

Lagoons and Estuaries



*Avicennia marina*



*Rhizophora spp*

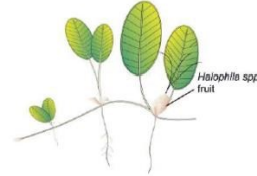
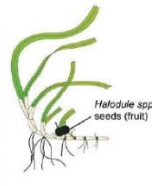


*Acrostichum aureum*



*Acanthus ilicifolius*

Sea grass beds



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Salt marshes



Sand Dunes



Coral reefs



Sea shore



*Salicornia sp.*



Maha rawana revula (S),  
Ravannan meesai (T)  
(*Spinifex littoreus*)



Wetakeiya (S)/ talai (T)  
(*Pandanus spp.*)



Muhudu Binthamburu (S),  
Beach Morning Glory (E)  
Atampu (T)  
(*Ipomea pescaprae*)



Wara (S)/ erukkalai (T)  
(*Calotropis gigantea*)

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Rivers and streams



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08

Unit 08 Environmental Biology 4

8.2.2 : Wetland Ecosystems of Sri Lanka

Marshes and swamp forests



*Aponogeton spp.*



*Colocasia species*



Reeds (E)/Pan (S)

Reservoirs



Manel, E: Water lily  
(*Nymphaea spp*)



Nelum, T: Tamarai  
(*Nelumbo nucifera*)



Kekatiya, T: Koddi  
(*Aponogeton spp.*)

Villus



Poaceae



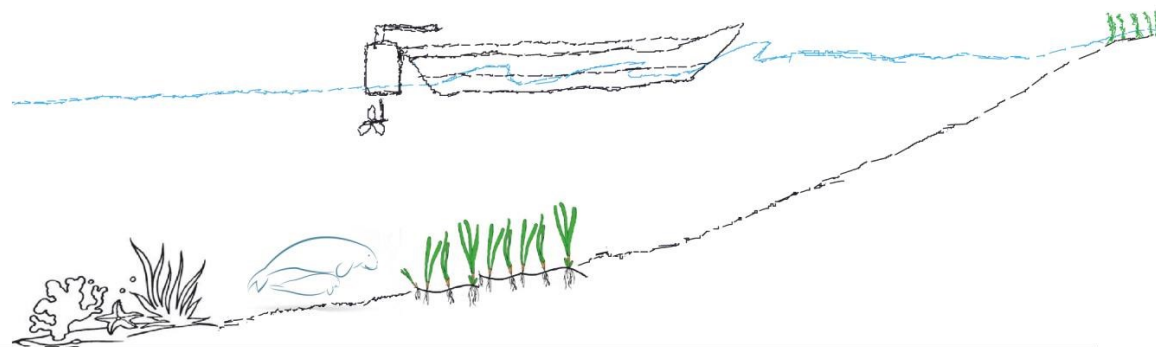
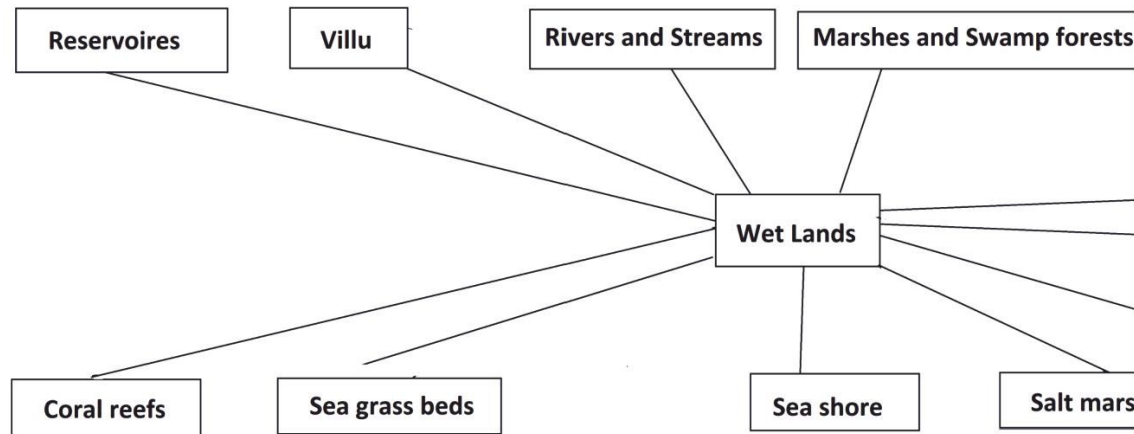
Cyperaceae  
(*Cyperus rotundus*)  
(Kalanduru)

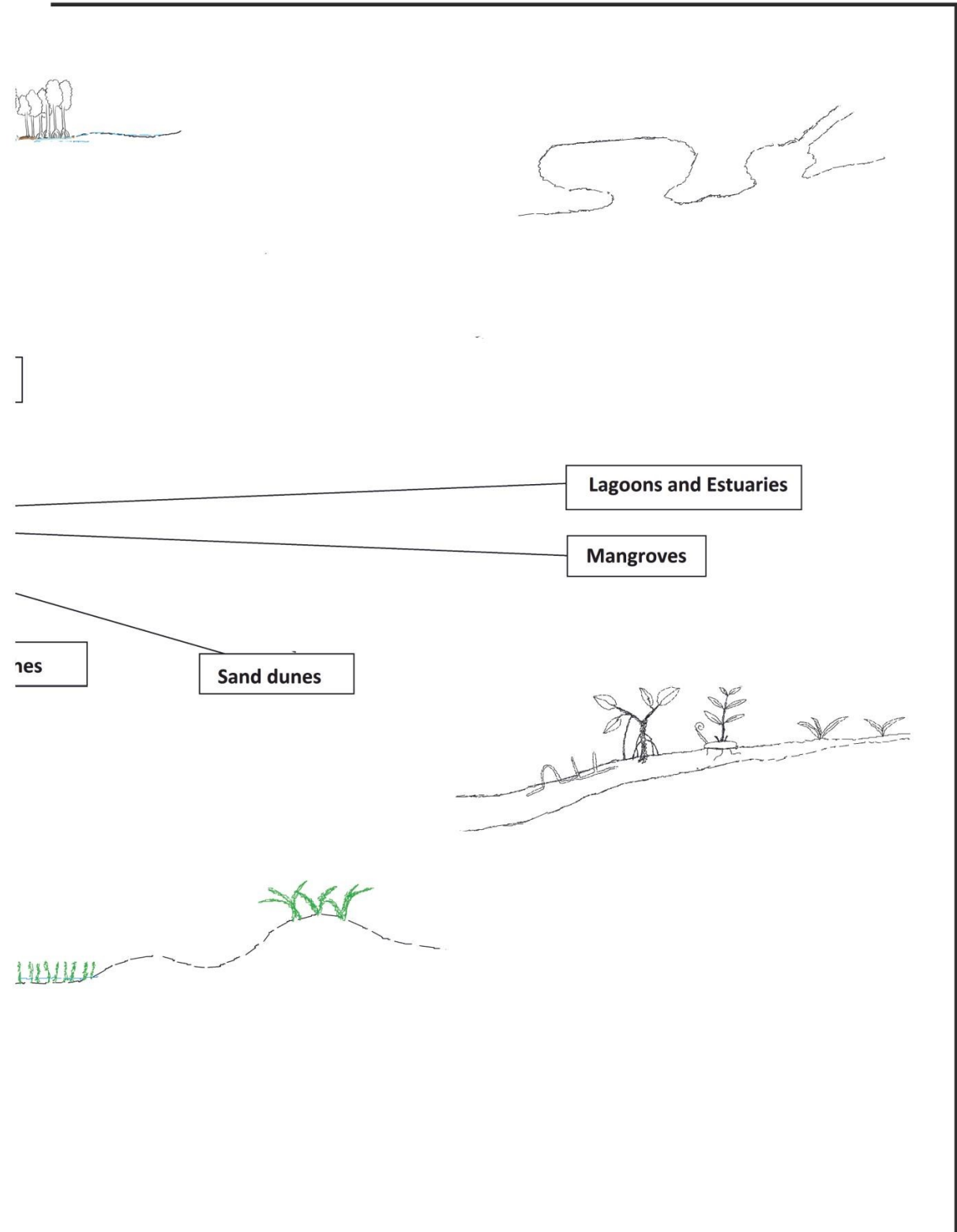
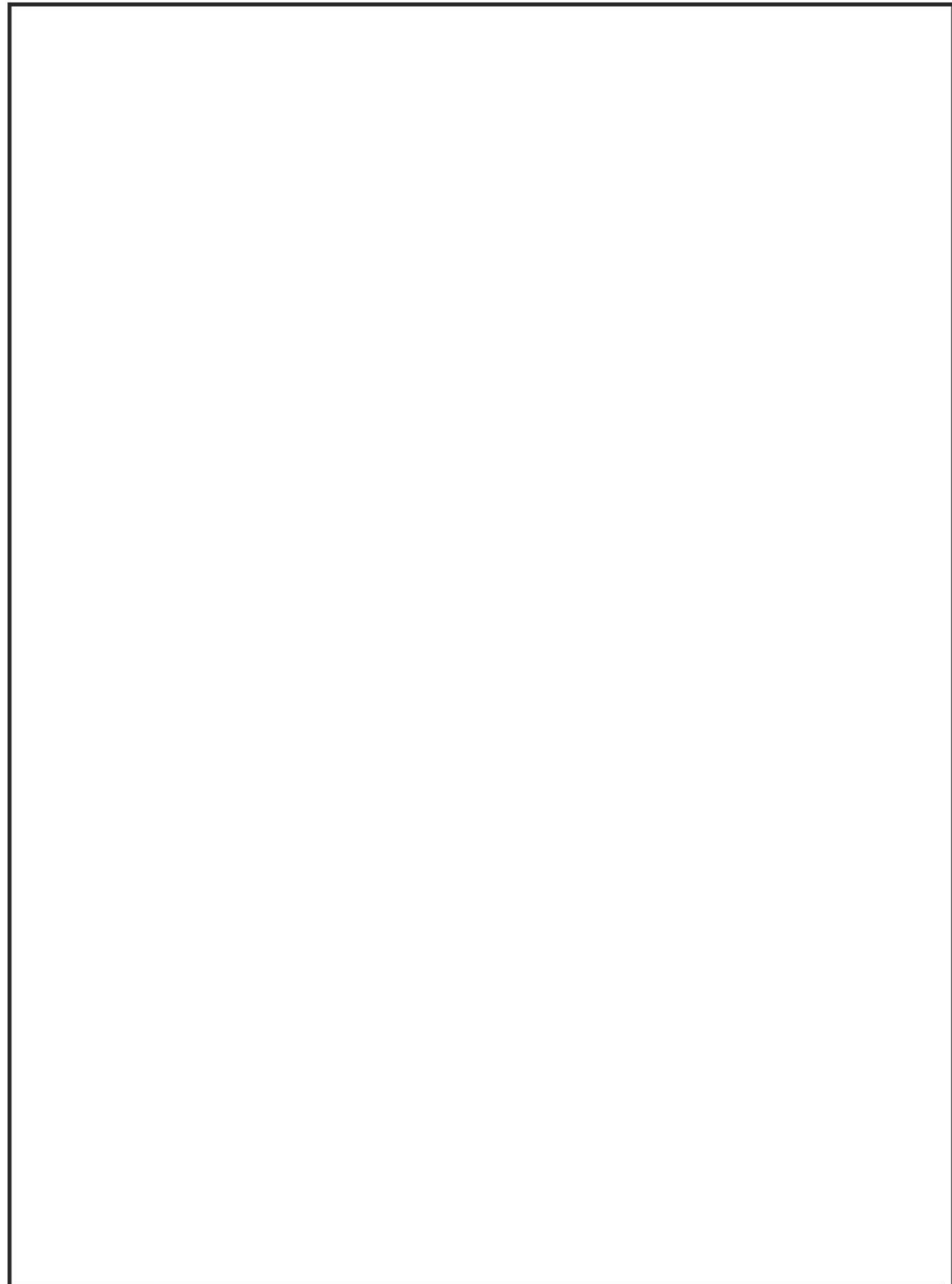


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B.Sc. (Hons), M.Sc.







### Wetlands

- Wetlands are simply habitats with permanent or temporary accumulation of water with associated plant and animals.
- According to Ramsar Convention, wetlands are defined as areas of marsh, fen, peatland or water, whether natural or artificial, permanent or temporary with water that is static or flowing, fresh, brackish or salt, including areas of marine water the depth of which at low tide not exceed six metres.
- The wetlands of Sri Lanka, which fit into the Ramsar definition, can be divided into three broad categories:
  1. Inland fresh water wetlands (Eg. rivers, stream, marshes, swamp forests and villus)
  2. Coastal wetlands (Eg. lagoons, estuaries, mangroves, sea grass beds, salt marshes and coral reefs)
  3. Man-made wetlands (Eg. tanks, reservoirs, rice fields and salterns)

### Rivers and streams

- Sri Lanka has an extensive network of rivers, which drains a total of 103 distinct natural river basins.
- The river basins originating in the wet highlands are perennial, while many of those in dry zone are seasonal.
- There is hardly any vegetation to be found in running water.



### Marshes and swamp forests

- Inland freshwater marshlands are low lying areas which receive water through surface runoff, ground water seepage or flood water from rivers.
- These contain peat (partially decomposed organic matter), and water logged sticky clay soil.
- Many water birds, amphibians and fish species inhabit these areas.
- Plants that have adapted to grow in shallow stagnant water such as Habarala (S)/ Semaikilangu (T)- Colocasia species  
Kekatiya (S) - *Aponogeton spp*,  
Reeds (E)/ Pan (S) species are abundant in inland marshlands.



Reeds (E)/Pan (S)



Colocasia species



*Aponogeton spp.*



(vii) Given below in the table is a list of generic names of aquatic plants. Indicate against each of them whether the features indicated in the columns of the table are present (✓) or absent (x) in these plants.

Genus	Marine/Fresh/Brackish/Terrestrial	Ecosystem
<i>Nymphaea</i>		
<i>Nelumbo</i>		
<i>Spinifex</i>		
<i>Ipomea</i>		
<i>Avecinia</i>		
<i>Colocasia</i>		

**2021 AL**

(iv) (a) Name two invasive alien plants found in the reservoirs of Sri Lanka.

.....

(b) Name two common sea grass genera in Sri Lanka.

.....

(v) Why are coral reefs considered as rain forests of the sea?

.....

**2023 AL**

(B) (i) How do inland freshwater marshlands in Sri Lanka receive water?

.....

.....

.....

.....

(ii) (a) State three abiotic characteristics of mangrove ecosystems.

.....

.....

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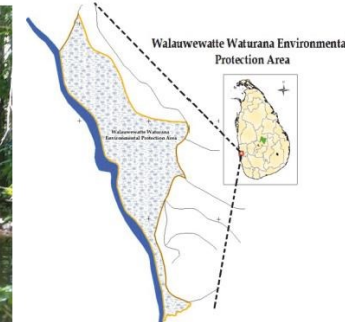
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(b) Name two true mangrove plants that are common in Sri Lanka.

.....

.....

- Freshwater swamp forests are not common in Sri Lanka.
- It is a place where forest vegetation is inundated for a short period of time in the year as seen in the Waturana swamp at Bulathsinhala located in the 'kalu ganga basin'.



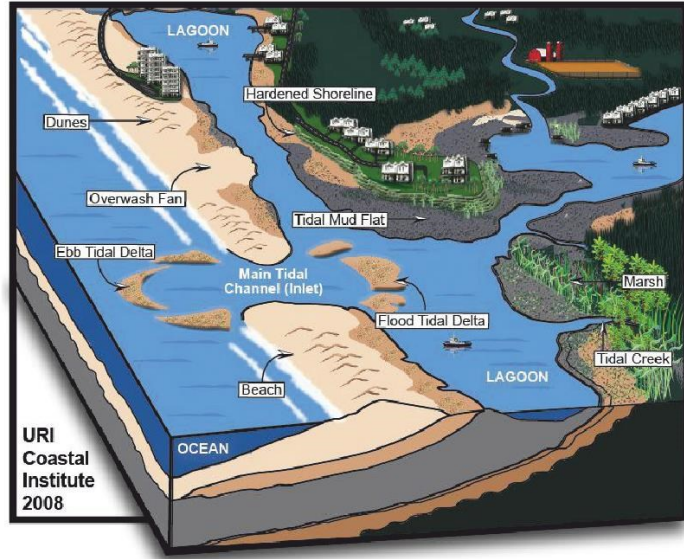
**Villus**

- Generally villus are the flood plains of the reservoirs. Villu grasslands possess a special link with the wildlife in the area, especially elephants and bird populations.
- The vegetation is dominant with grasses (members of *Poaceae*) and sedges (members of *Cyperaceae*).
- Villu grasslands are located in areas such as Mahawelli flood plains, Wilpattu National park etc.



Cyperaceae (*Cyperus rotundus*)    Poaceae (*Kalanduru*)

**Lagoons and Estuaries**



- Lagoons are coastal wetlands generally separated from the sea by a sand barrier. Eg: Negambo and Bundala lagoons.
- Estuaries are formed in places where rivers enter the sea and does not contain a sand barrier separating it from seas (Eg. Maduganga/Benthota).
- The daily tidal fluctuation is a characteristic of these places.



**Mangroves**

- Mangroves ecosystem is an intertidal vegetation that covers fringes of the lagoons and estuaries.
- They share characteristics usually of saline/brackish water, loose soil and anoxic conditions. The vegetation is also exposed to intense sunlight.
- Mangrove plants could be categorized into two groups; true mangroves that occur towards the boundary between sea and land and mangrove associates that occur more towards inland. Common true mangrove species are;  
S: kadol, T: kandal. (*Rhizophora spp*, *Bruguiera spp*, )

**Structured Essay**

**1997 AL/Bot**

(i) What is the special features of the mangrove environment?

.....  
.....  
.....

(ii) Name 3 genera of angiosperms commonly found in the mangrove community in Sri Lanka.

.....  
.....  
.....

(iii) Name a genus of a fern found in the mangrove habitat in Sri Lanka.

.....

(iv) List below four major problems faced by mangrove plants in their environment and taking Rhizophora as an example give the adaptations seen in the plant to overcome each problem.

Problem	Adaptation
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.....  
.....  
.....  
.....  
.....

(v) Mangrove plants and their environments are rapidly, destroyed by the activity of man.

Why is it important to conserve them?

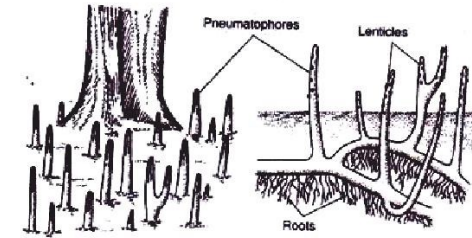
.....  
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(vi) Name two environmental factors which limit the growth of submerged aquatic plants.

.....

11. Quantities of mineral nutrients in soils of tropical rain forests are relatively low because  
 (1) Plant density is high. (2) Microorganisms are not in abundance in tropical soils  
 (3) Decomposition of organic matter in soil and re-assimilation of the minerals by plants occur very rapidly.  
 (4) Mineral cycling occurs at a relatively slow rate in tropical soils.  
 (5) The prevailing high temperature in the soil degrades the nutrients.
12. The dominant plant species in the dry patanas in the Uva Basin is  
 (1) *Cymbopogon nardus* (2) *Ipomea pescaprae* (3) *Imperat cylindrica*. (4) *Chrysopogon*.  
 (5) *Salicornia sp.*
13. Select the response that indicates a relict species and a species endemic to Sri Lanka respectively.  
 (1) *Acanthus ilicifolius* and *Dipterocarpus zeylanicus*  
 (2) *Panicum maximum* and *Garcinia quaesita*  
 (3) *Ichthyophis sp.* and *Salacia reticulata*  
 (4) *Crudia zeylanica* and *Puntius nigrofasciatus*  
 (5) *Lingula sp.* and *Loris tardigradus*
14. Which of the following responses indicate/s in correct order, the plants that are found in three ecosystems located in increasing altitudes of Sri Lanka?  
 (A) *Salicornia sp.*, Heerasssa, Themeda (B) Kadol, Weera, Hora  
 (C) Katu iki li, Gal weralu, Ranawara (D) Palu, Hal, Tussock grass  
 (E) Karan koku, Naa, Gini andara 2022/47
15. Some vegetation types and the ecosystems where they can be seen in Sri Lanka are given below.
- | Vegetation type        | Ecosystem                    |
|------------------------|------------------------------|
| A — Stunted vegetation | P — Tropical montane forests |
| B — Dense scrub layer  | Q — Tropical thorn scrubs    |
| C — Thick grass cover  | R — Sand dunes               |
| D — Sparse large trees | S — Savanna                  |
- Which of the following responses indicates all correct combinations of the vegetation type and the ecosystem where it is found?  
 (1) A-P, B-S, C-R, D-Q (2) A-P, B-R, C-Q, D-S  
 (3) A-R, B-S, C-P, D-Q (4) A-R, B-P, C-S, D-Q (5) A-R, B-P, C-Q, AL 2024/35
16. This question is based on the following plants of Sri Lanka.  
 P — *Salicornia* Q — Kaluwara/Karun-kaali R — Palu/Paalai  
 S — Gini-andara/Vidattal/Vindattai T — Heeressa/Pirandai U — Tassock grass  
 V — Keena/Pongu W — Weera/Vrai X — Walkurudu/Kaatu karuwa  
 Plants that are found in three ecosystems arranged according to increasing annual rainfall in correct sequence are  
 (A) S, R and U. (B) T, Q and X. (C) S, U and W. (D) P, W and V. (E) P, V and Q. 2024/50

S: Mas athu gas T: kannamaram (*Avicennia marina*)



*Avicennia marina*



*Rhizophora spp*

- Common mangrove associates are:

S: Karan Koku, E: Golden leather fern (*Acrostichum aureum*)

S:Katu- ikili, E: Holly mangrove (*Acanthus ilicifolius*)



*Acrostichum aureum*



*Acanthus ilicifolius*

- In order to protect from sunlight leaves of mangrove have a thick cuticle to reflect sunrays and/or cut off excess radiation.
- Some have salt glands to secrete excess salts that are absorbed by the plants. .
- There are special roots to intake atmospheric oxygen.
- Seeds of some mangroves germinate while attached to the mother plant (vivipary).
- This help the seed to establish successfully soon after falling from the tree.
- Mangroves provide a unique habitat mainly for many crustaceans and mollusks.
- Mangroves are found in Puttalam, Batticaloa, Trincomalee, Galle, Bentota and Negombo.





### Salt marshes

- These are marshlands restricted to the arid coastal regions of the country where soil dries up to form crystals of salts during the dry season. Low rainfall, high wind, high temperatures and loose sand blowing with salt are some of the major characteristics found in this ecosystem.
- The vegetation has only few plant and animal species. Plants are short, contain fleshy succulent plant bodies. One common plant species is *Salicornia sp.* Salt marshes are common in Puttalam, Mannar, Hambantota and Vakara areas.



**Salicornia sp.**

### Sea grass beds

- In large lagoon areas with low wave action, the floor of the shallow sea is occupied by sea grasses.
- These are not grass species but appear like grasses due to the shape of leaves.



Eg. Plant species such as *Halodule spp* and *Halophila spp.* are common sea grasses found in Sri Lanka (especially from Kalpitiya to Mannar).

### MCQ

- Which one of the following combinations of plants would you expect to find growing together naturally in a sandy sea shore?
    - Chrysopogon nodulibarbis, Ipomea pescapre, Spinifex litoreus.*
    - Pandanus tectolus, Ipomea pescapre, Rhizophora spp.*
    - Pandanus tectolus, Cyperaceae, Spinifex litoreus.*
    - Aponogeton spp, Ipomea pescapre, Spinifex litoreus.*
    - Pandanus tectolus, Ipomea pescapre, Spinifex litoreus.*
  - Which of the following plants cannot be considered a member of a mangrove community?
    - Bruguiera* (2) *Poacea* (3) *Rhizophora* (4) *Acanthus* (5) *Avicennia*
  - Which of the following tree species grows naturally in the forests of Sri Lanka?
    - Colocasia* (2) *Mesua ferrea* (3) *Aponogeton* (4) *Cyperaceae* (5) *Acrostichum*
  - Which of the following plants would you not expect to find in Sinharaja forest?
    - Acrostichum aureum.* (B) *Mesua ferrea* (C) *Ipomea pescaprae* (D) *japan jabara* (E) *Vateria copallifera*
  - Which of the following combinations of plants can be found to grow naturally in the same environment?
    - Diospyros ebenum, Dipterocarpus, Mesua ferrea*
    - Aponogeton, Ipomoea pescapre, Spinifex littoreus*
    - Salicornaria, Holodule, Avicennia, Halophyla*
    - Rhizophora, Bruguira, Avicennia, Alocasia*
    - Rhizophora, Bruguira, Avicennia, Acanthus*
  - Four of the following plants belong to one Phylum. Select the plant that does not belong to this family.
    - Nymphaea sp* (2) *Halodule* (3) *Acrostichum aureus* (4) *Ipomea pescaprae* (5) *Salicornia sp.*
  - Which of the following is not true grass species.
    - Chrysopogon* (2) *Arundinella* (3) *Cymbopogon* (4) *Imperata* (5) *Halophila*
- Questions No 8 to 9 are based on the following species of plants in Sri Lanka.
- Rhizophora spp.* (2) *Pandanus spp* (3) *Acanthus ilicifolius* (4) *Salicornia sp.* (5) *Halophila spp.*
- Which of the above plants is submerged ?
  - Which of the above plants would you find in a salt marshy environment in Sri Lanka?
  - In which of the following list/s all the tree species can be dominant species in a dry mixed evergreen forest.
    - Drypetes sepiaria, Manilkara hexandra, Diospyros ebenum.*
    - Callophyllum walker, Elaeocarpus montanus, Cinnamomum ovalifolium*
    - Dipterocarpus zeylanicus, Mesua ferrea, Vateria copallifera.*
    - Dichrostachys cineria, Cassia auriculata, Cissus quadrangularis*
    - Terminalia chebula, Phyllanthus emblica, Terminalia bellirica*

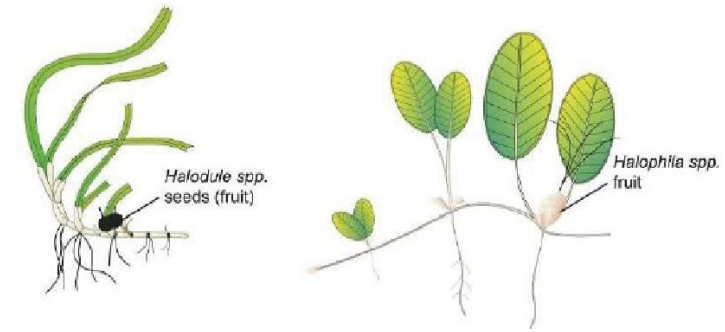
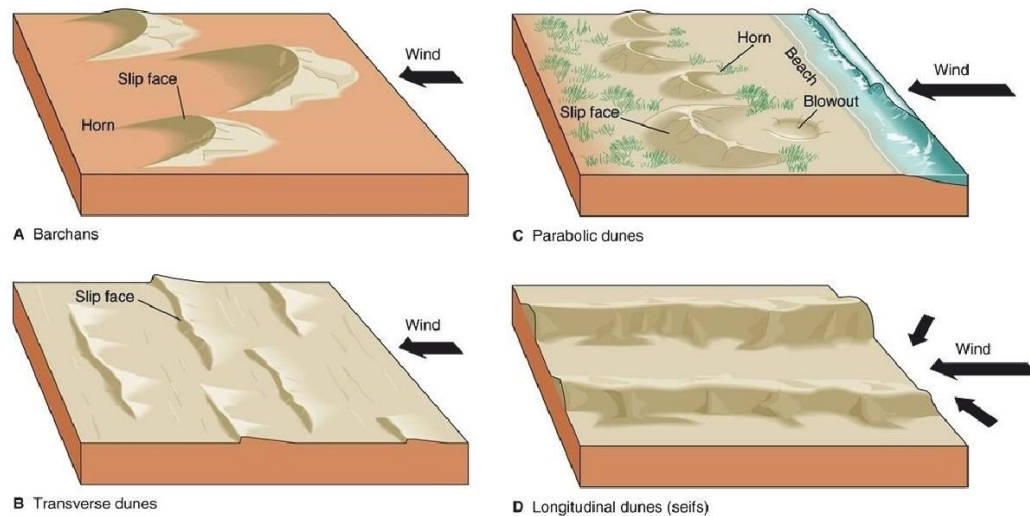




## Sand Dunes

- Dunes are characterized by stunted or creeping vegetation on large masses of sand.
- The sand dune structure is determined by wind speed and direction.
- Dunes are raised beaches of sand and are characteristic of certain coastal areas in the arid zone.

Eg: Near Mullativu, Trincomalee, Kalpitiya, Yala etc.



- Sea grasses grow in a compact cluster and provides the sea bed a favourable habitat for breeding of many fish species.
- However, these areas are often disturbed by the fisheries activities as these are the parking areas of fishing boats.

## Coral reefs

- Coral reefs are one of the natural wonders of the world.
- Coral reefs consist of calcareous structures secreted by a group of marine invertebrates.
- Coral reefs are famous for their spectacular beauty.
- They are considered as 'rain forests of the sea' because of their high productivity and high diversity of organisms inhabit them.
- Coral reefs can be seen in southern coast (Akurala to Tangalle), Gulf of Mannar, etc.
- The reefs are habitats for a large number of fish species, invertebrates such as spiny lobsters, sea cucumbers, etc.
- Marine mammals and reptiles such as dolphins and sea turtles inhabit reefs occasionally.



## Reservoirs

- There are no natural lakes in Sri Lanka, but there are numerous ancient irrigation tanks mainly scattered in the lowland dry zone. Typical irrigation tanks include 'Parakrama samudra', 'Kala wewa', 'Minneriya wewa and tissa-wewa'.





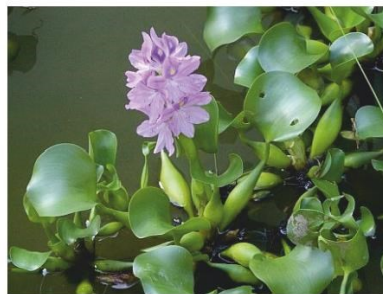
- Aquatic plant species commonly found in the reservoirs are  
 S: Manel, E: Water lily (*Nymphaea spp.*),  
 S: Nelum. T: Tamarai (*Nelumbo nucifera*)  
 S: Kekatiya, T: Koddi (*Aponogeton spp.*)



*Nymphaea spp.*



*Nelumbo nucifera*



*Aponogeton spp.*



*Salvinia*



*Japan jabara*

- Often free floating invasive alien plant species such as Salvinia and Japan jabara (S)/ water hyacinth (E) also can be seen in these tanks.

### Sea shore

- The long sea shore of Sri Lanka varies in nature.
- The most common sea shore type is sandy sea shores.
- The sea shore areas share the characteristics of high temperature throughout, and salt spray and high winds especially during the monsoon seasons.



- Most of the sea shore plants have adapted to these conditions.
- Examples for these plants are  
 Muhudu Binthamburu (S), Beach Morning Glory (E)- atampu (T) (*Ipomea pescaprae*)  
 Maha rawana revula (S), Ravannan meesai (T)- *Spinifex littoreus*.



*Ipomea pescaprae*



*Spinifex littoreus*

- The vegetation gradually become stable a distance away from the tide mark, with the stabilization of the soil. In these areas plant species such as Wara (S)/ erukkalai (T)- (*Calotropis gigantea*), Wetakeiya (S)/ talai (T) - *Pandanus spp* etc. can be found.



*Calotropis gigantea - Wara*



*Pandanus spp.*