

Soil Degradation

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<http://timetraveler.html.xdomain.jp>

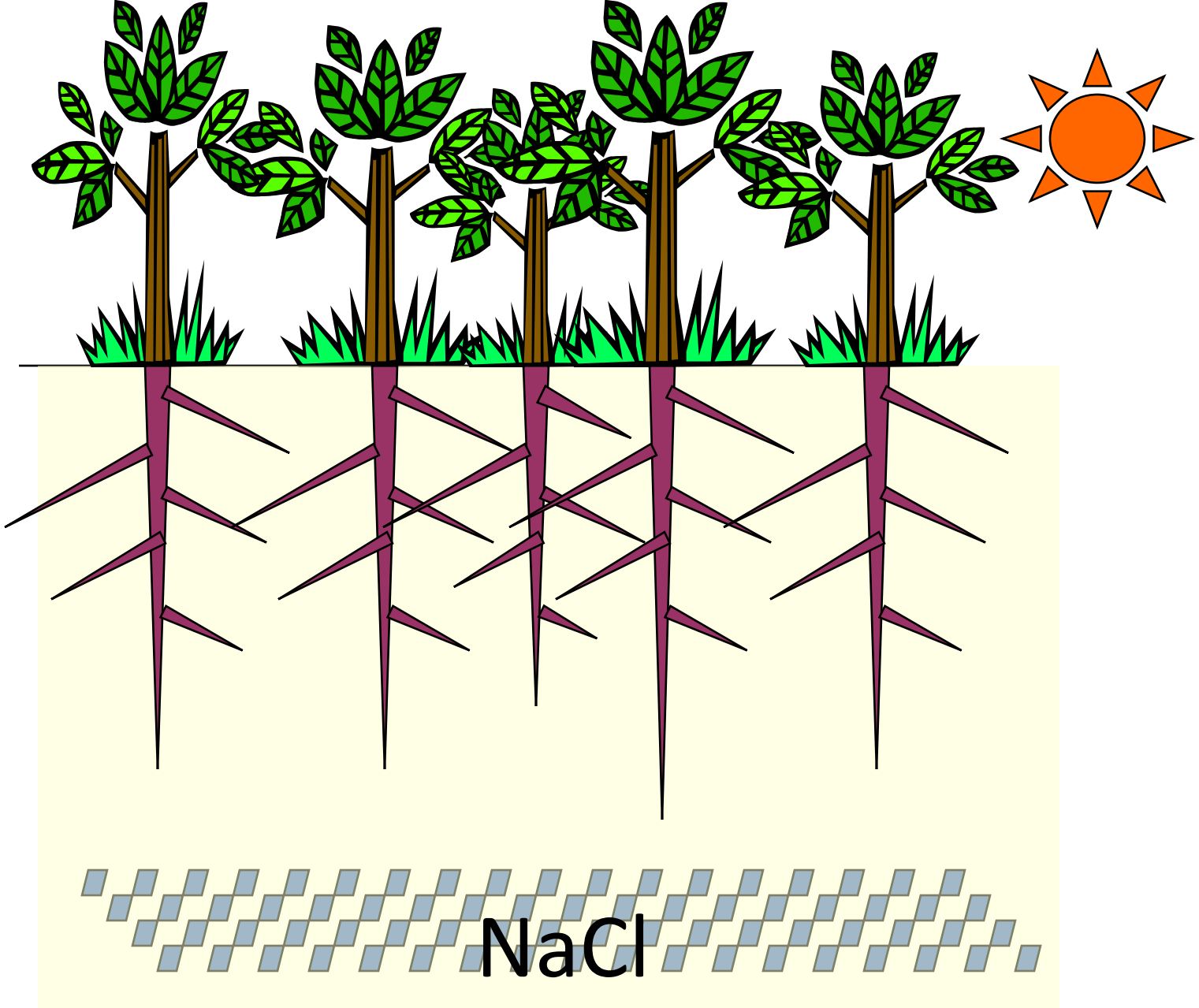
Mechanism of Soil salinization

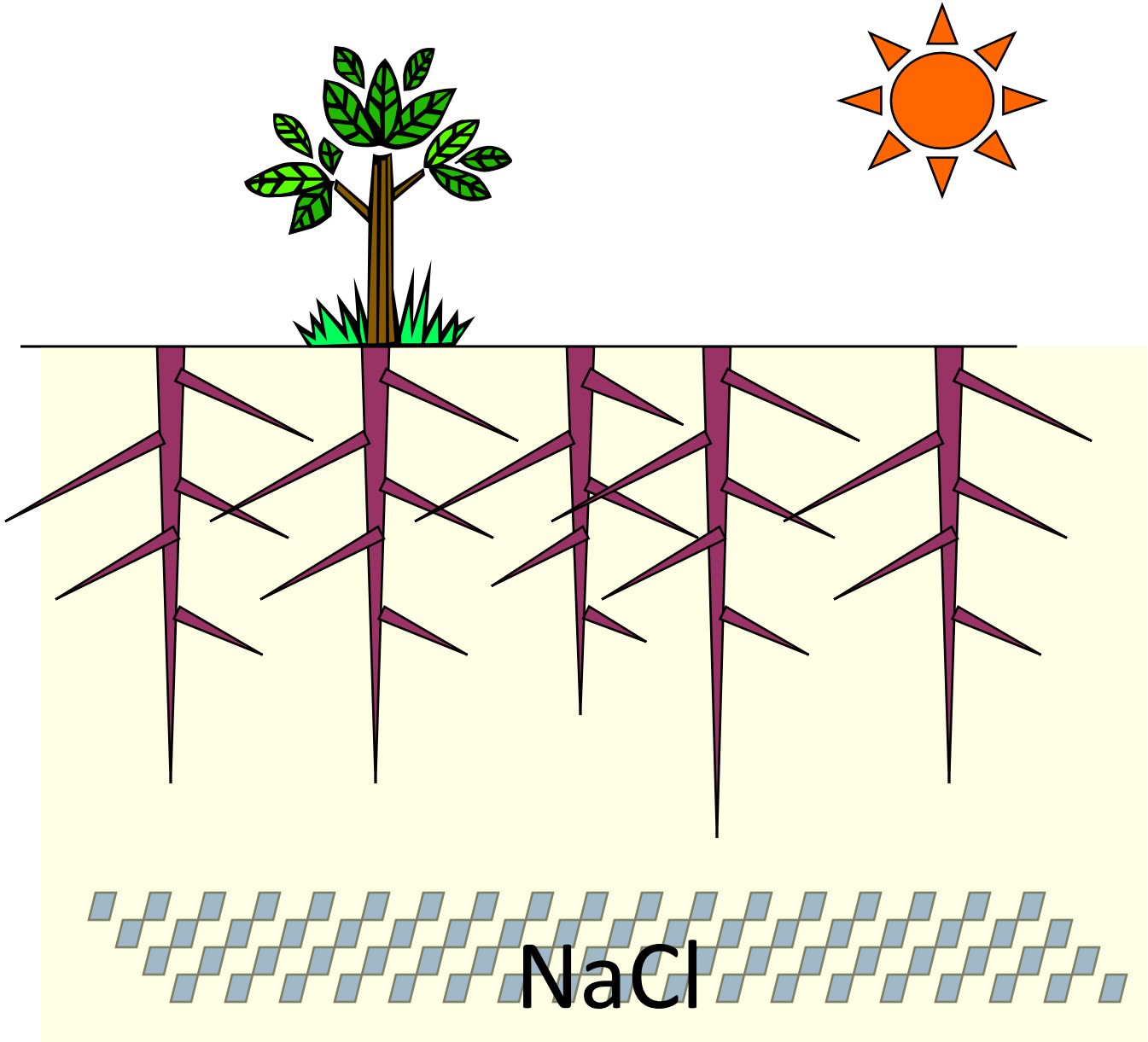


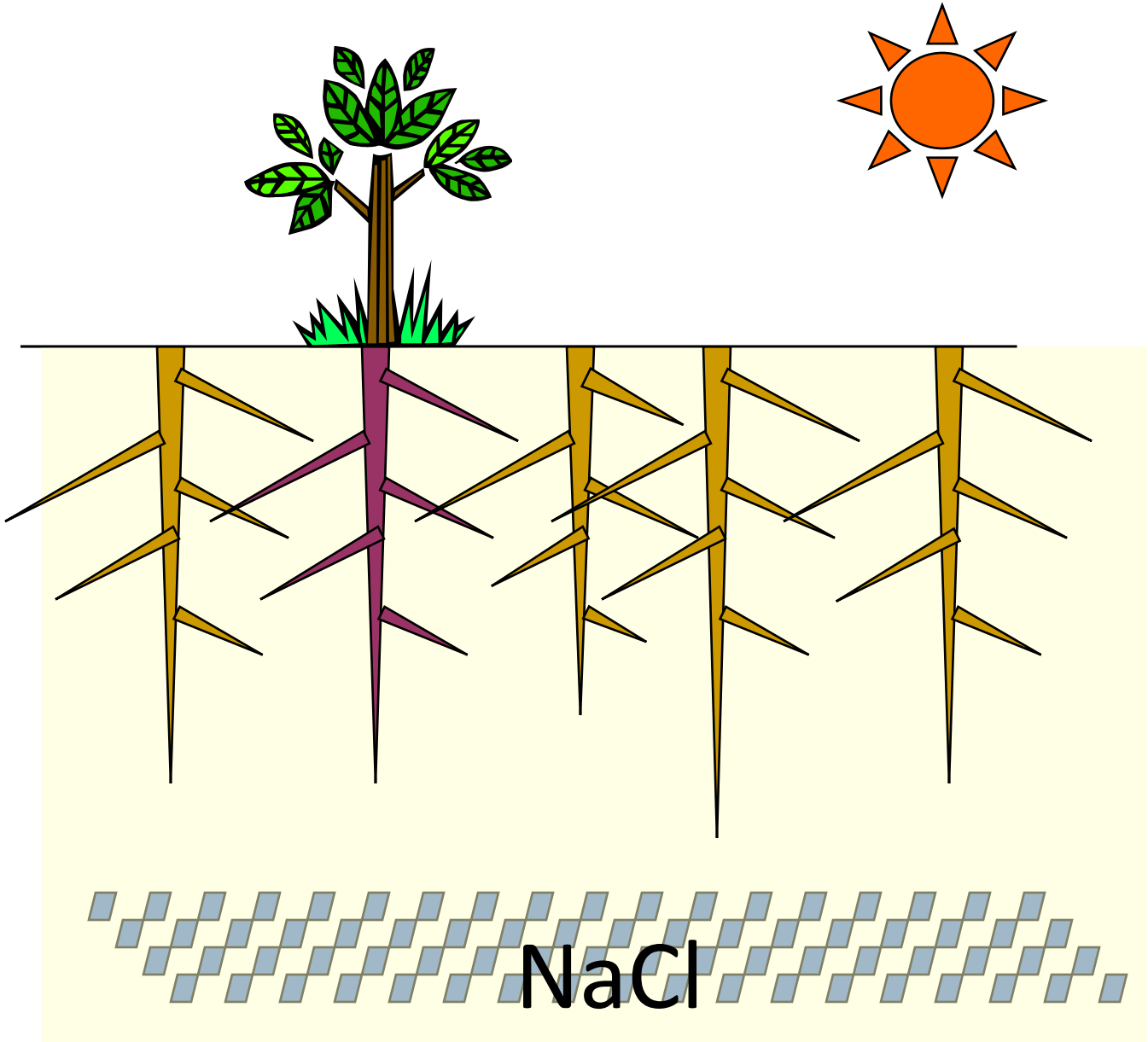
Salinized land in Khon Kaen, Thailand

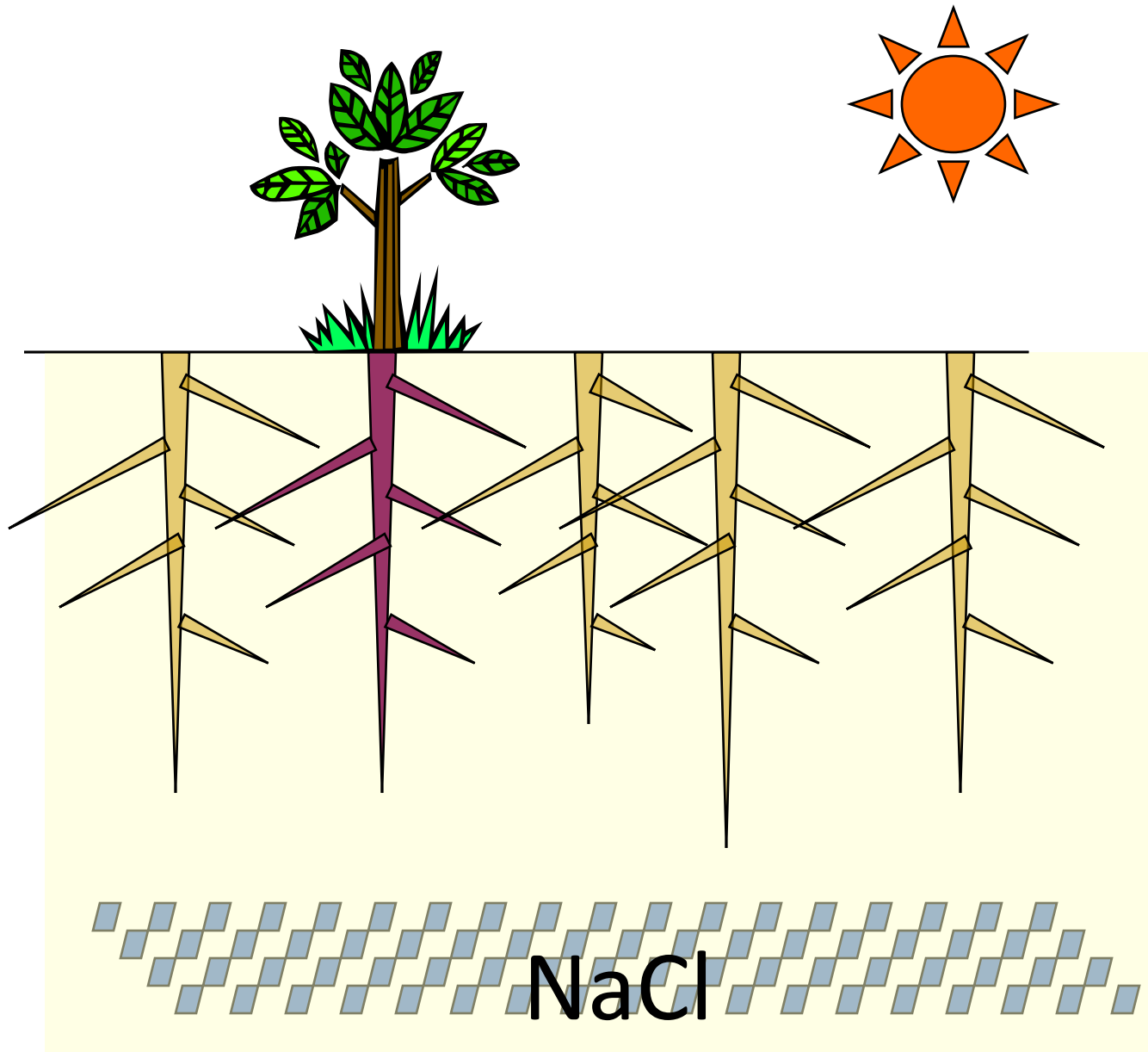


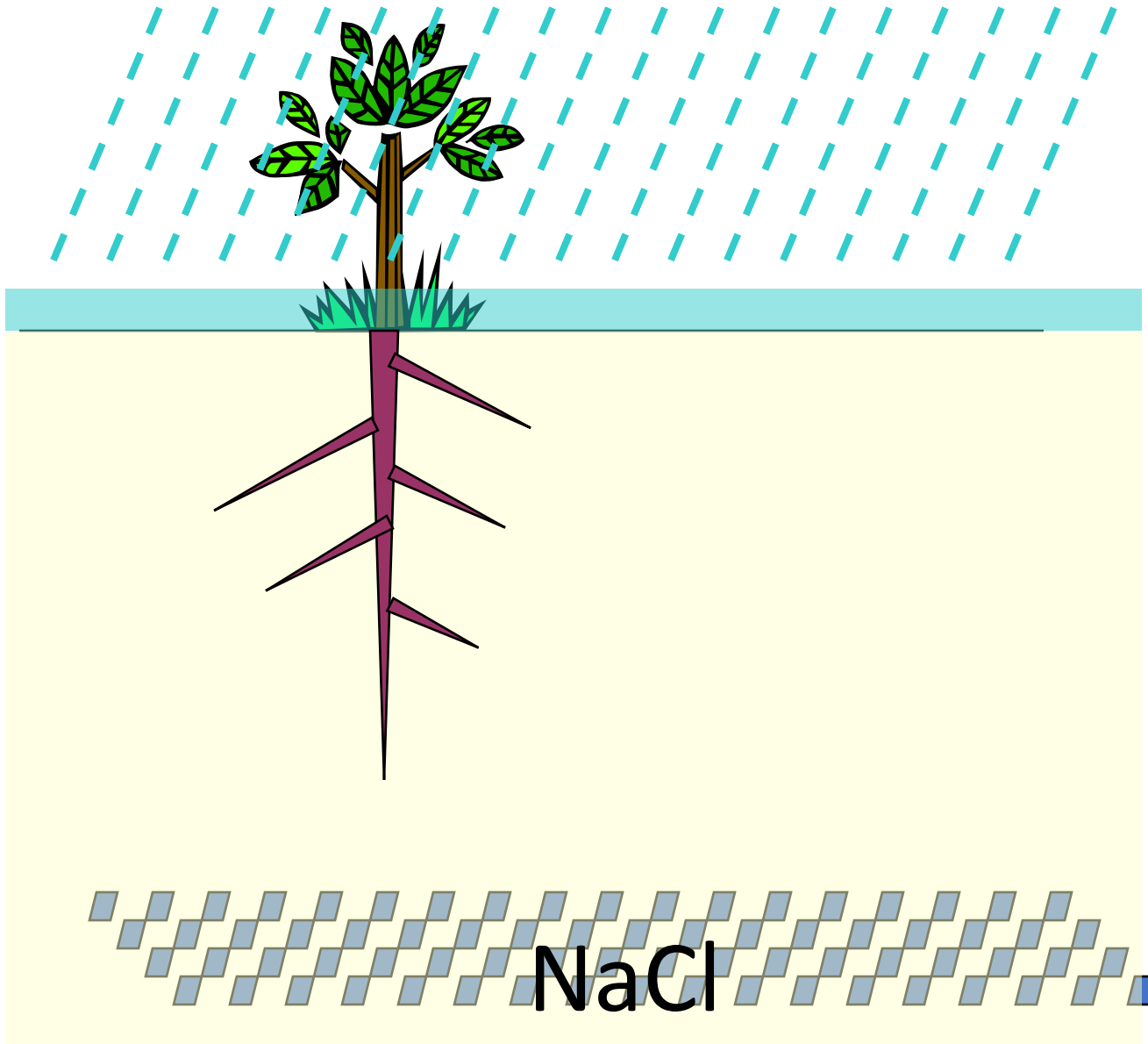
Soil covered with salt film.

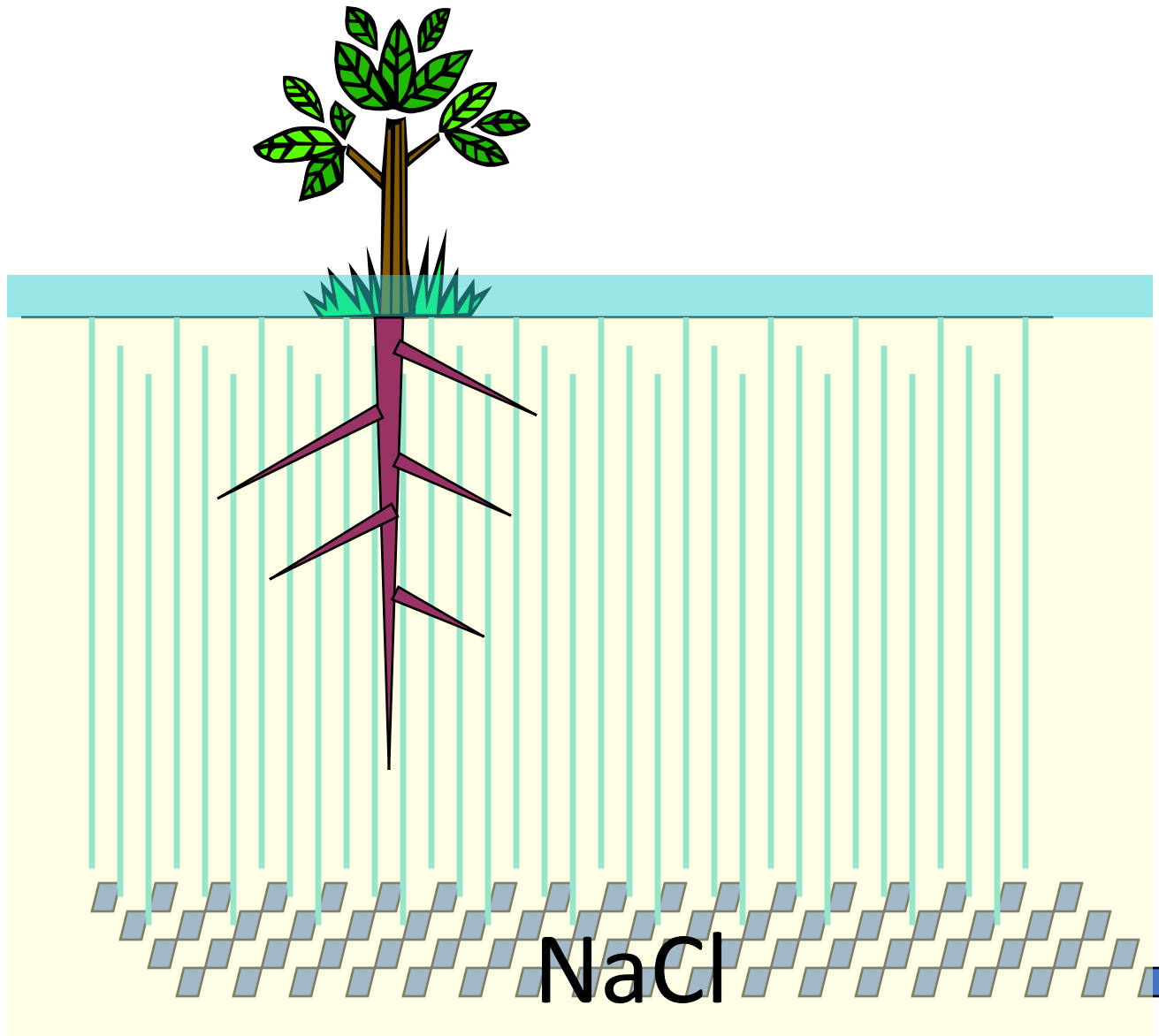


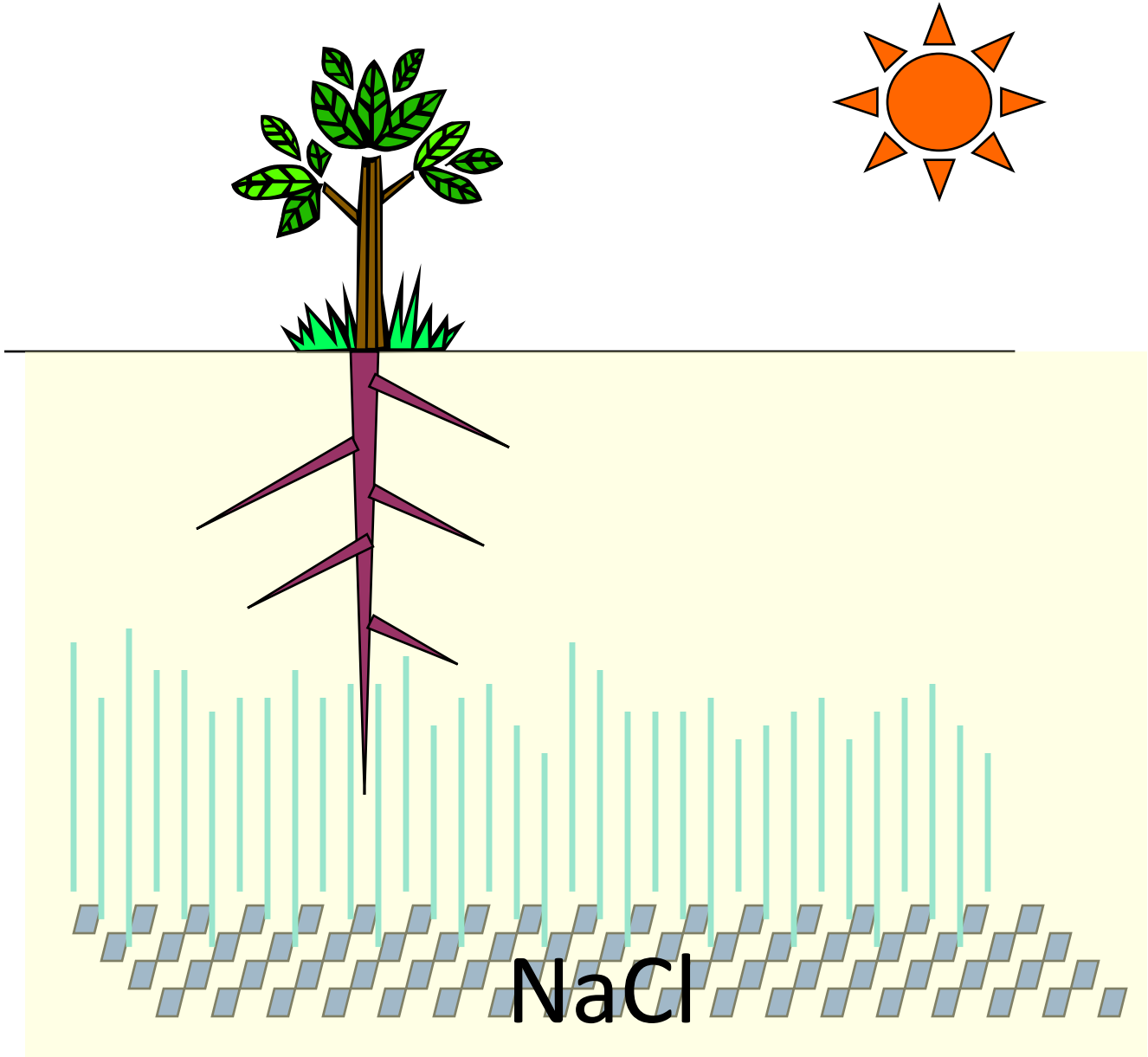


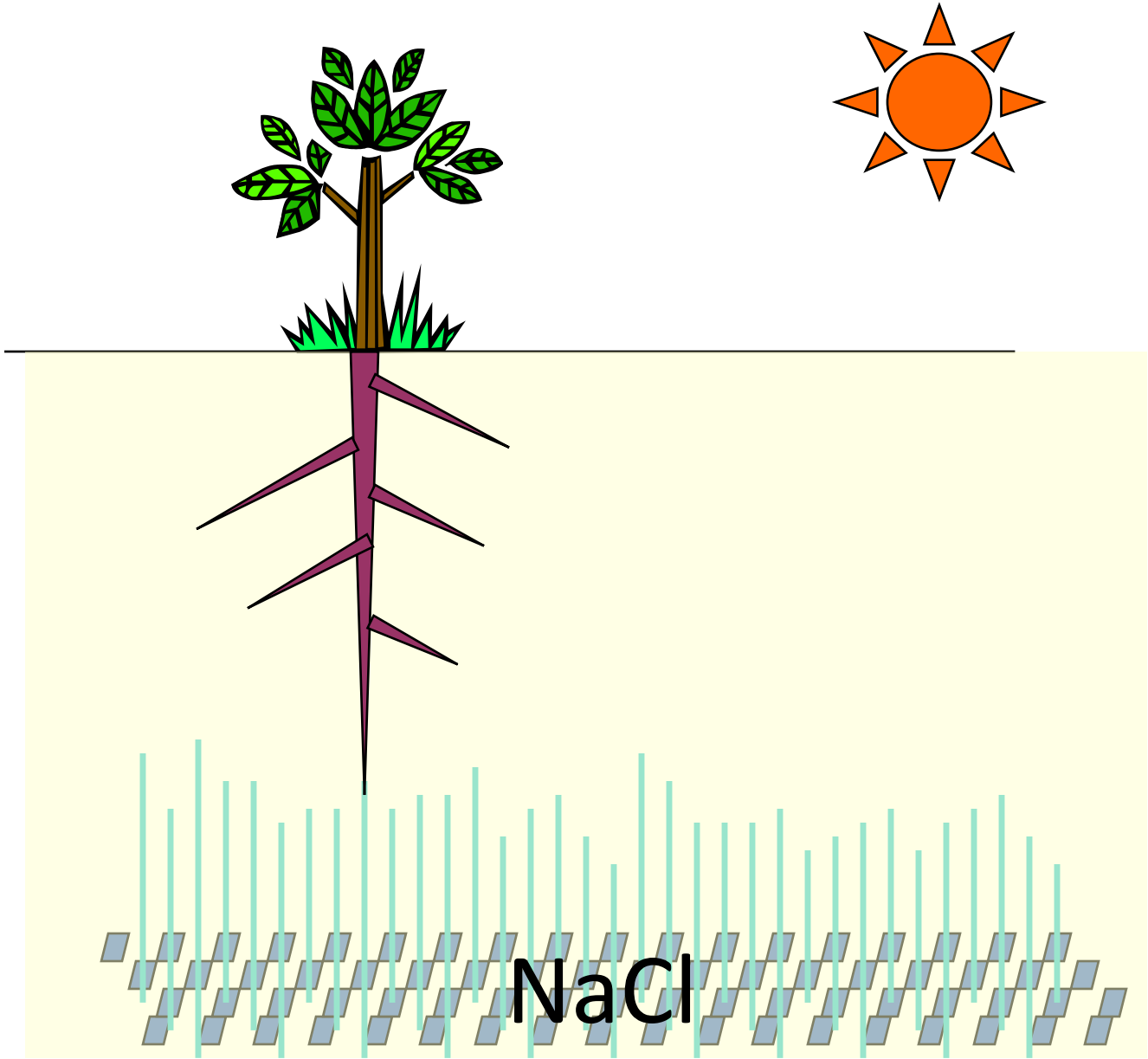


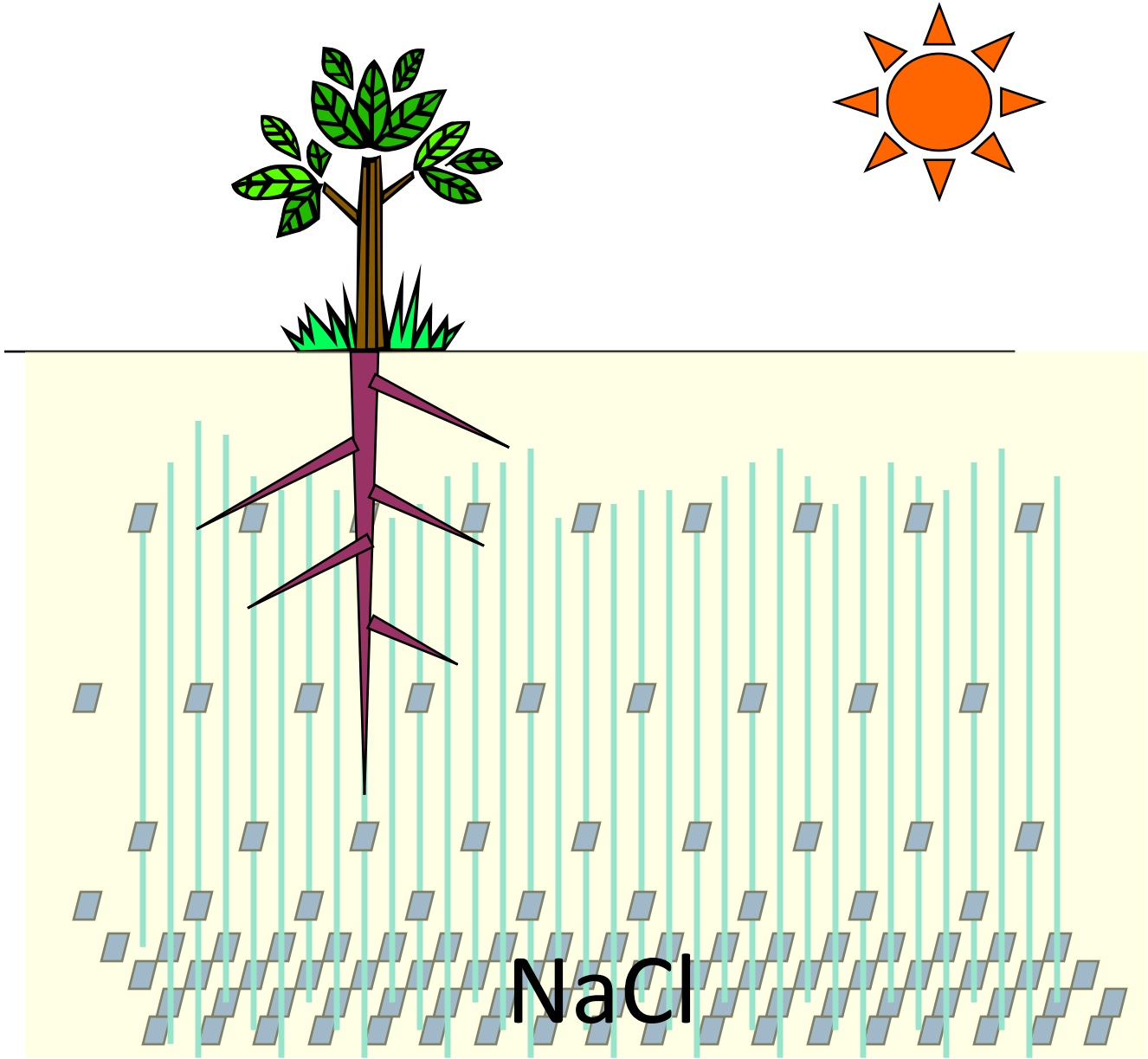


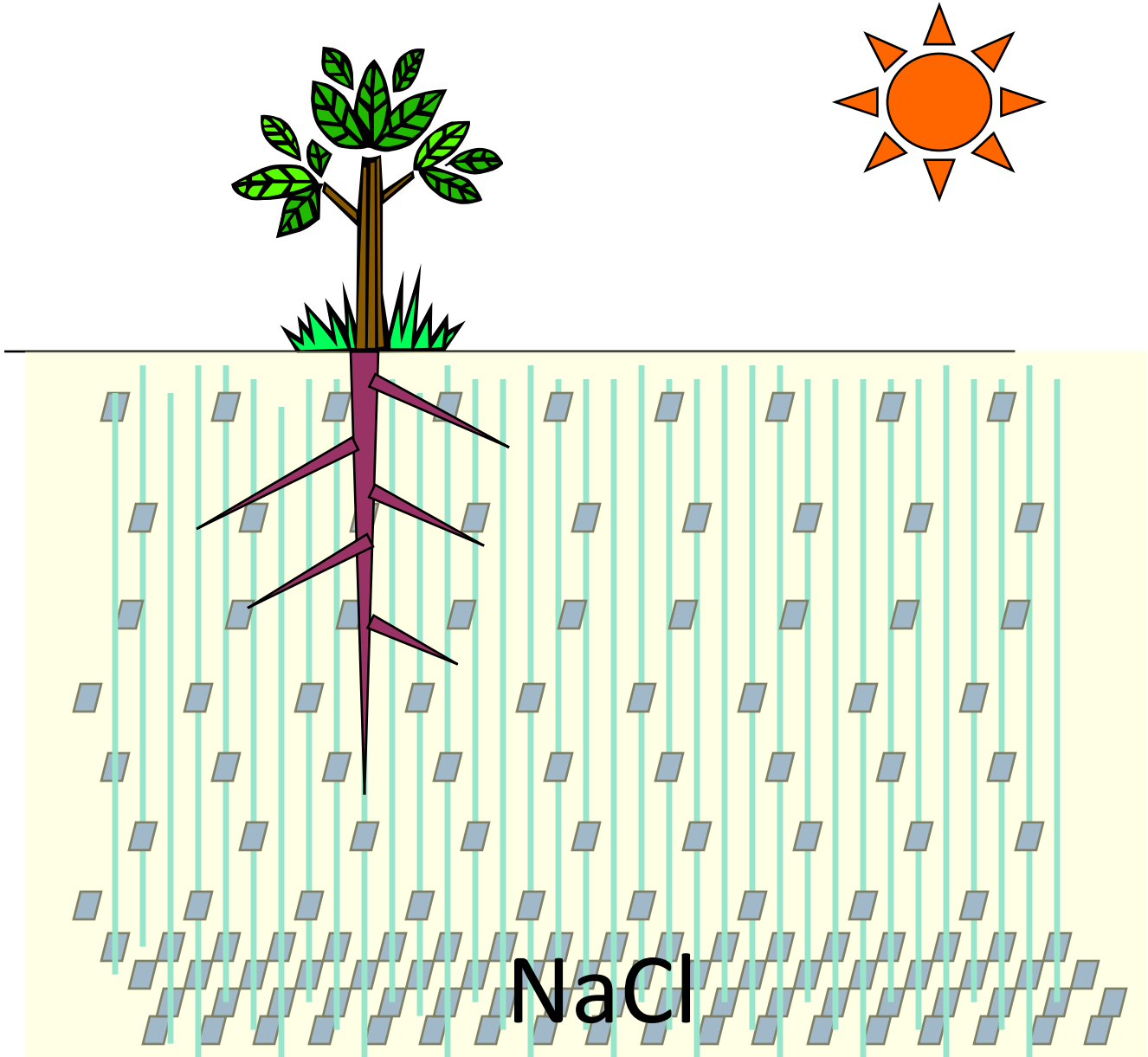


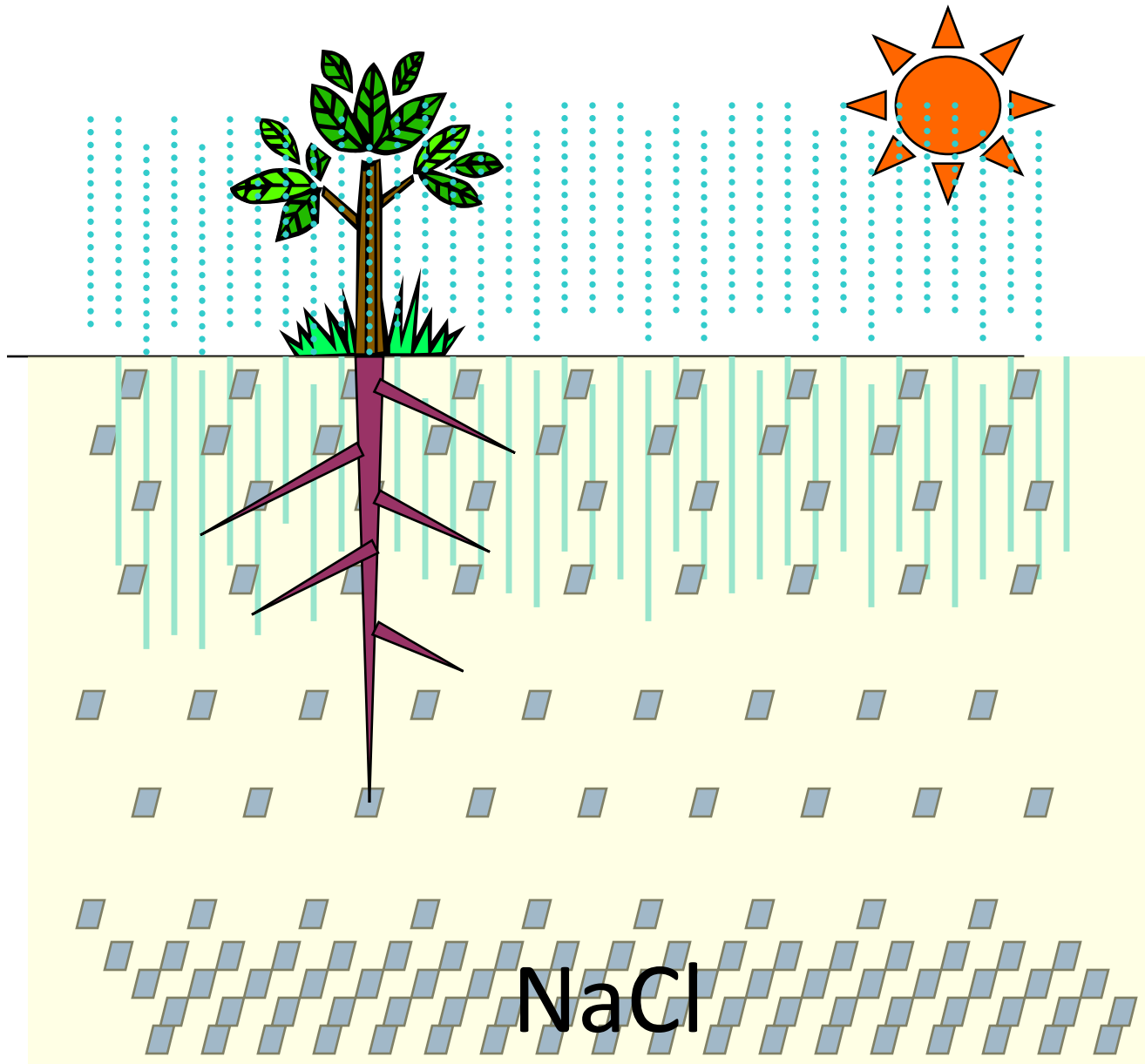


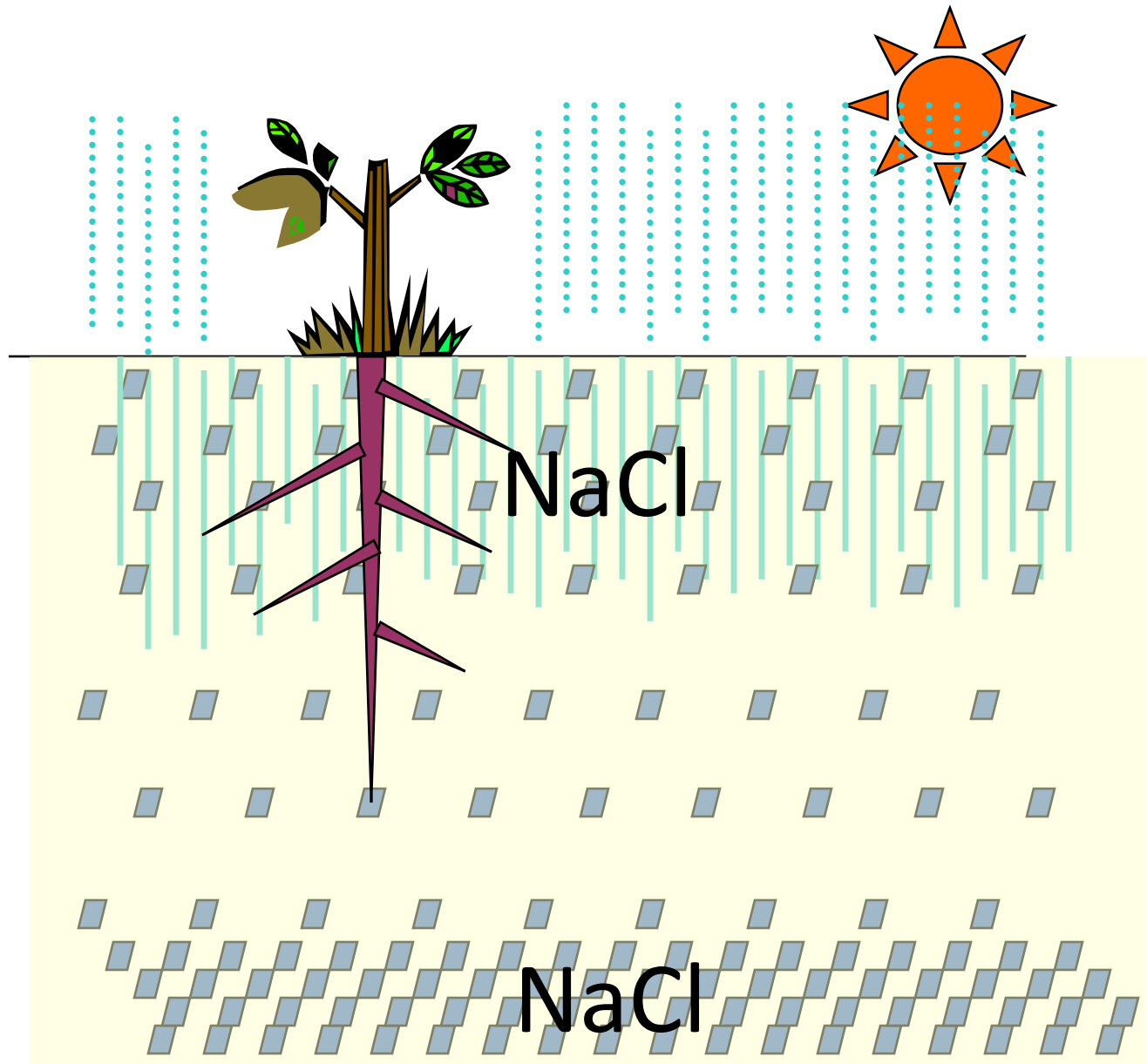


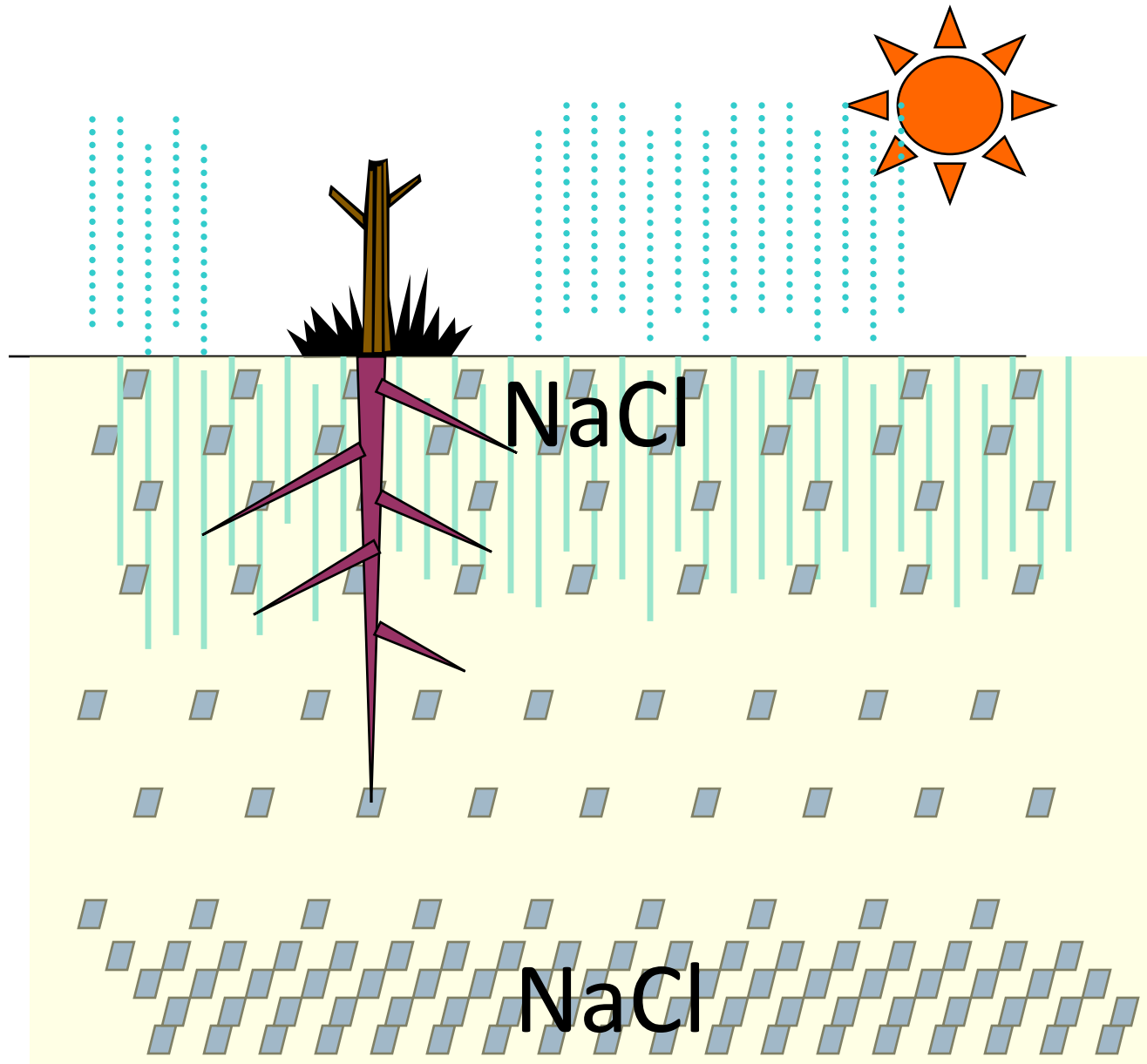


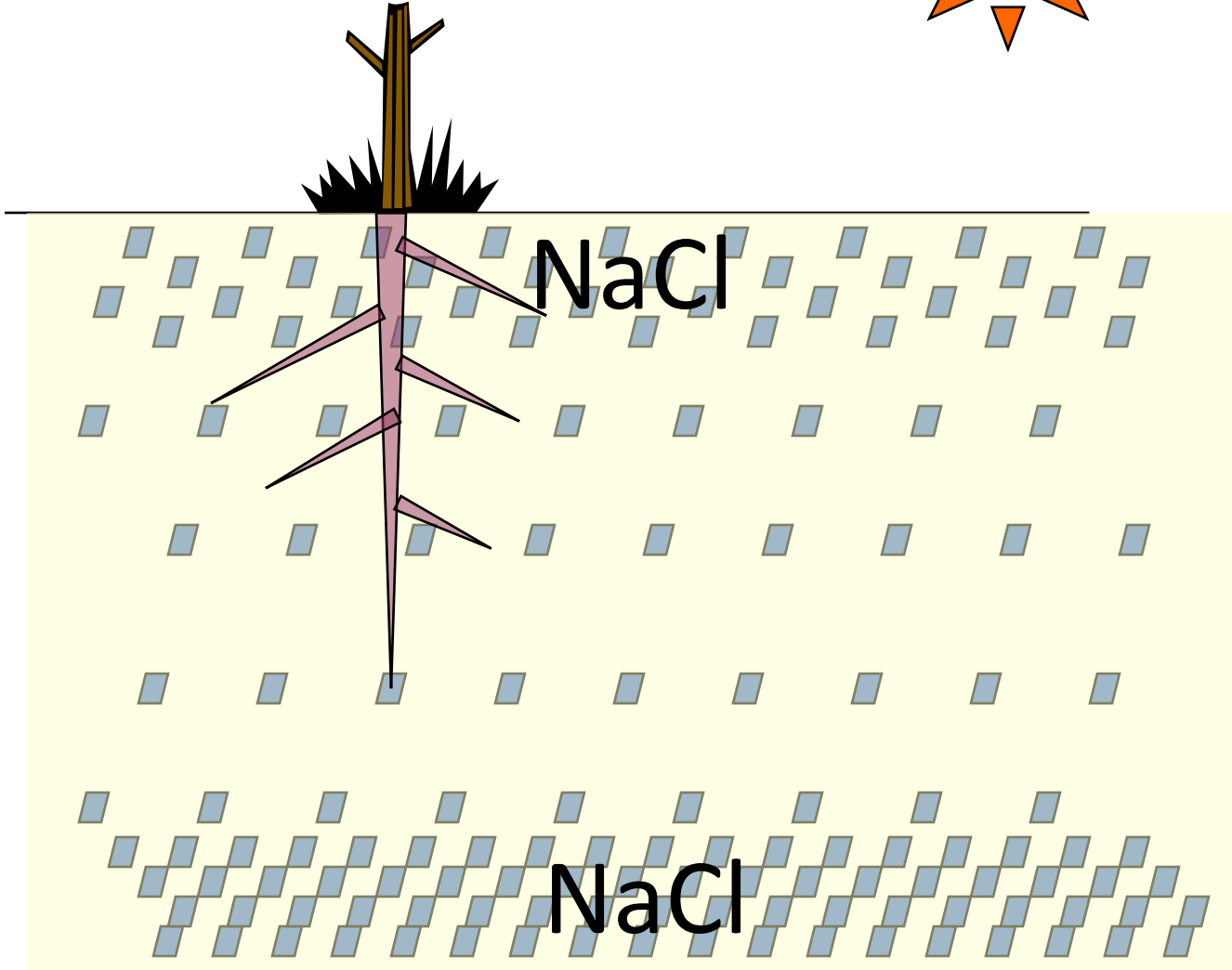
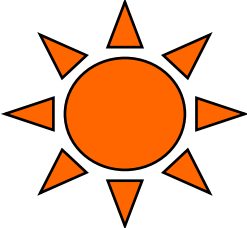






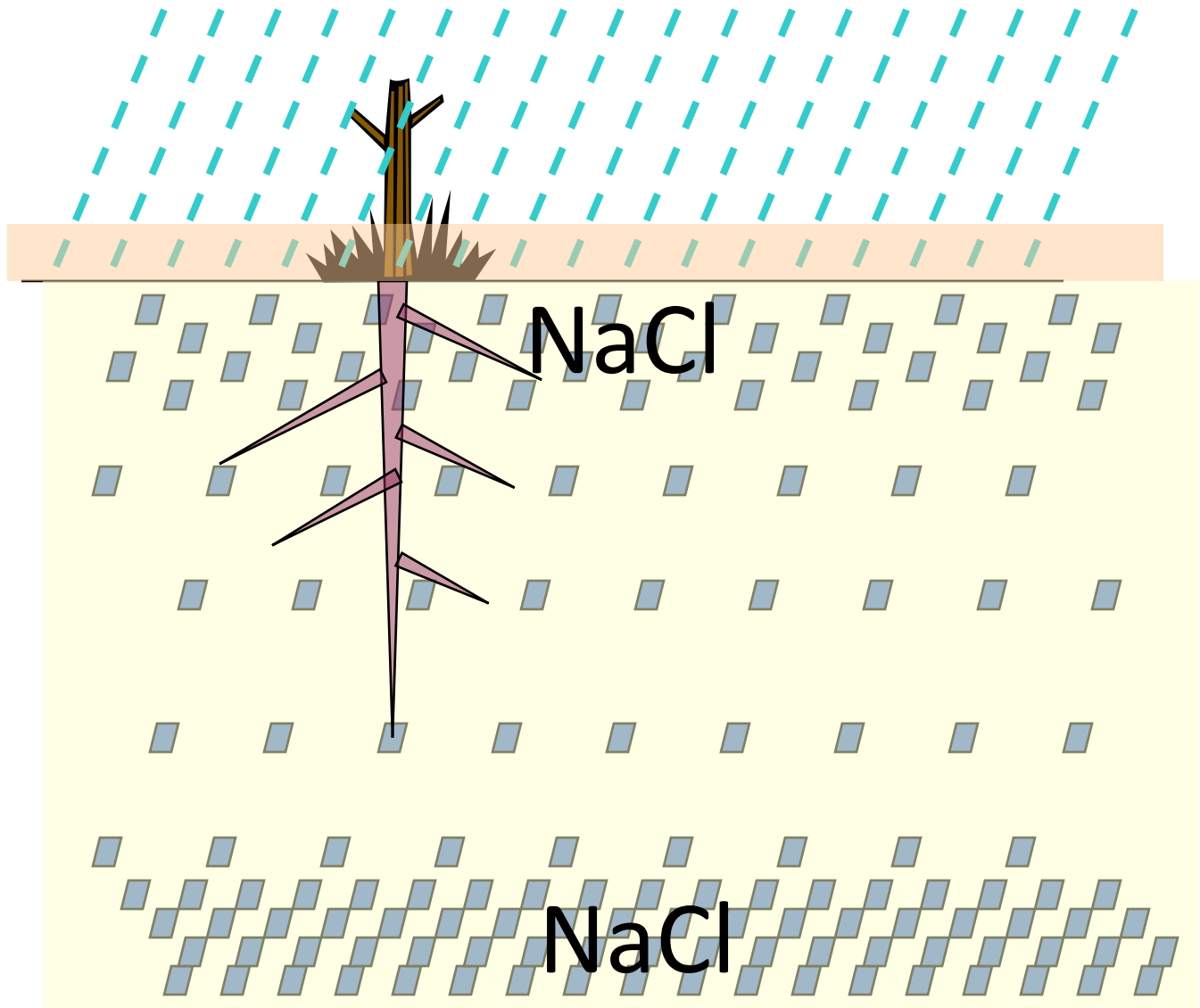


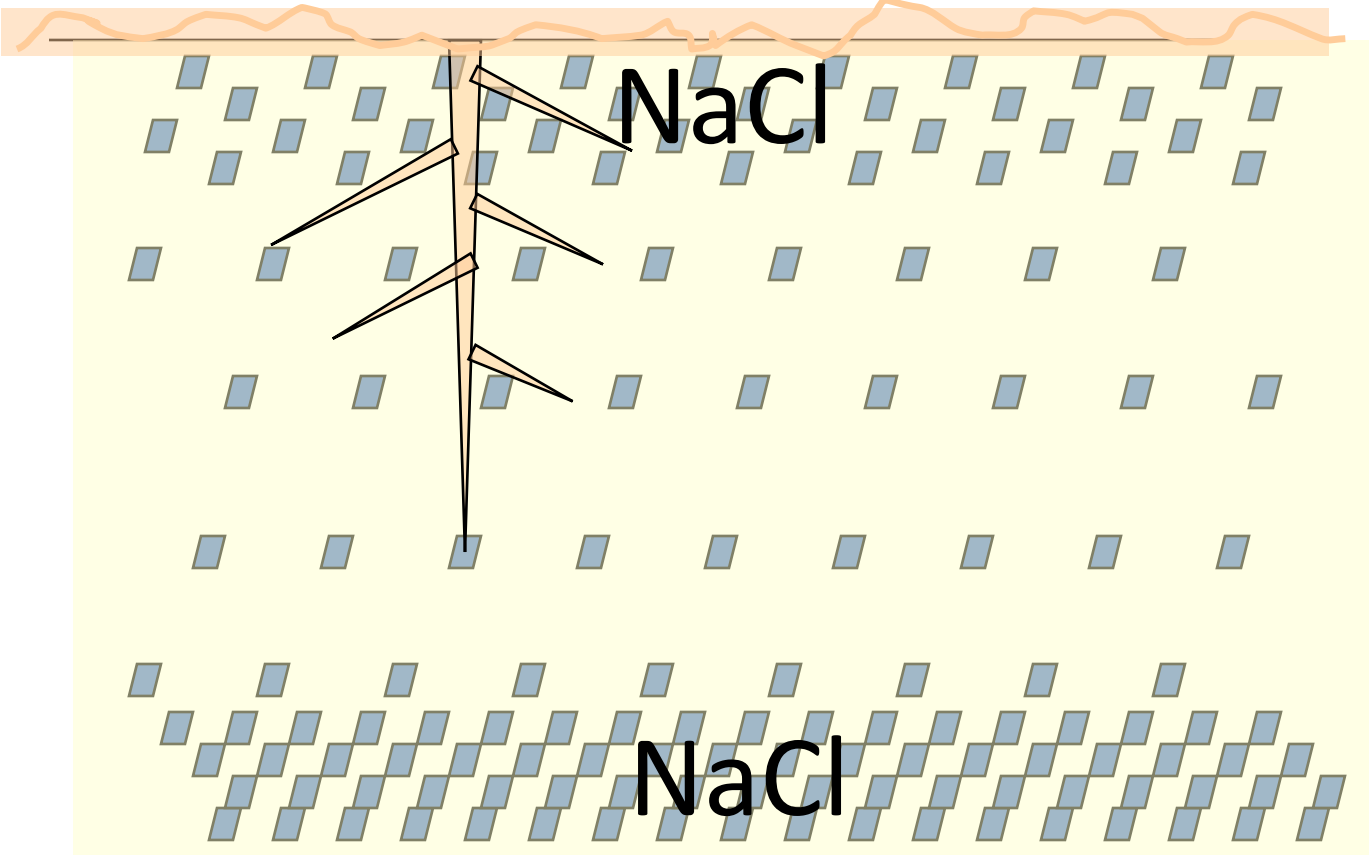


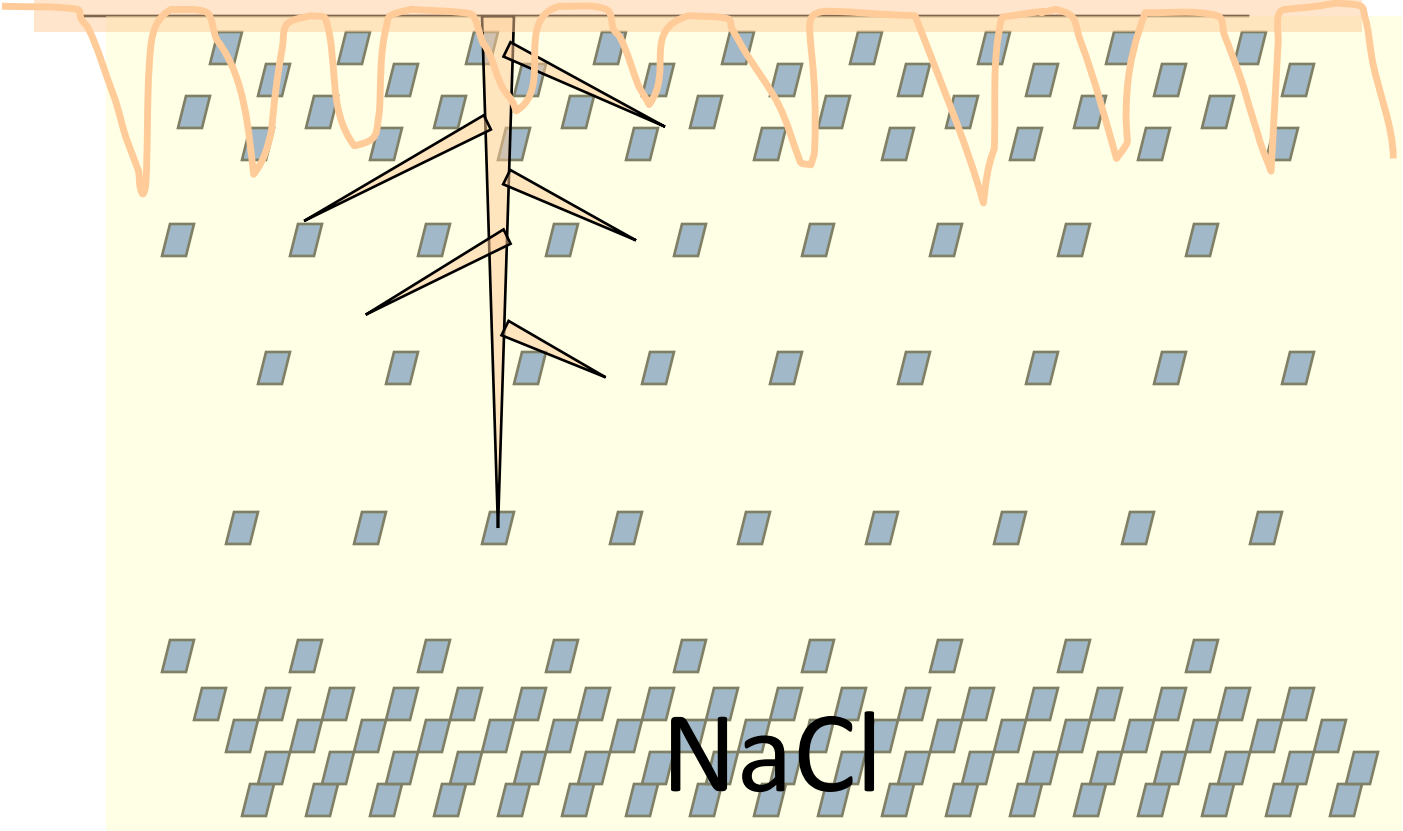


NaCl

NaCl







Improper irrigation and drainage

- Irrigation is necessary to conduct agriculture in the dry land with the annual rain fall less than 250 mm.
- However, if the water is not drained properly, salts dissolved in the irrigation come out on the land surface.

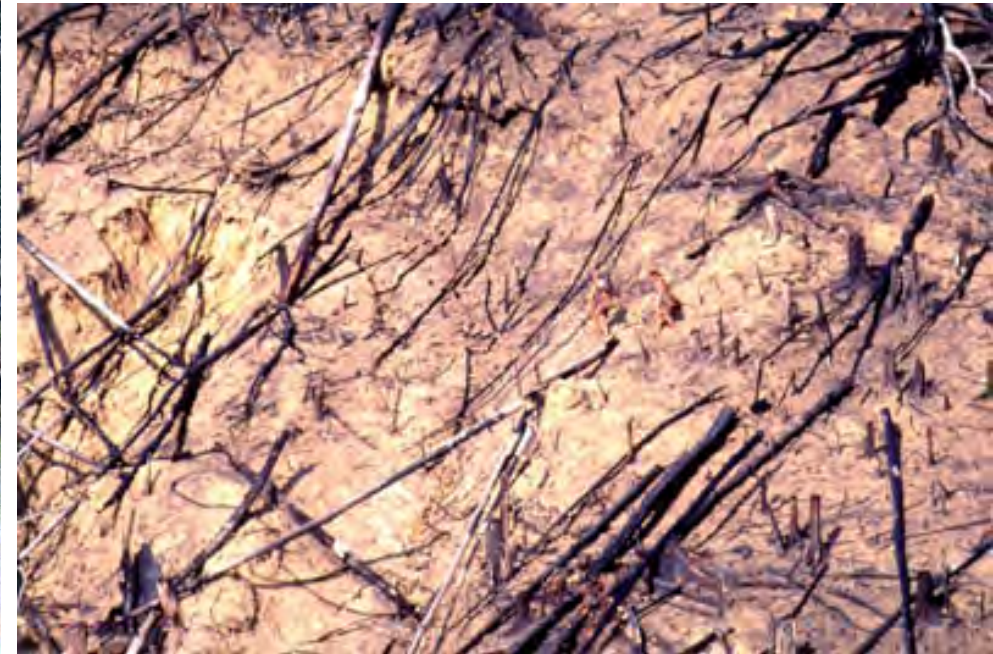
Repeated use of drained water from the fields.

- Causes the increase in salt concentration in river water.
- Total area of salinized irrigated lands in the world.
- = 20,000,000 ~ 25,000,000 ha
= 200,000 ~ 250,000 square kilometer

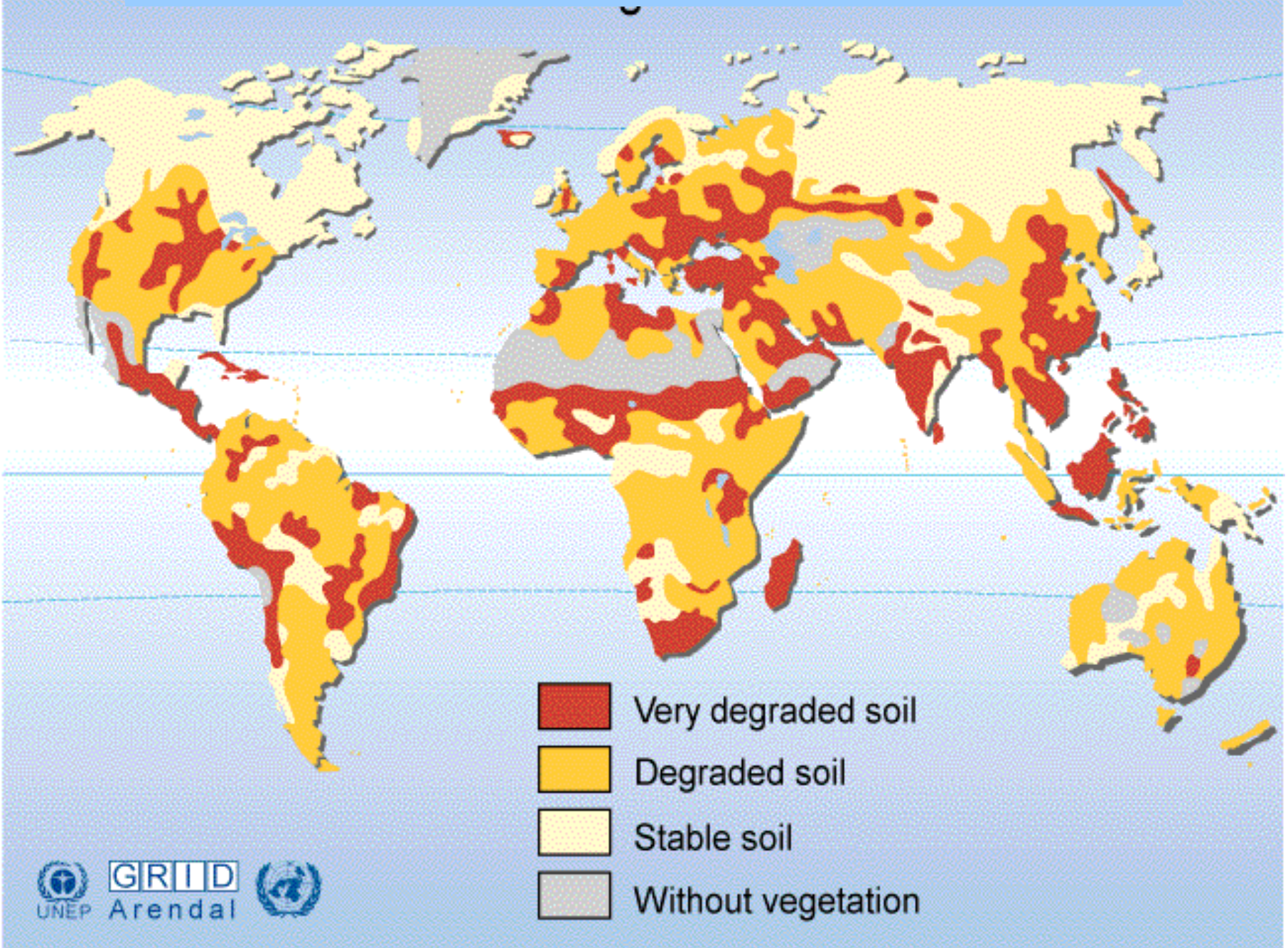
Soil erosion

Gully erosion

Due to the excess forest clearing in Borneo (Kalimantan), Indonesia
According to Nippon University.



Present state of soil erosion in the world.



Soil erosion

(Loss of fertile surface soil)

- Annual soil loss due to erosion

USA	3.1 billion tons
Etiopia	1.0 billion tons
India	6.0 billion tons
Russia	2.3 billion tons
China	5.0 billion tons

1.0 billion ton = 1 Giga ton
(= the weight of water in 1 cubic kilometer mass)

Soil loss due to erosion in Japan

- Cultivated land: 0.1~4 t (av. 1.7t) / ha
- Bare land: 0.9~103 t (av. 31.6 t) / ha
- If soil is lost at the rate of 2 t/ha from the upland field (in total 2.4 million ha) in Japan,

Sum of the lost soil will be

around 5 million t / year.

Amount of soil blown off by wind. (Yokoi, 1986)

	Mg (ton)/ ha	Thickness of lost soil (cm)
Non plowed land	0 ~ 30	0 ~ 0.30
Autumn plowed (humic soil)	20 ~ 50	0.20 ~ 0.50
Autumn plowed (subsoil)	40 ~ 100	0.40 ~ 1.00
Spring plowed	120 ~ 200	1.20 ~ 2.00

Loss of soil by wind erosion

- Wind erosion in volcanic ash and sand dune area.
- More the 50 % of the land is bare (uncovered) in winter and early spring in Hokkaido.
- 6 – 9 cm of plowed layer soil is lost annually.
Equivalent to the loss of around 1,000 tons / ha.

Wind erosion in Australia

