Sea-level rise vs. delta subsidence (20th century change)

**Delta risk map**

**SUBSTANTIAL RISK**
- Sediment deposition rates less than sea-level rise
- River valleys are eroded by the time it reaches its delta.

**GREATER RISK**
- Deltaic landscape is eroding due to sedimentation.
- Ground compaction exacerbating low sediment deposition rates.

**SEVERE RISK**
- Virtually no sediment deposition and valley subsidence.

**By numbers**

- 1% The amount of Earth’s land area occupied by deltas.
- 24 The number of major deltas that are sinking.
- 45-82 cm The likely range of global average sea-level rise possible by 2100 if emissions continue unabated. Sea level will continue to rise beyond 2100.
- 85% The percentage of major deltas that experienced severe flooding in the last decade.
- >500 million The number of people who live on deltas.

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**SOURCES**

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**Sea-level rise vs. delta subsidence**

**Subsequent sea-level rise causing sea-level rise**
1. Pampa Argentina
2. Perla, Paraguay
3. Delta, Pakistan
4. Brahmani, India
5. Mahanadi, India
6. Godavari, India

**Ground compaction exacerbating low sediment deposition rates**

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**Delta at risk**

Deltas have long shaped humans’ lives: our ancestors thrived in river valleys like the Nile, Indus and Yellow. Their rich topsoil, refreshed every year by floods, fed and sustained our early societies.

Today, the story is reversed: humans are shaping deltas. And some deltas are no longer thriving. Modern humans extract oil and water from delta sediments and the rocks below; they build dams upstream that trap sediments that would have replenished the deltas. These and other human activities have led to compacted soils – and slowly sinking deltas.

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**In 2011, the Chao Phraya river flooded swamping Bangkok and leaving much of the capital submerged for months. The city has been sinking for decades due to groundwater extraction. Steep taxes on groundwater have slowed subsidence substantially.**

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**Despite forest destruction, hydropower projects and more impacts upstream, the Amazon River delta is in relatively good health. Nearly 3 million people live on the delta but its sheer size dampens human impacts.**

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**As deltas sink the risk of flooding rises. In the Yellow River delta (top right) waves have causedSkin-high storm surges.**

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**The Po delta experienced a 6cm annual subsidence rate, due to sea-level rise and methane extraction. This reduced dramatically once methane extraction ended.**

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**The delta is home to over 100 million people making it the most populated on Earth. Effective sea-level rise is up to 18 millimetres per year. In 2007–08, substantial flooding affected the Ganges, Mekong, Irrawaddy, Chao Phraya, Brahmani, Mahanadi, Krishna and Godavari. More than 100,000 died and more than a million people were displaced.**

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**The Aswan Dam traps nearly 98% of sediment flow downstream. Without those soils, the Nile Delta has compacted and sunk. Relative sea-level rise there is 4.8 millimetres every year.**

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**In the Mississippi delta (top left) farms and other areas have taken their water allotments, the deltaic river slows to a trickle by the time it reaches its delta. Sometimes it stops flowing altogether and then no sediment is deposited.**

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**The amount of Earth’s land area occupied by deltas.**

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**The number of major deltas that are sinking.**

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**The likely range of global average sea-level rise possible by 2100 if emissions continue unabated. Sea level will continue to rise beyond 2100.**

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**The percentage of major deltas that experienced severe flooding in the last decade.**

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**The number of people who live on deltas.**

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**Sources:**