

**Environmental systems and societies**  
**Standard level**  
**Paper 2**

Friday 22 May 2015 (morning)

2 hours

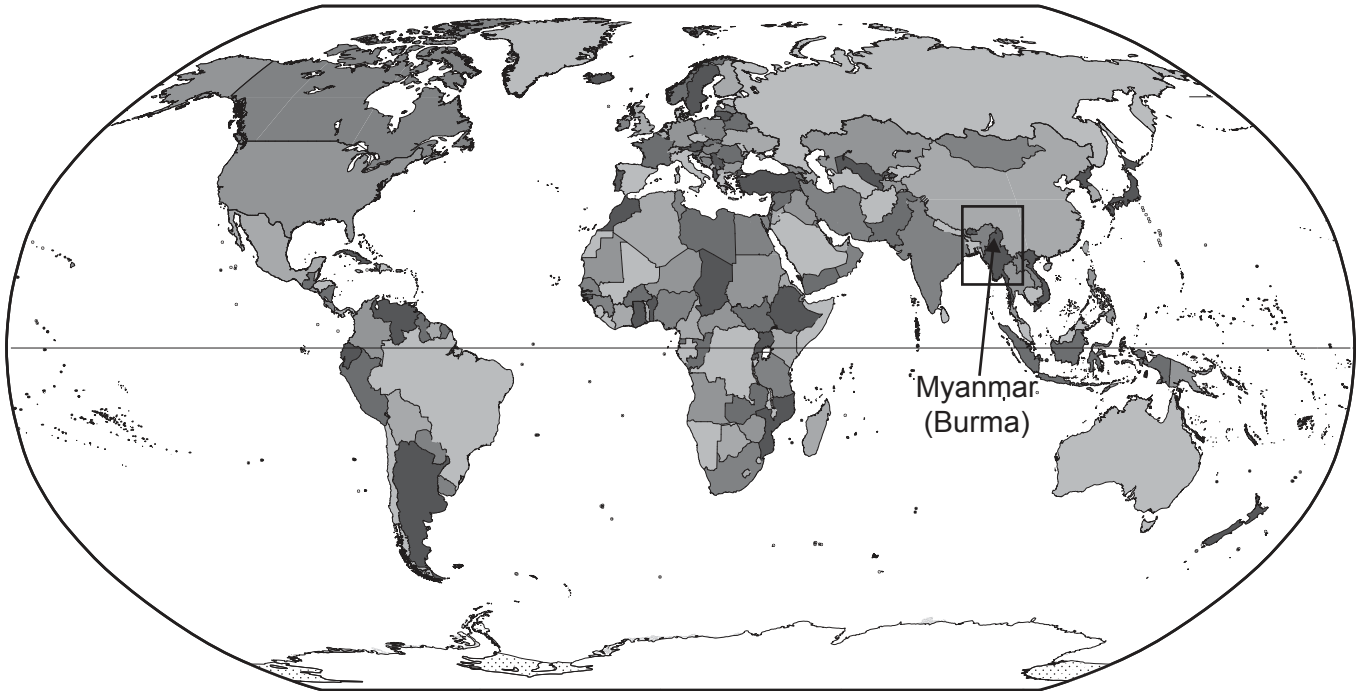
# Resource booklet

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**Instructions to candidates**

- Do not open this booklet until instructed to do so.
- This booklet contains **all** of the resources required to answer question 1.

**Figure 1: World map showing the location of Myanmar (Burma)**

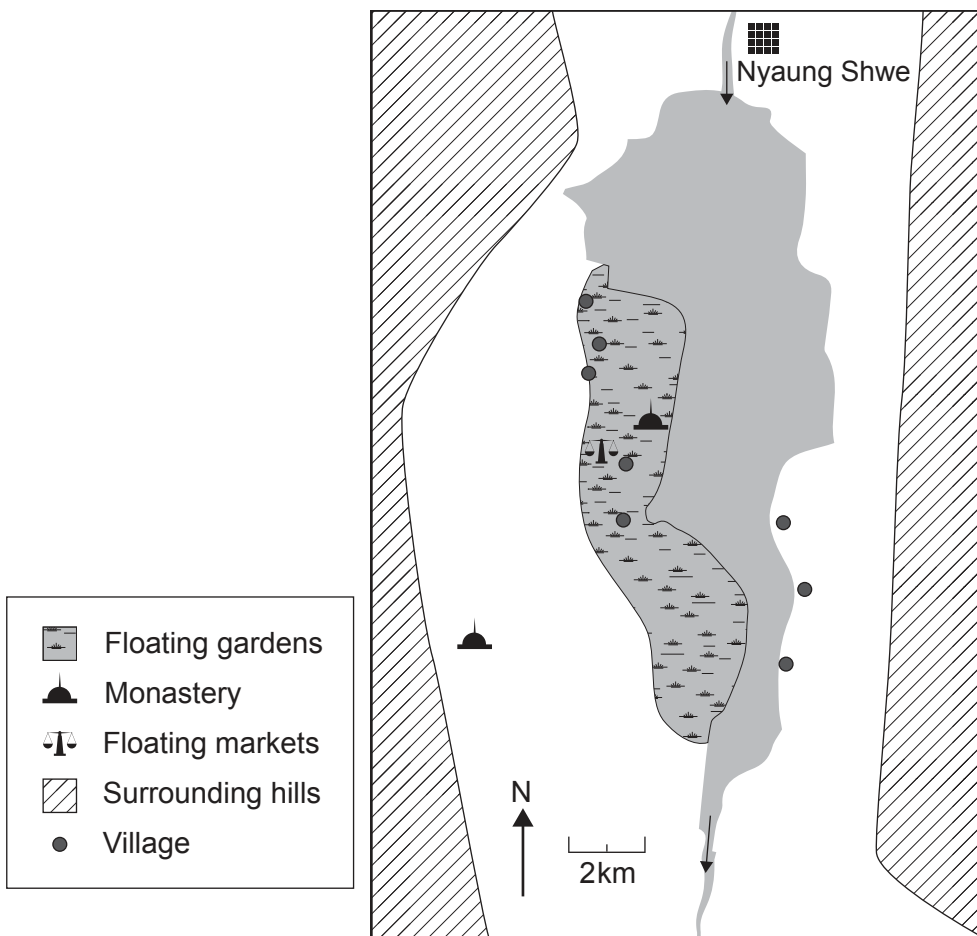


**Figure 2: Myanmar (Burma) showing the location of Inle Lake**



[Source: Fig 1: © International Baccalaureate Organization 2015  
Fig 2: adapted from CIA World Factbook]

**Figure 3(a): Map of Inle Lake, Myanmar (Burma)**



[Source: Data taken from [http://en.wikipedia.org/wiki/Inle\\_Lake](http://en.wikipedia.org/wiki/Inle_Lake); © International Baccalaureate Organization 2015]

**Figure 3(b): Inle Lake fact file**

- Freshwater lake, second largest in Myanmar (Burma).
- 116 km<sup>2</sup> surface area.
- Average depth 2 m, maximum depth 3.7 m.
- Monsoon rains raise lake surface by 1.5 m.
- Altitude 880 m above sea level.
- Many endemic species (found only in this location) eg snails and fish.
- 70 000 people living around and on the lake.
- The predominant native people are the Intha with minority groups (eg Pa-O, Shan, Bamar) within the local population.

[Source: Data taken from [http://en.wikipedia.org/wiki/Inle\\_Lake](http://en.wikipedia.org/wiki/Inle_Lake); © International Baccalaureate Organization 2015]

**Turn over**

**Figure 4(a): The photographs show aspects of human activity on and near Inle Lake**



Intha fishermen



Local market



Intha house



Floating gardens

[Source: © International Baccalaureate Organization 2015]

**Figure 4(b): Agriculture of Inle Lake fact file**

- Most people living here are self-sufficient farmers and fishermen.
- Houses are built of wood and bamboo on stilts in the lake.
- Inle carp (a species of fish) caught in the lake are a staple food.
- Rice is also grown on the surrounding hillsides.
- Lotus plants, growing in the lake provide fibres for weaving a unique fabric used in the clothing of Buddhist monks.
- Using weed taken from the lake bottom, floating gardens are made and anchored with bamboo poles.
- Fruits and vegetables eg tomatoes and cauliflowers are grown on these floating gardens.
- Since the gardens rise and fall they are not affected by flooding.
- The gardens are rich in nutrients from the lake.
- Over time, sediment from the gardens builds up and fills the lake, creating land.

[Source: © International Baccalaureate Organization 2015]

**Figure 4(c): Sign at Inle Lake**



[Source: © International Baccalaureate Organization 2015]

**Figure 5: Environmental pressures at Inle Lake**

- Floating gardens started in the 1960s.
- Since then, the lake area has decreased by one third.
- Deforestation of the surrounding hills leads to increased levels of sediment and nutrients in the lake.
- Nutrients from the gardens lead to increased nitrogen and phosphate levels in the lake system.
- Increased nutrients in the lake lead to the impacts of eutrophication.
- These impacts include hypoxic water (*ie* reduced oxygen levels in the water).
- Water hyacinth, a non-native floating plant, has been introduced and grows very fast.
- Grass carp, a non-native species of fish, has been found in the lake and has been known to feed on water hyacinth.
- A coal mine and power plant nearby discharge toxic waste into the lake.
- In drought years, drinking water has to be brought in from elsewhere as the lake is too polluted.
- Floating garden farmers use fertiliser and pesticides that enter the lake waters.
- The WWF lists the biodiversity of Inle Lake as vulnerable.

[Source: © International Baccalaureate Organization 2015]

**Figure 6: Tourism at Inle Lake**

In recent years, political changes have led to more tourists visiting Myanmar (Burma).

	2011	2012
<b>Tourists at Inle Lake</b>	60 000	120 000

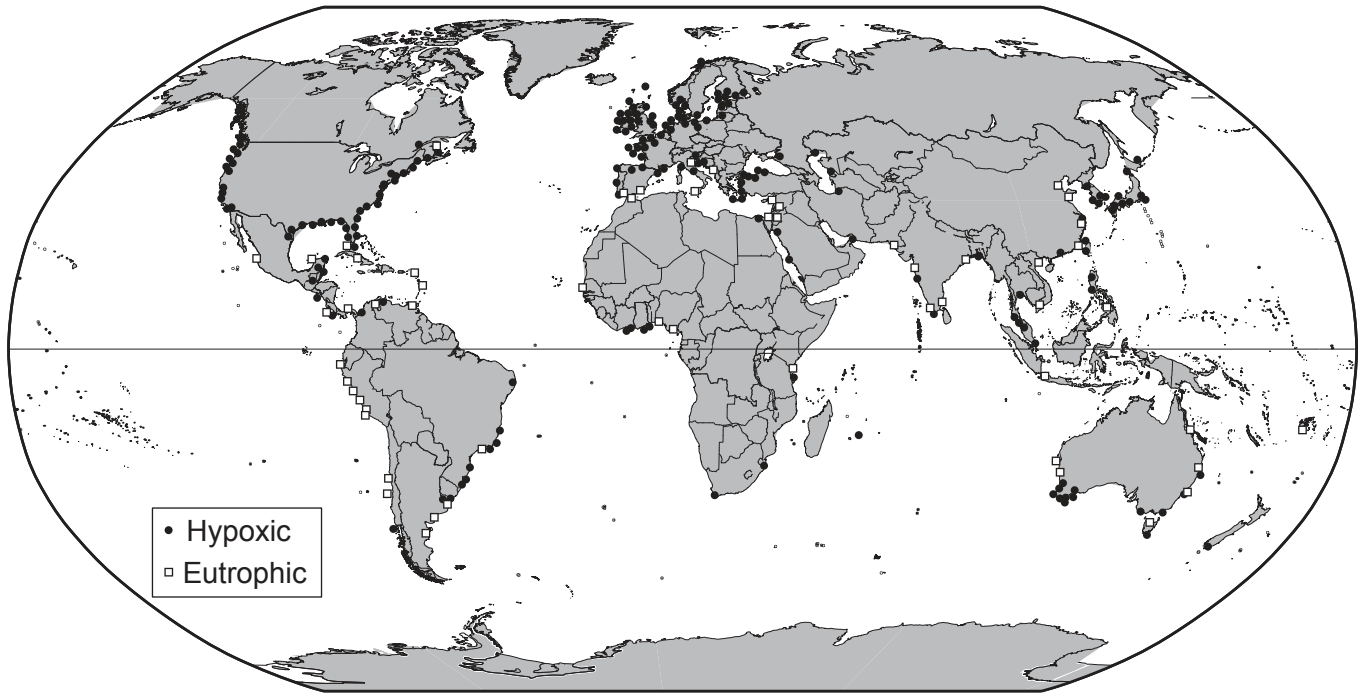
- Local young people who work in the tourism industry have the opportunity to learn new skills *eg* other languages, catering and construction.
- Average wage in Myanmar (Burma) is US\$2 a day. A worker on construction sites of new hotels can earn US\$4 a day so doubling the family income and paying for schooling for children.
- Tourism leads to new markets *eg* selling artefacts to tourists.

**But...**

- The growth of tourism has meant that local farmers have lost their land to new hotel developments.
- There are fewer fish to catch and less rain for crops than in previous years.
- Diesel engines of boats taking tourists and locals around the lake lead to noise and oil pollution.
- A lot of the money does not benefit the local people but leaves the region.
- The growth of tourism is in danger of destroying the beauty of the area that tourists come to see.

[Source: © International Baccalaureate Organization 2015]

Figure 7: World map showing distribution of eutrophic and hypoxic coastal areas



[Source: © International Baccalaureate Organization 2015]