



# DELTA IN MALAYSIA



Muhammad Mika Arif bin Mohd Zaini (S59145)

Farah Syuhada binti Baharudin (S58403)

Aini Amirah binti Salleh (S59084)

Ahmad Muaz bin Sukri (S58246)

Yap Yin Chin (S58319)

Nurqadrina bt Mohd Kadri (S60517)



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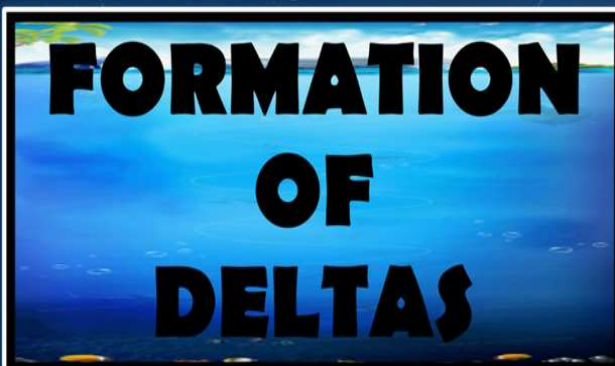
## DEFINITION OF DELTA

Delta meaning in the Cambridge English Dictionary is a low, flat, flat-shaped plain area like a triangle where a river splits a few small rivers before flowing into the river. Deltas are wetlands that are formed when rivers drain their water and precipitate other bodies of water, such as oceans, lakes, or other rivers. While very rare deltas, they may also empty into the ground.

A river moves more slowly as it approaches the estuary or its end. This causes sediment or solid material carried downstream by current to fall to the bottom of the river. Slow river speeds and sediment accumulation allow rivers to be cut off from one channel when entering the estuary. Under the right conditions the river will form a delta lobe. Mature delta lobes include a distribution network and a smaller shallow channel network called distributors that branch from the mainstream of the river.

In the delta lobe the heavier and coarse material settles first. Smaller and finer sediments are carried farther downstream. Good materials will be stored outside the estuary. This material is called alluvium or silt. When mud is formed and new soil is formed it is known as a delta.

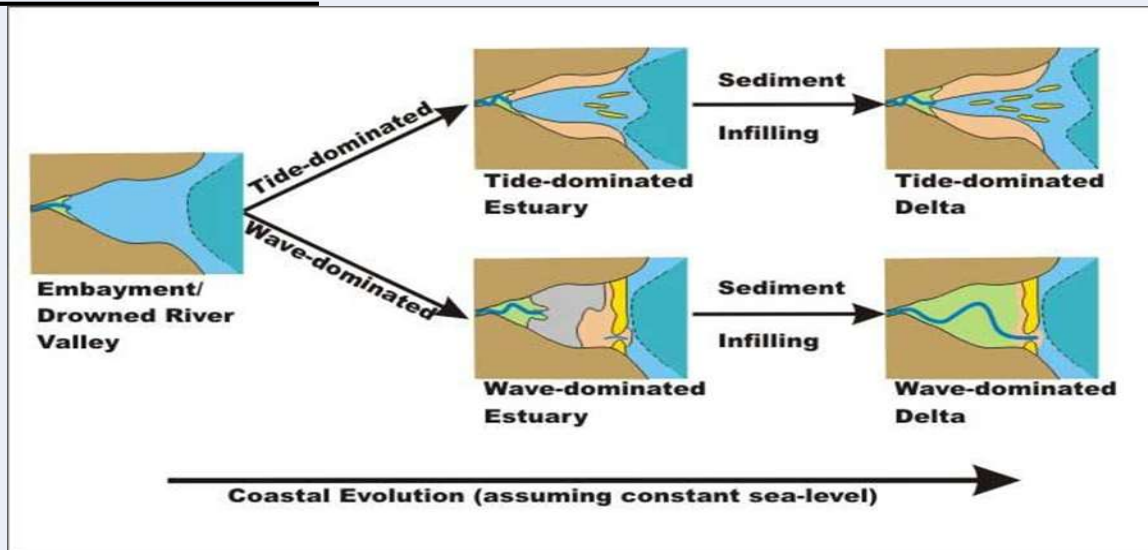
## FORMATION OF DELTA



**The** formation of deltas take a long process.

Delta formed when the areas of sediment **deposited** and **blocked** at the mouth of river and thus **reducing the capacity** and **competence** of water. As deposition continues, the water became more shallow and eventually topset beds begin to rise above the surface of water. When sediment is **deposited faster** than it can be **removed**, delta is formed. The river will split into several small channels called **distributaries** to flow to the sea.

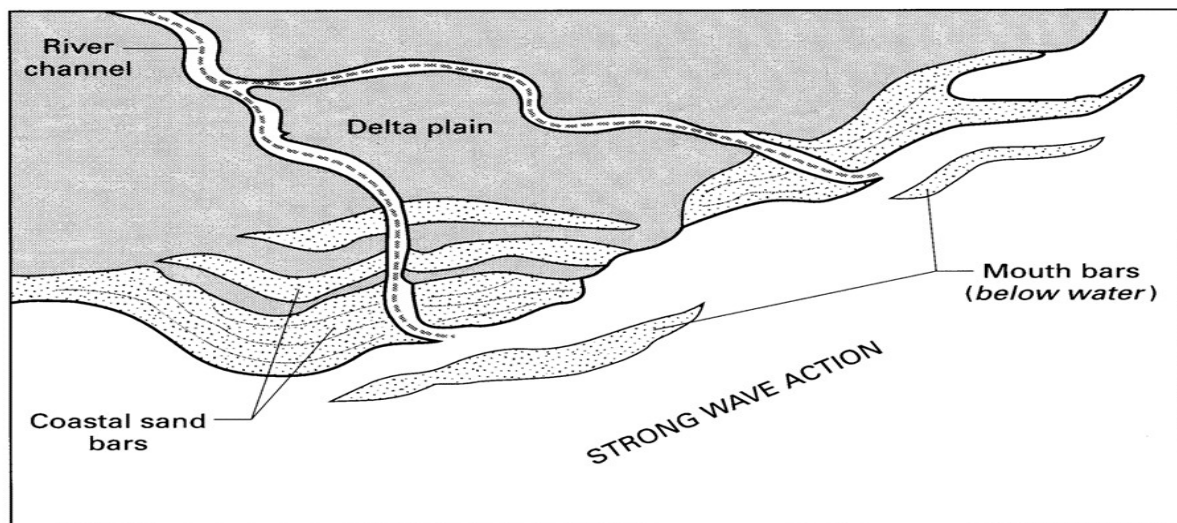
## TYPE OF DELTA



The diagram above shows types of deltas which is wave-dominated deltas and tide-dominated deltas.

Source : Pinterest

There are three main types of deltas which is wave-dominated, tide-dominated and river-dominated deltas. The shape of a river delta, the morphology of the delta, depends on several variables, such as waves, tides, wind, size and volume of sediments, but also on the space in which the delta develops.

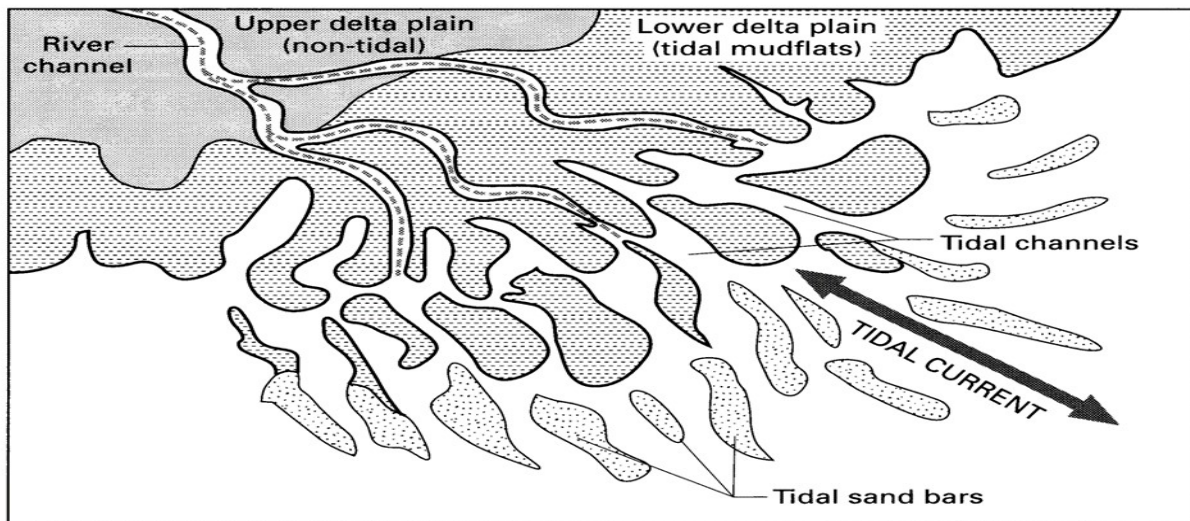


The diagram above shows wave-dominated delta.

Source : [seddepseq.co.uk](http://seddepseq.co.uk)

The wave-dominated deltas are deltas where the fluvial sediment is formed by waves as the dominant force. Waves influence the depositional sediment patterns close to the mouth of the river. Smooth coastlines and few distribution channels are frequently present in wave-dominated deltas. The Baram Delta is the best example of wave-dominated deltas in Sarawak, which is also regarded as a modern analog for the prolific tertiary sandstone reservoirs in NW Borneo's Baram Delta Province.





**The diagram above shows tide-dominated delta.**

**Source : [seddepseq.co.uk](http://seddepseq.co.uk)**

Tide-dominated deltas are known as deltas that undergo heavy tidal interaction. Tide-dominated deltas are made up of a river that is linked directly to the sea by channels usually flanked by low-lying floodplains and swamp areas. Tide-dominated deltas usually occur in areas with broad tidal ranges or strong tidal current speeds. The delta of the Klang in Selangor is one of the example of tide-dominated delta. The Klang Delta that situated in the wet tropics, shows the processes, morphology and sedimentary structure associated with a variety of small high tidal deltas found in tropical Southeast Asia.



**The diagram above shows river-dominated delta.**

**Source : [seddepseq.co.uk](http://seddepseq.co.uk)**

The river-dominated deltas have irregular shorelines that reach into the basin considerably away from the general shoreline. Strong fluvial flow and sediment load, low wave and tide movement, and a shallow basin are words that favor river-dominated deltas. It happens when the tidal range is very small and the motion of the tidal current is very slow. Tanjong Sedili Besar in Johor exhibits the best example of river-dominated delta.

## DELTA IN MALAYSIA

There are many example of Delta that we can get around Peninsular Malaysia and South East Malaysia. Delta which is always form at the river and have relatives with formation of soil and land. Delta also is effect by tidal wave and tidal formation. Formation of delta is usually form at the mouth of river. There are have many places at Malaysia that occur the formation of data. The most popular delta in Sarawak is Sungai Rajang Delta and Baram Delta with Delta Pahang at Sungai Pahang. There are also have many benefits to living things can get which is lowest the pollution into upstream. If want to know the place is delta or not is mouth of river in triangle shape. This is because meaning of delta in Greek is 'triangle'.



**The picture of Delta at Sungai Rajang, Sarawak.**

**Source : Google Earth Pro**



**This picture is the places of Sungai Rajang at Sarawak maps.**

**Source : Google Earth and Nasa Observation Maps**

The delta of Sungai Rajang occurs in an embayment formed by the Central Borneo Massif's folded Mesozoic and Cenozoic sediments. It occupies an area of 11,000 Km<sup>2</sup> and is physiographically divided into a floodplain of an alluvial valley, an abandoned tidally flushed delta plain, and a rectilinear delta/coastal plain that constantly accretes. 50 to 80% of the surface area is covered by 1 to 20 m thick peat.





**This picture shows Baram Delta, Sarawak.**

**Source : Google Earth Pro**

The Baram Delta is known as wave-dominated delta. The distribution of facies and sedimentary processes of the delta suggest that sedimentation currently exists only on the broad mouth bar and that the Baram is more accurately classified as a mixed wave and tide-influenced delta. Tidal currents occupy more than half of the surface area of the mouth bar and are covered with tidally deposited sediments because the nearshore hydrodynamics are governed by a relatively broad tidal prism. Conversely, the extensive sandstones of the tertiary shoreface reservoir are simply wave-dominant and there are no tidal signatures.



**This picture shows Delta Pahang.**

**Source : Google Earth**

The Pahang River forms a delta on the east coast of Peninsular Malaysia at Kuala Pahang. The delta lies in a humid tropical climate with a high precipitation rate. A rare case study for a tropical fluvio-marine windwave-dominated delta, which was deeply affected by seasonal storms, is supported by the Pahang Delta system. The deltaic sand, which includes abundant clay clasts, is coarse and moderately sorted. The southern coastline of the Pahang Delta is constantly altered by the storm waves' erosive attack. In other kinds of deltas that have been replaced by strand plains, sand bars and sand flats, the delta is subjected to extremely high-energy storm waves and fluvially shaped sand bodies, such as channel mouth bars. The combination of high wave energy and heavy littoral drift along the Malay Peninsular's east coast results in a shift in the orientation of the Pahang Delta's sand bodies. No modern delta dominated by wind is comparable to the environment of the Pahang delta.

## **FUNCTIONS OF DELTA**

- Like most wetlands, deltas are incredibly diverse and ecologically important ecosystems.
- Deltas absorb runoff from both floods (from rivers) and storms (from lakes or the ocean).
- Deltas also filter water as it works its way into the distribution network of the delta slowly.
- This can reduce the impact of pollution flowing from upstream.
- Deltas are also important wetland habitats. In deltas, plants such as lilies and hibiscus grow, as do herbs such as wort used in traditional medicines.

## **THREATS ON DELTA**

- Delta will face "high to very high risks" in the future from rising sea levels, even under scenarios where the world rapidly reduces emissions of greenhouse gases and minimizes the rise in global temperatures and the subsequent melting of ice sheets and glaciers.
- While deltas have influenced human society, delta ecosystems are now being shaped and threatened by human activity. Which are:

### **• Constructions Of Dams**



**Source : Google**

- ❖ The main challenges to deltas is the development of hydroelectric power, the reduction of floods or the diverting of river water to drier regions.
- ❖ The deltas will eventually recede if these deposits decrease and are unable to control the erosion forces.
- ❖ The delta at the mouth of the river thus receives a lower sediment volume than it did before the dam was built.
- ❖ The decreased deposition may not be adequate to battle erosion forces and the delta would gradually lose sediments and withdraw.

### **• Mining Activities**



**Source : Coastalcare**

- ❖ Sand mining can be destructive to river deltas.
- ❖ The potentially devastating effects of such mining, however, are not well known.
- ❖ When more and more sediments from the delta are removed, the delta continues to sink.
- ❖ Ultimately, this effect on the delta contributes to the loss of farmland and property, as well as the collapse of dikes, bridges, and highways.

## • Channeling a River Downstream



Source : Google

- ❖ When the water of a river is diverted into many inland locations by different channels, the size of the delta at the mouth of the river will shrink.
- ❖ Artificial channels, for instance, are often dug along a river's course to lead some of its waters into inland areas where water is scarce.
- ❖ As a larger volume of water with a lower sediment content enters the sea, the results of channelling are close to those of dam building.
- ❖ The lower sediment deposition thus contributes to deltas being eroded.

## WAYS TO PROTECT DELTA

Conservation of deltas can be carried out by :

### Preserving or restoring the sediment balance by dredging



- Areas with local sediment starvation or sediment excess are found in most artificially modified deltas. By dredging, modification of this balance can be achieved. In order to keep their usefulness for society, most navigation channels are often dredged.

### Integrating mangrove



- Mangrove trees are tolerant of salt. They have adapted to the harsh conditions and the various levels of the tide. They have unique characteristics such as salt reduction leaves and even a root system that enables the plants to breathe. Their root system also helps to trap dirt, contaminants, and sediments. So we should plant mangrove trees and choose an old tree to be a log and not the young tree.

### River restoration



- Deepening or restoring the canalized river arms into their original meandering form by the river increases the ability of water storage and decreases flow velocities during storms.



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The project by first year students

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**Muhammad Mika Arif Bin Mohd Zaini -**  
"Ocean is the place to make our heart calm"



**Farah Syuhada Binti Baharudin –** "Life is like a river, you have to keep flowing until you reach the ocean"



**Aini Amirah Binti Salleh –** "The ocean stirs the heart, inspires the imagination and brings eternal joy to the soul"



**Nurqadrina Binti Mohd Kadri –** "The sea is a miraculous ocean. Its elegance and surprises are impressive. Every wind, every tide, every beach is our life's fee. Wake up and work hard to save God's most wonderful world"



**Ahmad Muaz bin Sukri –** "Blue is beautiful, as beautiful as the blue sky in the ocean"



**Yap Yin Chin –** "Oceans are a nexus. A bond between continents, their people, their culture and their life. Let us value this connection and work to save them"