

# **Climate Change and Ecosystem Processes**

**Nirmalie Pallewatta Ph.D**

**Department of Zoology and Environment  
Science**

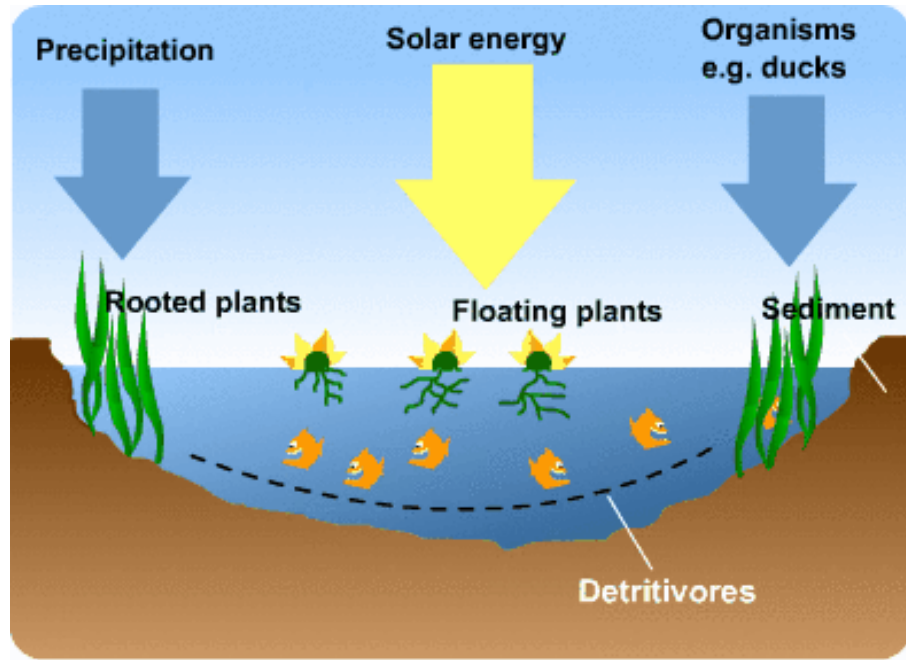
**University of Colombo**

**Climate Reality, Dialogues on National Climate Change  
Adaptation**

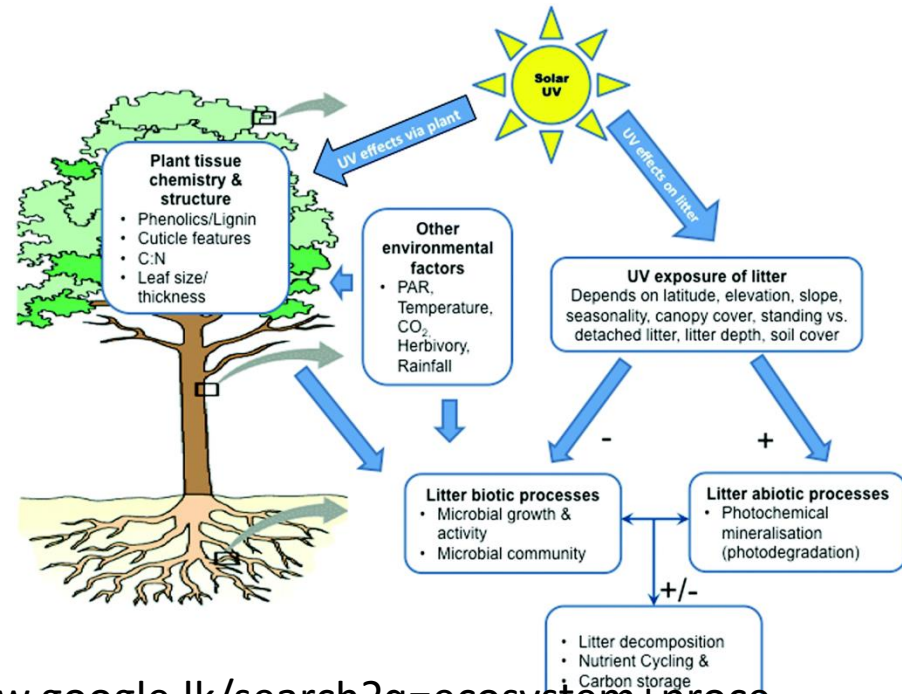
**17<sup>th</sup> September 2018, MAS Innovation Center, Colombo, Sri  
Lanka**

# What is an ecosystem and an ecosystem process?

- A system consisting of living and non living beings in a given area and interactions between them- energy flows, nutrient cycles
- A characteristic of an ecosystem by which the system is kept together and whole. These are the interactions between living-non living components. Examples- photosynthesis, decay of organic materials, transfer of energy between living beings
- Ecosystem process= Ecosystem function



<https://www.s-cool.co.uk/a-level/geography/ecosystems/revise-it/ecosystem-processes>



[https://www.google.lk/search?q=ecosystem+processes&rlz=1C1JZAP\\_enLK713LK740&tbm=isch&source=iu&ictx=1&fir=dBpnavsbNYQm1YM%253A%252CRSoKjLWEGlfjIM%252C](https://www.google.lk/search?q=ecosystem+processes&rlz=1C1JZAP_enLK713LK740&tbm=isch&source=iu&ictx=1&fir=dBpnavsbNYQm1YM%253A%252CRSoKjLWEGlfjIM%252C)

# How does CC affect ecosystem processes?

Temperature, rainfall and humidity are the main factors that decide where plants and animals live naturally. Particularly temperature has a fundamental effect

All living beings have an optimal range of temperature within which they live and function best.

But human mediated increase of temperature has taken place faster than living beings can adapt- **Climate change due to human activities**

# Is this the only factor? NO

- CC is not the only thing that affects ecosystem processes- already most ecosystems of our planet are highly degraded and cannot function normally- The Millenium Ecosystem Assessment (2005)
- CC is the final nail that interacts with all other reasons for loss and further weakening of ecosystem processes

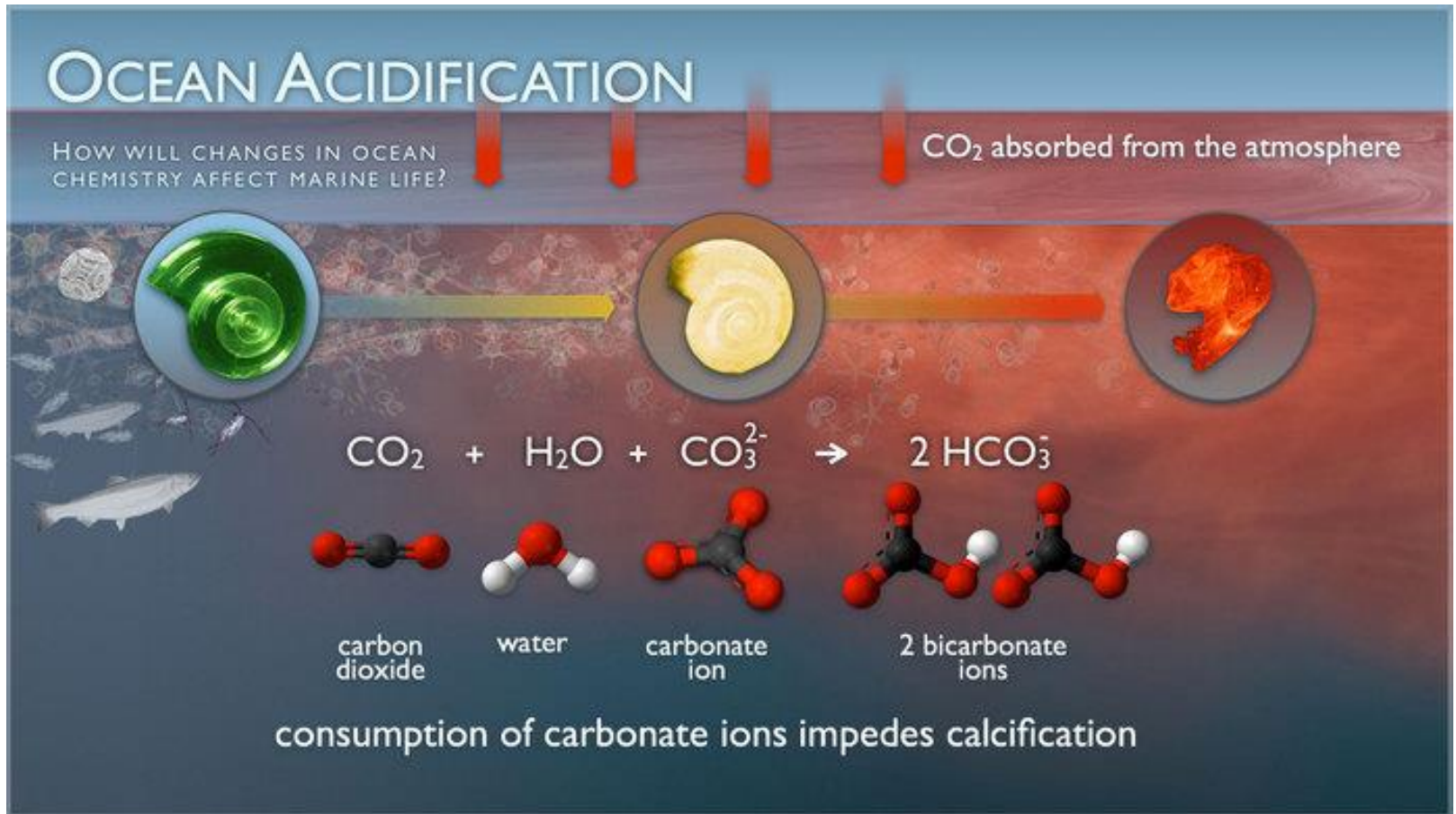
- NO ECOSYSTEM PROCESSES – NO LIFE ON THIS PLANET
- NO ECOSYSTEM PROCESS IS INDEPENDENT OF THE CLIMATE
- AS WE ALL LIVE ON THIS PLANET, ANYTHING THAT AFFECTS ECOSYSTEM PROCESSES WILL AFFECT US TOO
- TRENDS??- **GETTING WORSE**

# Predicted impacts of CC scenarios for Sri Lanka

- Increase of extreme weather events
- No change in total amount of rainfall but its distribution has become more variable, less predictable
- Dry areas are likely to be drier, wet areas wetter

(Source: Presentation of Dr. BV Punyawardena, Dept. of Agriculture, Sri Lanka)

# OCEAN ACIDIFICATION



Source: <https://www.pmel.noaa.gov/co2/story/Ocean+Acidification>



# Ocean Acidification

- Oceans absorb 30-40% of the CO<sub>2</sub> given off to the atmosphere- a carbon sink
- This has led to a change in the chemistry of the ocean water- increase of the acidity of the surface layers of water
- Dissolved CO<sub>2</sub> will consume carbonate ions that are needed along with Calcium ions by shellfish and marine life as building blocks of their hard skeletons- disrupt shell formation
- **Coral reef formation- same reason as above**

# Sri Lanka lags behind in studying the effects of CC on ecosystems

- For more information and an interesting TV debate
  - Global Climate Action Summit- California, USA, 12-14<sup>th</sup> September 2018
  - France24 (English)- *The Brewing Storm, The Politics of Extreme Weather*