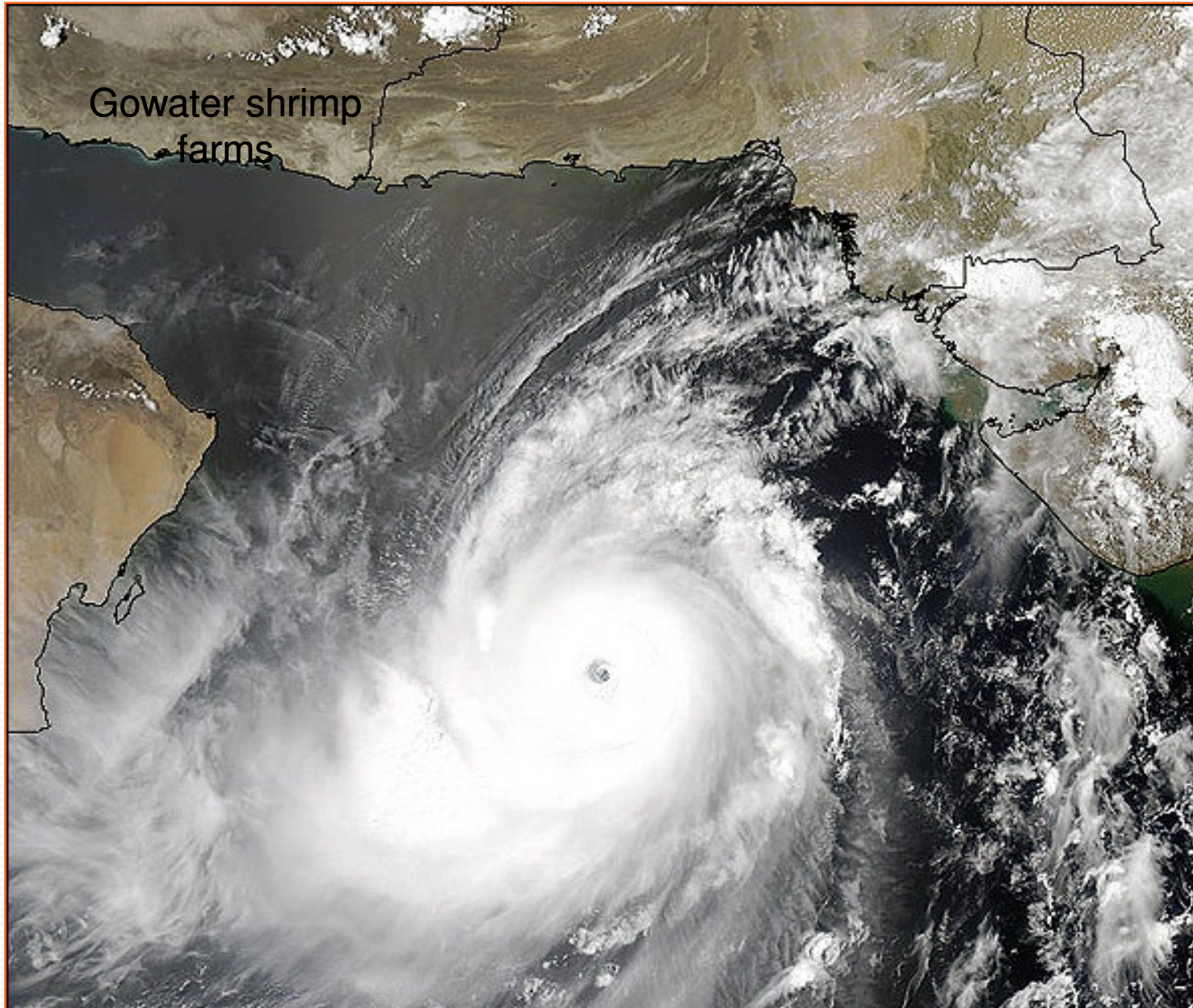


Evolution of the Iranian farm raised shrimp production



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- This industry was flourishing by producing high quality protein, creating employment, job opportunities and income for the coastal communities until the first outbreak of white spot syndrome (WSSV) disease in 2001. This disease started in Choeibdeh area of Abadan with subsequent occurrences in Bushehr and Hormozgan provinces, causing a massive loss and decline in shrimp production.
 - These incidents ceased the farming activities in these areas for a few years until 2006 when the Iranian Fisheries Organisation introduced a new species, white leg shrimp (*Litopenaeus vannamei*) to replace Indian white shrimp.

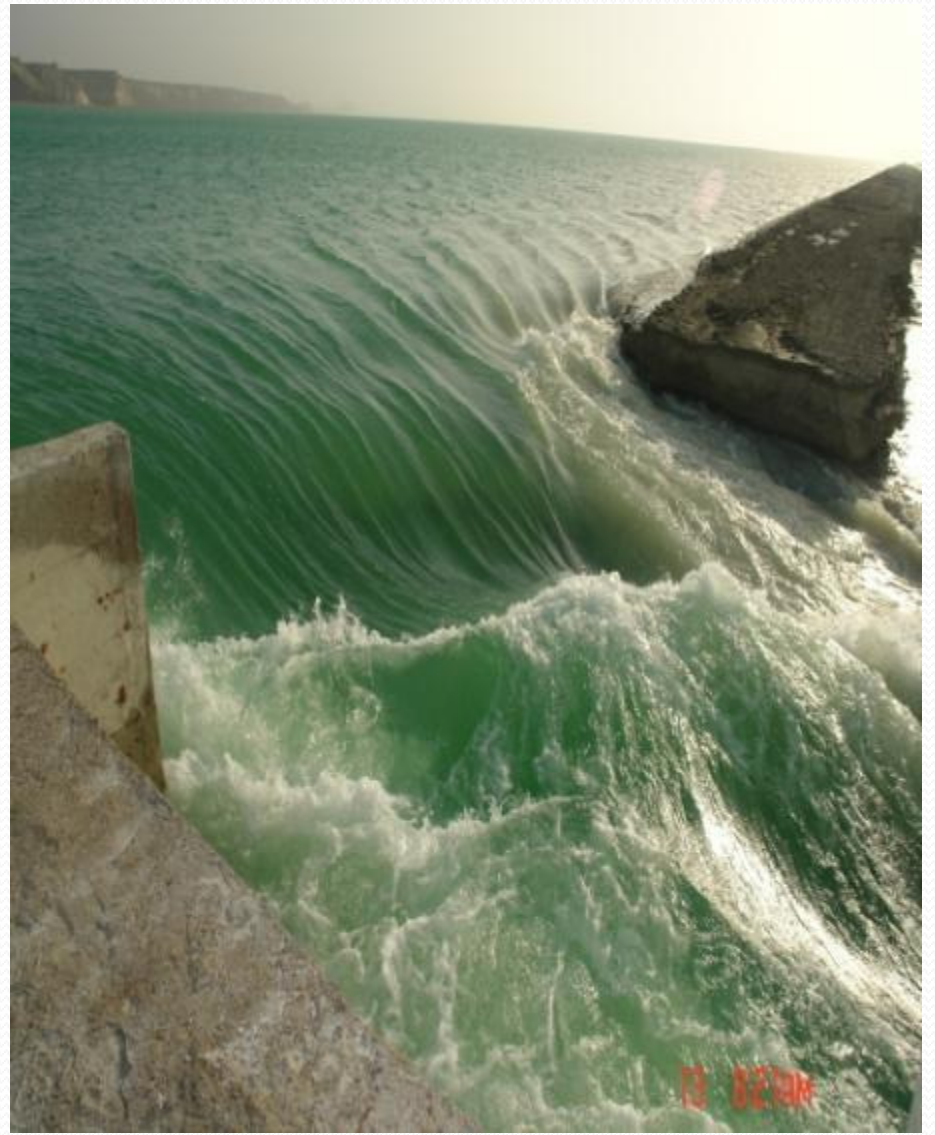
Gono Typhoon in Oman Sea, 2006



Flooding and inundation of the site

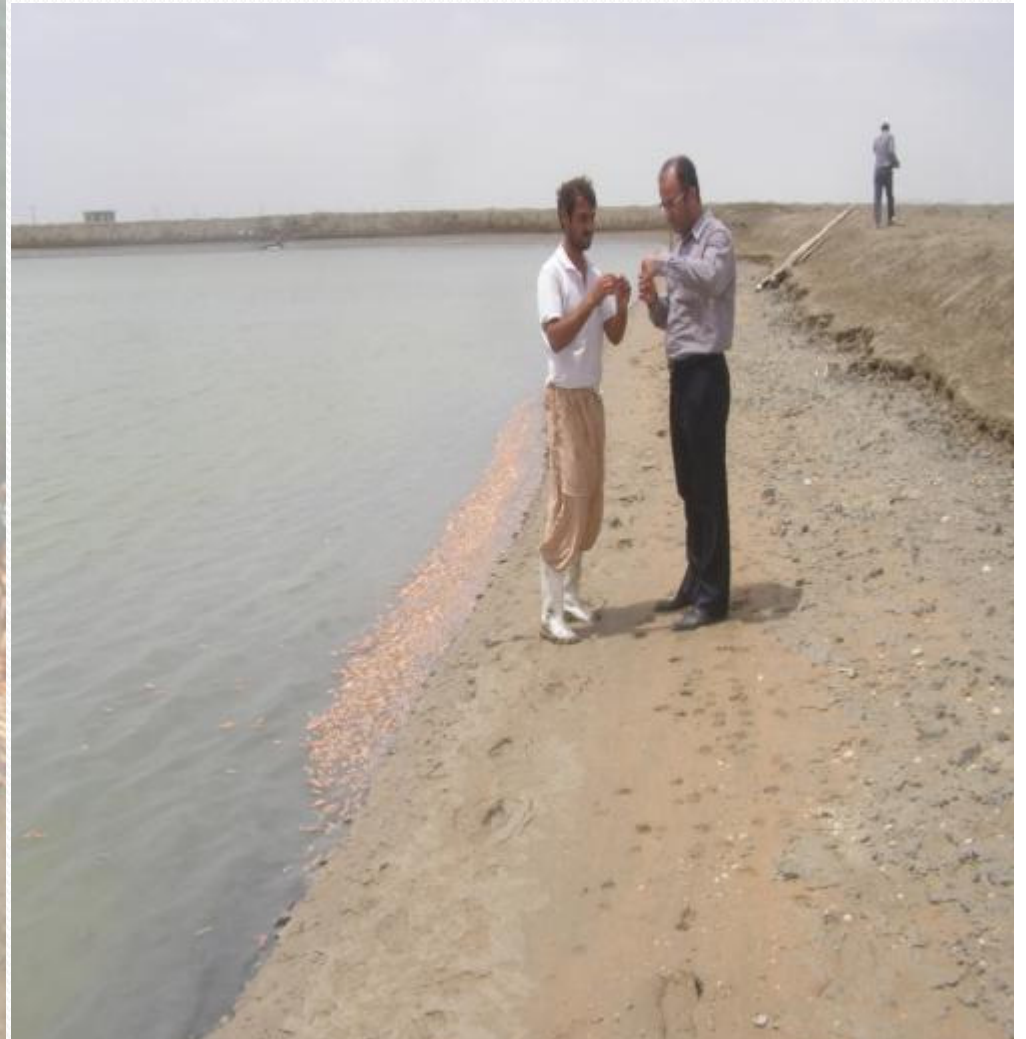




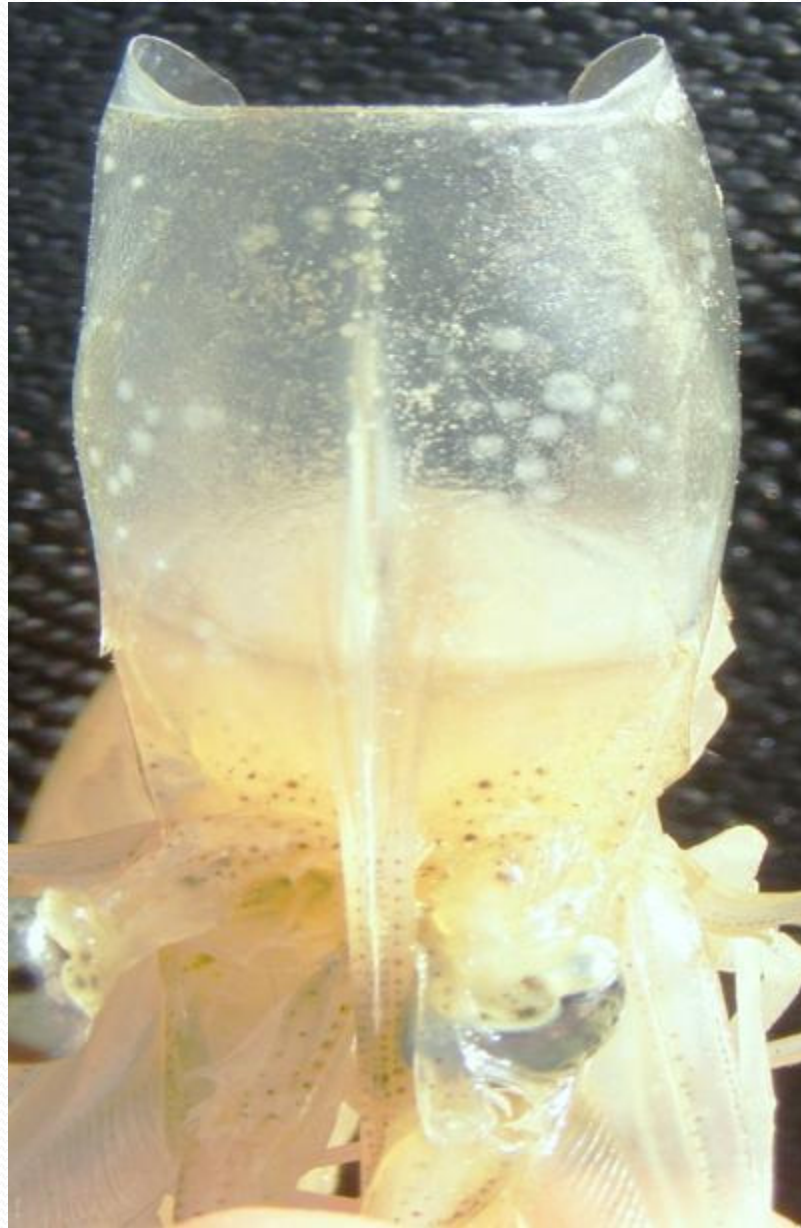




White spot outbreak in 2007



White spot symptoms on carapace







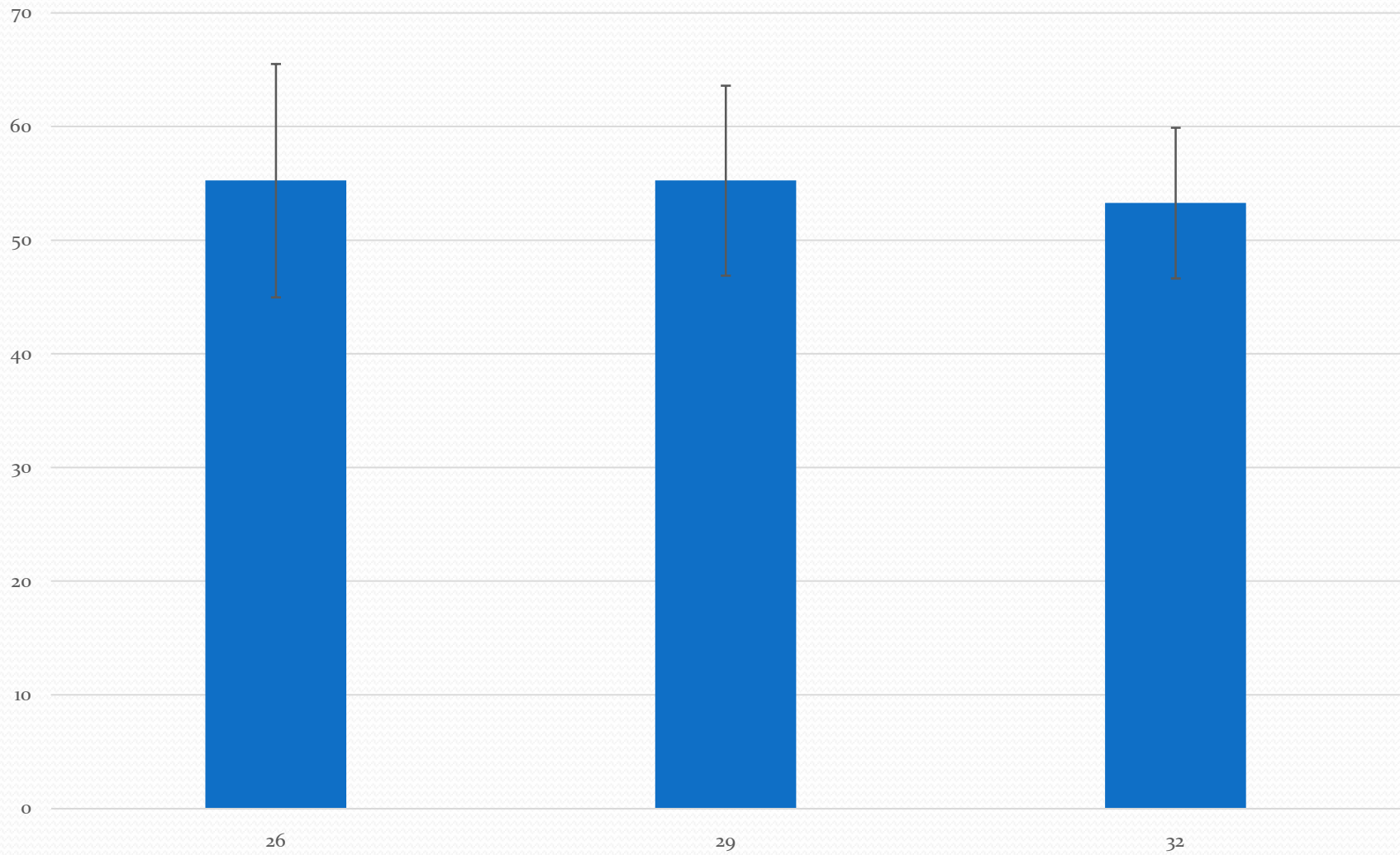




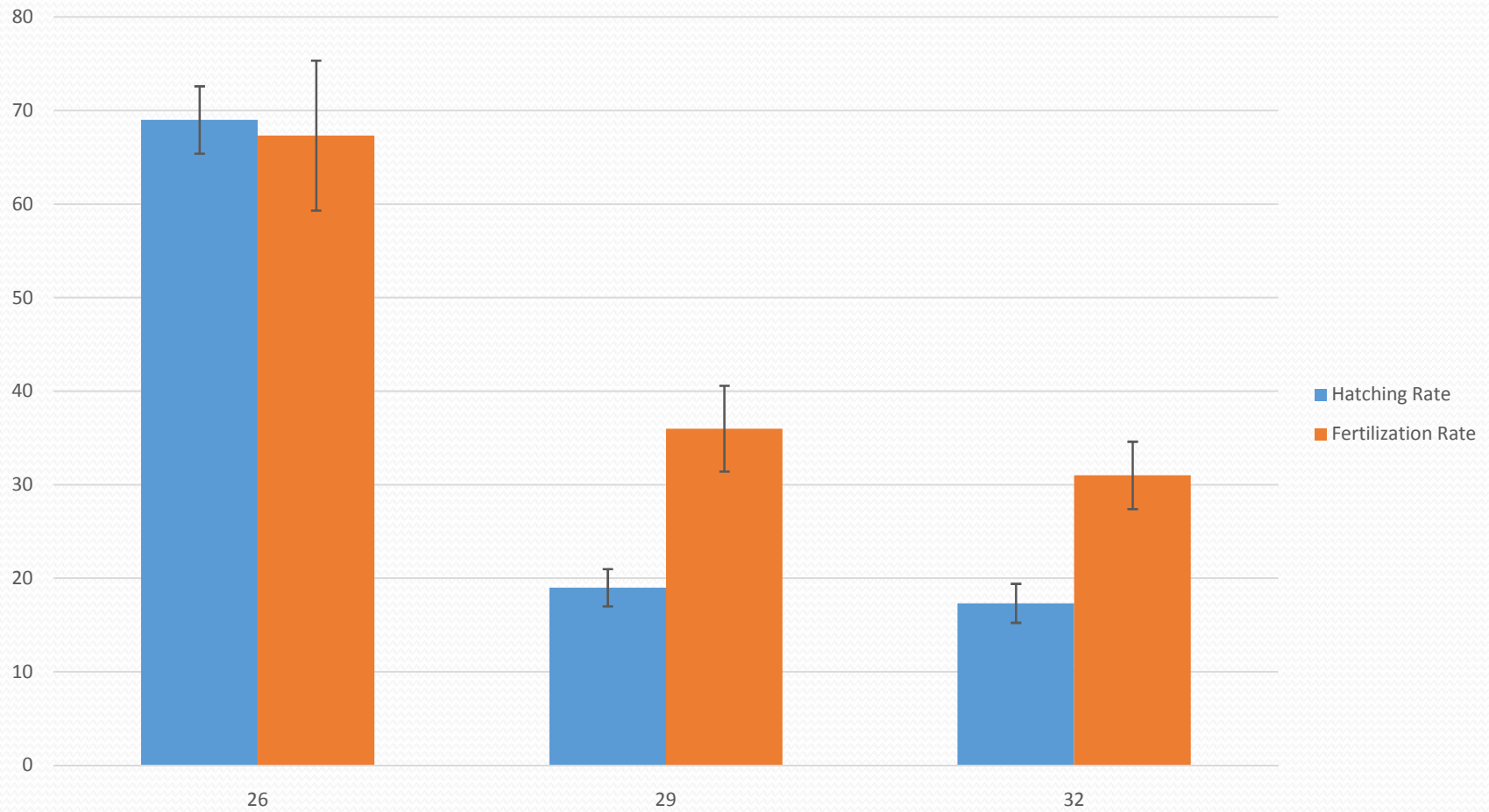
Three experimental hatcheries

Groups	Name of hatchery	Location	Number and nationality of technical officers	Methods of monitoring water temperature
Group A	Meigoo kesht	Konarak	3- Philippno	Isolation of broodstock, using air conditioner and adding ice to the holding tanks
Group B	Chabahar Abzi parvar	Konarak	1 Indonesian and 2 Indian	Only air conditioner
Group C	Bahar Abziparvar	Between Beris and Pasabandar	3 Thai (Thailand)	Water without cooling and temperature adjustment

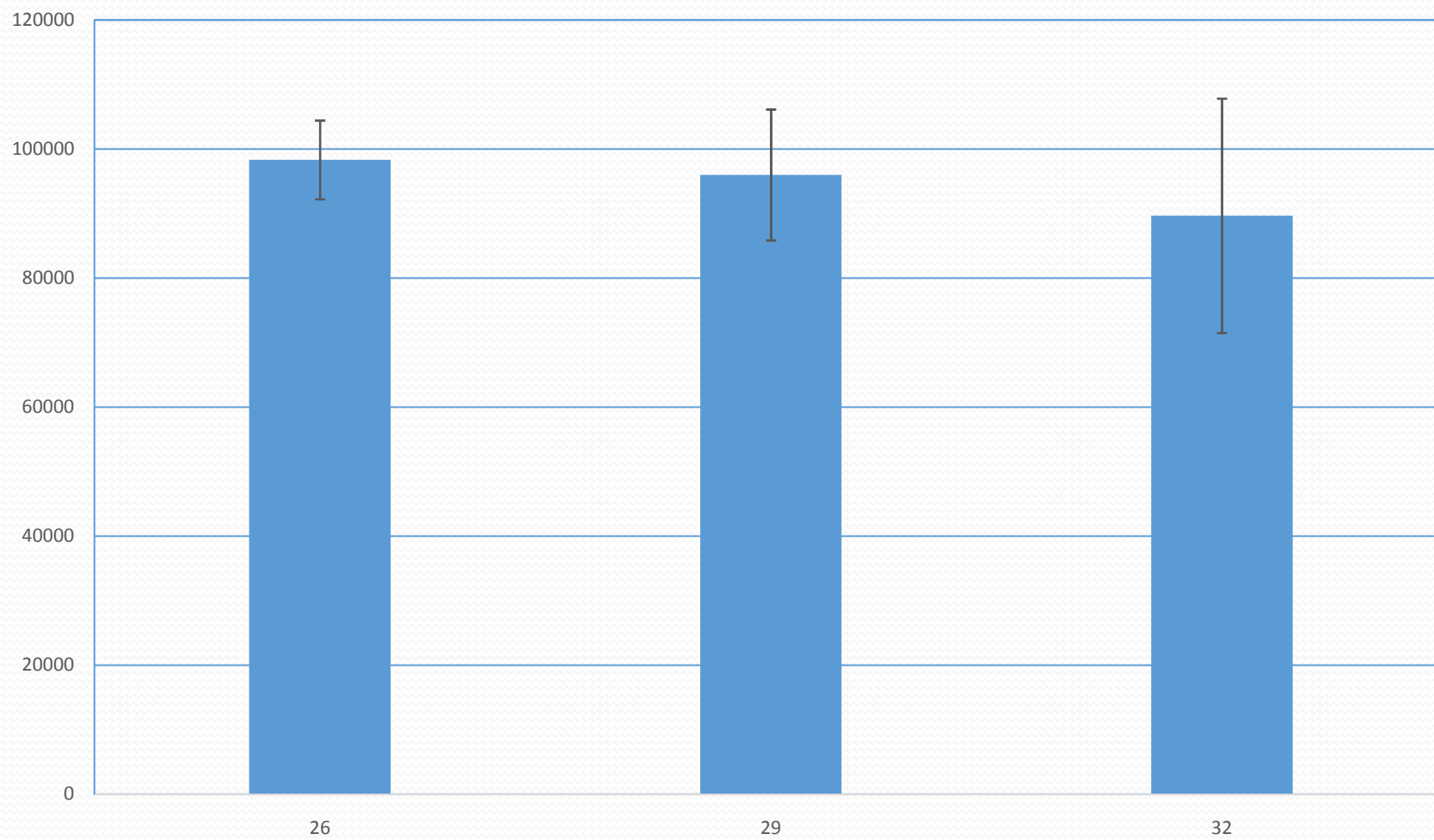
Mating percentage in white leg shrimp at different temperatures



Fertilization and Hatchin Rate in white leg shrimp at different temperatures



Egg No









THANK YOU!

