Year 12 Geography

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Contents

Chapter 1

Global Sustainability Aquaculture

1.1 Introduction to Aquaculture

"Farming of aquatic species in controlled or semi-controlled conditions" Eg. Salmon, barramundi, lobsters (can be semi-controlled), crabs, prawns, oysters, scallops, seaweed Non food: pearl scallops, coral (people keeping pets), crocodile skin Pets: goldfish

In situ → In the environment

Ex situ → Isolated to the environment

Eg. Oyster farms in situ may be affected by external factors like a sewage spill

1.1.1 History

Although the Brewarrina fish traps are one of the oldest human constructions, they aren't real farms Roman oyster farm Chinese carp farm

Aquaculture is practised across a wide variety of locations and species. Can be:

- Marine (mariculture), estuary or freshwater (in-land)
  Mariculture is currently underutilised, vast ocean space that isn't being used
- In-situ or ex-situ
- Fin-fish, crustacean, molluscs, or plants (usually algae)
  Carp (trash fish)
- For human consumption, fishmeal, or fish oil
- For local consumption or for export earning
  Norway and Chile grow the majority of the world's salmon, and is exports
  Changes the nature that the fish grows

Aquaculture is **NOT** fishing

In 2018, aquaculture produced 114.5 million tonnes in live weight, with a total farm-gate sale value of US$263.6 billion Aquaculture accounted for 46% of the total seafood production and 52% of fish for human consumption China produces and consumes the largest amount of aquaculture, but also more broadly Asian countries

There aren't that many inland waters, so inland fisheries do not have a significant amount of production [1]

Types of Economic Activity

- Primary - Farming
- Secondary - Manufacturing, producing
- Tertiary - Distribution of goods, using produced goods
- Quanternary - Researcher of salmon

1.1.2 Distribution of Aquaculture

Aquaculture is mainly centred around Asia, with China representing aroudn 60% of global aquaculture Fish is common in South-east Asia, especially with river fish eg. Vietnam Other countries just catch their fish

African countries do not have the development or GDP to farm fish. Culturally also doesn't eat fish [2]

Developing countries are increasing their share of international fish trade Countries with large fishing catches often have larger aquaculture production

Various places have cultural preferences and natural advantages for the production of particular species

- Predominantly carp [3]
- Seaweeds
- Tilapia
- Oysters
- Clams
- Catfish
- Prawns - Warm species
- Salmons, trouts, smelts - Salmon is expensive
- Freshwater fishes

As China gets richer and richer, they will seek to eat more expensive fish, therefore increasing the demand

1.2 Draft Nature and Spatial Patterns Text

The text below is a reasonable, band 4-5 response to the stimulus prompt **"Examine the nature and spatial patterns of ONE global economic activity"**. Use the FAO report below to help you edit the text into a strong Band 6 response, complete with a clear thesis, detailed information and vocabulary, and well structured paragraphs. Your finished text should be around 300-500 words in length.

Draft Text

Aquaculture is global economic activity whereby people grow fish for food and trade. Aquaculture takes places around the globe, giving people both food and money.

[1] Carp and tilapia are not nice - David Latimer
[2] "I don't like river fish, it's gross" - David Latimer
[3] "River fish have a bland, muddy flavour" - David Latimer, D1 river fish hater

Aquaculture is really old, having been practised for years and years. However, people grow lots of different species today. It's important to state that aquaculture and fishing are different activities.

The economic activity of aquaculture can be carried out in both rich and poor countries. However, different countries tend to practise aquaculture differently and for different reasons. Aquaculture is mostly practised in rich countries.

Aquaculture is also practised in different environments. Moreover, these different types of aquaculture are not growing at the same speed. Some types of aquaculture are growing much more rapidly than others.

Comments

- Use stats
- In an "examine the nature and spatial distribution" question, evenly allocate writing to each part
- Specify location; Asia is very broad but aquaculture is focused around only 5

1.3 Influences on the global economic activity

"How do different things affect the activity of aquaculture" Nature, spatial patterns, future changes, sustainability

Biophysical Economic Technological Political/Organisational

Biophysical	How the biophysical environment and ecosystems influence aquaculture
Economic	A
Technological	New tech
Political/Organisational	How is it controlled

1.3.1 Biophysical Factors

There are 622 species recognised by the FAO as being produced by aquaculture with each species requiring its own specific biophysical requirements

Local water conditions can impart "**merroir**" to seafood → the flavour it has

Local conditions flavour specialisation and give places competitive advantages

- Atlantic Salmon production is dominated by cold deep waters found in Norway and Chile
- Salmonids have become the largest single fish commodity by value
- Shrimp production benefits from brackish, warm tropical waters

Ex situ aquaculture attempts to separate aquaculture from the biophysical environment by controlling for temperature and chemistry. However, it is difficult to reproduce the conditions cheaply

Water Chemistry

The local bedrock and substrates will impact various chemical characteristics to the water, such as nitrates, phosphates, heavy metals Heavy metals are present due to mining operations that

Salinity is one of the most important characteristics of the water used in aquaculture

- Briny - High salinity

- Saline - Seawater, salt lakes
- Brackish - Estuaries, mangrove swamps
- Fresh - Ponds, lakes, river, streams

Eg. Oyster farmers will move their oysters up and down stream to control the way they grow

Salmon farms need high flow of water to account for the waste produced by the high concentration of salmon Water plants can generally be grown anywhere

66% finfish, 22% crustaceans, 12% molluscs

Climate

Atlantic Salmon require deep water with temperatures below 10°C giving Norway and Chile an advantage

Vannamei Shrimp require brackish, estuarine water that does not fall below 20 °C giving South-East Asian nations an advantage

Ecological

Aquaculture can have a highly detrimental interaction with local and global ecologies. For example:

- Carbon emissions from feed catch trawling
- By-catch from trawling
- Land clearing of mangroves

Aquaculture ventures often have to work with nearby human settlements. Some communities use this to produce multi-trophic production systems

Disease outbreaks are increasing in aquaculture due to **monoculture**

Eg. An in situ production system:

- Food pellets aren't completely consumed, increasing the concentration of food in an area
- The introduction of non-native species that are highly competitive

  Bad weather can increase the likelihood of escapes
- Predators like birds can attack birds, increasing the overall level of fish stress
- Bulk antibiotics applied to fish farms can impact resistance in future

  This can extend to humans consuming the fish
- Fat salmon are better to eat, however to become this way they are overfed and lazy. If salmon escape, they can breed lazy salmon in the natural environment [4] [5]

To mitigate the greater environmental impacts:

- Make the farm ex situ
- Lower the density of the farm (However this lowers profit)

[4] "How do you get a fat salmon" - Latimer
[5] "You want a fat, lazy salmon" - Latimer

- Enironmental Laws → Developing nations are also able to use lax environmental laws to develop coastal land for aquaculture

Positive Ecological Impacts

Oyster farming industries can filter estuaries and apply pressure to keep waterways clean - encourages community to reduce pollution

1.3.2 Economic

Commodity Prices

Variable exchange rates and market prices for export commodities will modify production, including access to feed meal.

In recent years, other major producing countries have reported low market prices of staple species, reflecting market saturation at least seasonally and locally for these mass-produced species.

Salmon and avocado sushi was invented by Norwegians to encourage Japanese to purchase it Before introduction, Japan was not a major salmon consumer but was wealthy and Norwegians had an excess

The **commodification** of aquaculture produce also placed demand to exceed environmental capacity. Commodification drives the production of more goods

Differences in HIC and LIC aquaculture

In some LICs, low labour costs can be a competitive advantage for production.

However, capital can be difficult to source in LICs - Greater degree of risk, less willingness for investors

HICs will use the high value of their markets to demand higher quality produce.

China has been accused of devaluing its yuan to promote exports. If their exchange rate is lower, their exports are cheaper, people will buy more, better for the Chinese market. (Denied by China ofc)

Urbanisation

People are increasingly living in cities with higher incomes and better infrastructure to facilitate fish purchases

Labour Specialisation

In HICs, changes in life expectations have made it difficult to find adequate labour - It is difficult to get people to work in far away aquaculture farms. Is promoted in Australia by using Tongan migrants as labour.

In LICs, small scale farms account for much greater rates of production

The International Labour Organisation (ILO) has identified that aquaculture utilises child and slave labour, but notes there is limited availability of evidence.

People from Myanmar run to Thailand to escape the government. However questionable law enforcement in Thailand promotes illegal labour. One solution to this is international agreements and tarriffs, however this is unlikely because people want their shrimp cheap. It is then a responsbility of the consumer to check the source of produce