

# ECOSYSTEM SERVICES

## Session 4 - IMPRINT+ Training course



imPRI+<sup>+</sup>



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**Ecosystem** - a group of interconnected elements, formed by the interaction of a community of organisms with their environment.





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**Service** - A system supplying a public need.

- The action of helping or doing work for someone.
- An act of assistance.
- **Providing something.**



**Ecosystem services** - The benefits people obtain from ecosystems.

**“Ecosystems and Human Well-Being: Synthesis.”**

- Millennium Ecosystem Assessment, 2005.





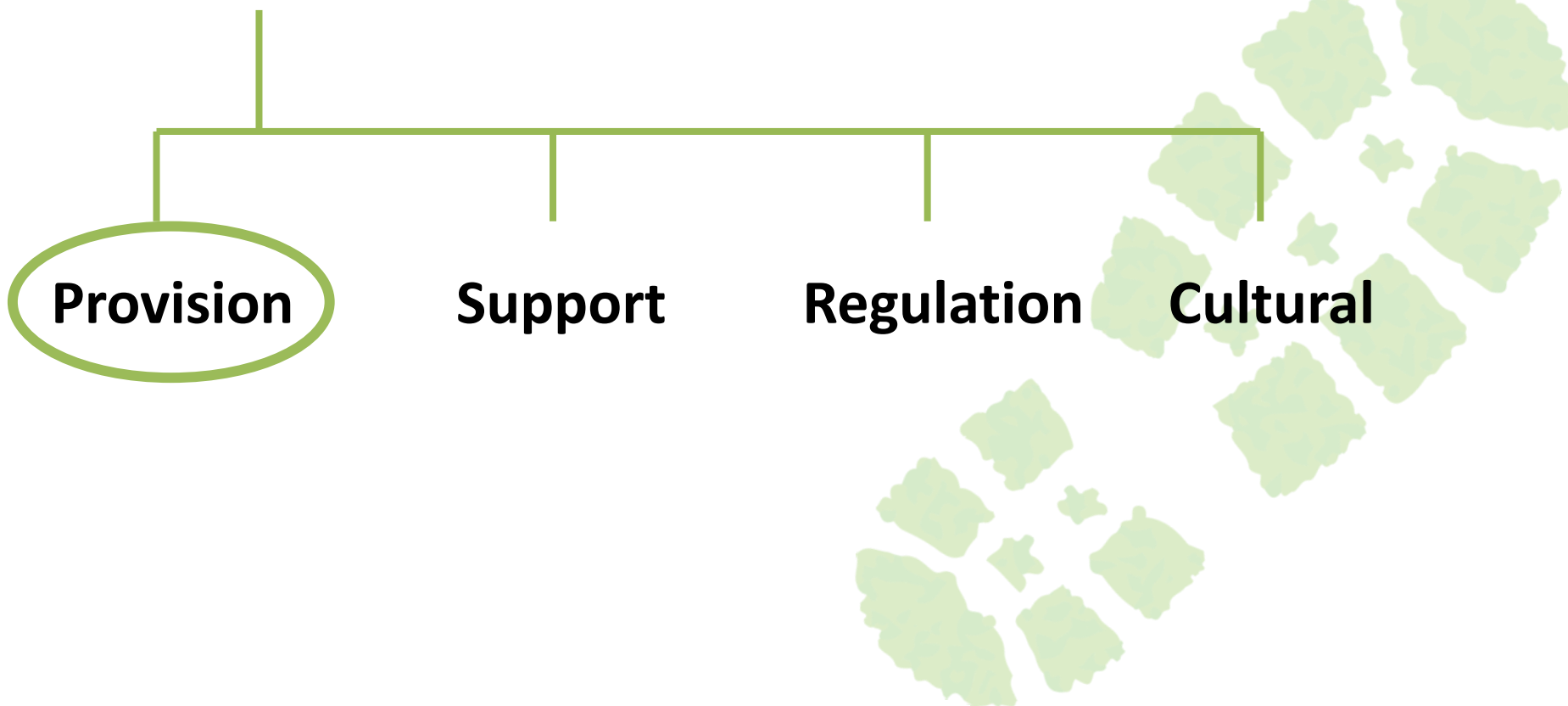
**Ecosystem services** - The benefits people obtain from ecosystems.



**Can you identify ecosystem services in this landscape?**



### Ecosystem services



### Provisioning services

Products obtained from ecosystems.





### Provisioning services - FOOD





### Provisioning services - FRESH WATER





### Provisioning services - FIBER



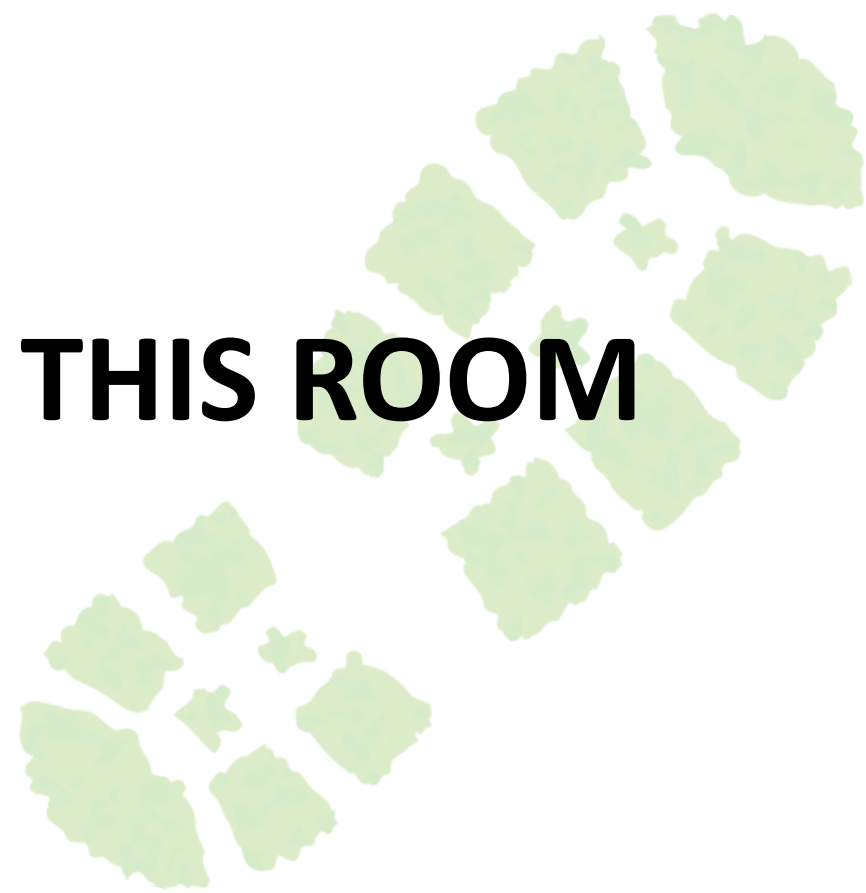
### Provisioning services - FUEL



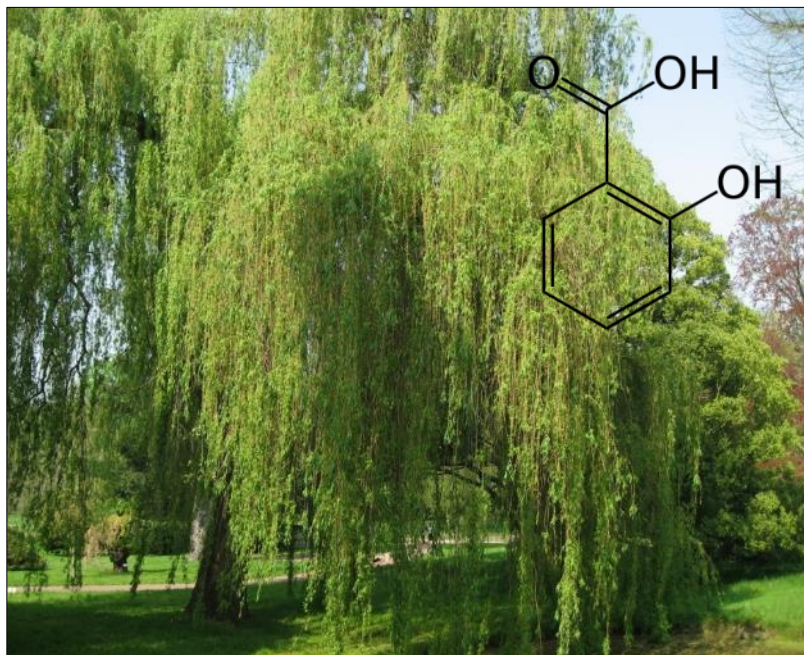


Provisioning services

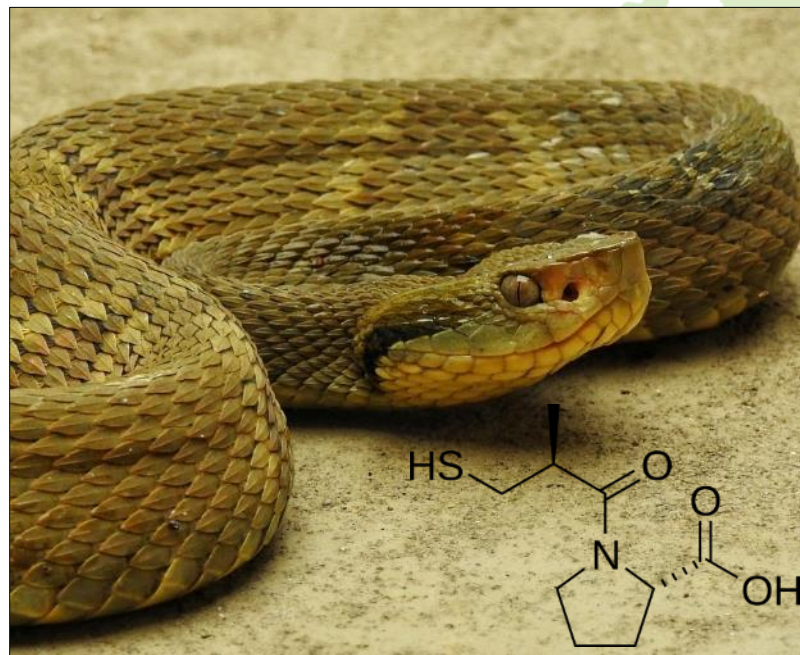
**EVERYTHING IN THIS ROOM**



### Provisioning services - MEDICINE



Aspirin was developed from salicylic acid, found in willow tree bark.



ACE inhibitors, hypertension and heart failure medicine, were developed from the venom of *Bothrops jararaca*.



### Provisioning services – GENETIC RESOURCES



### Provisioning services - PETS



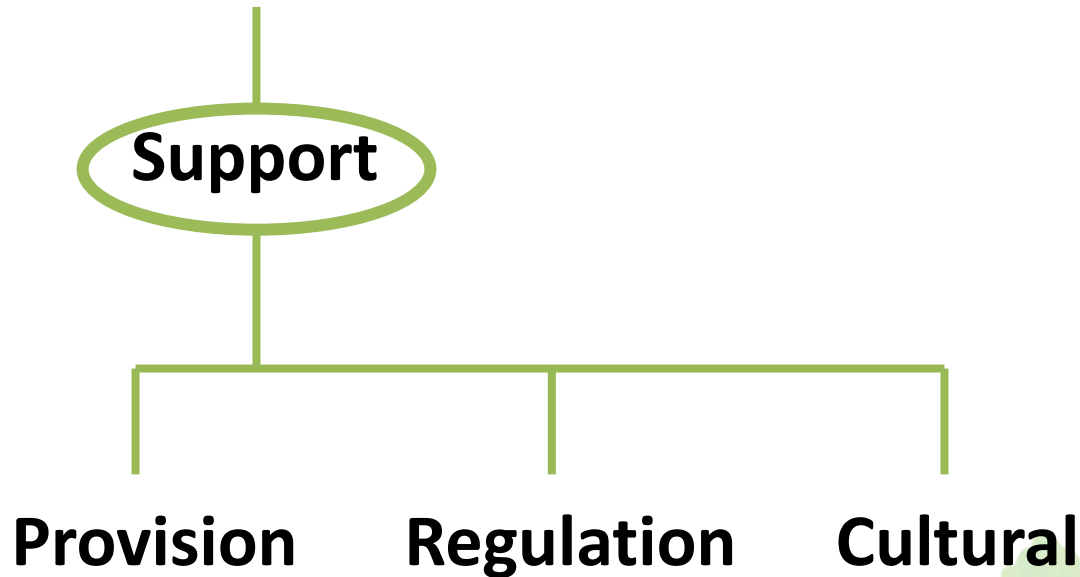


### Ecosystem services



**Actually.....**

### Ecosystem services



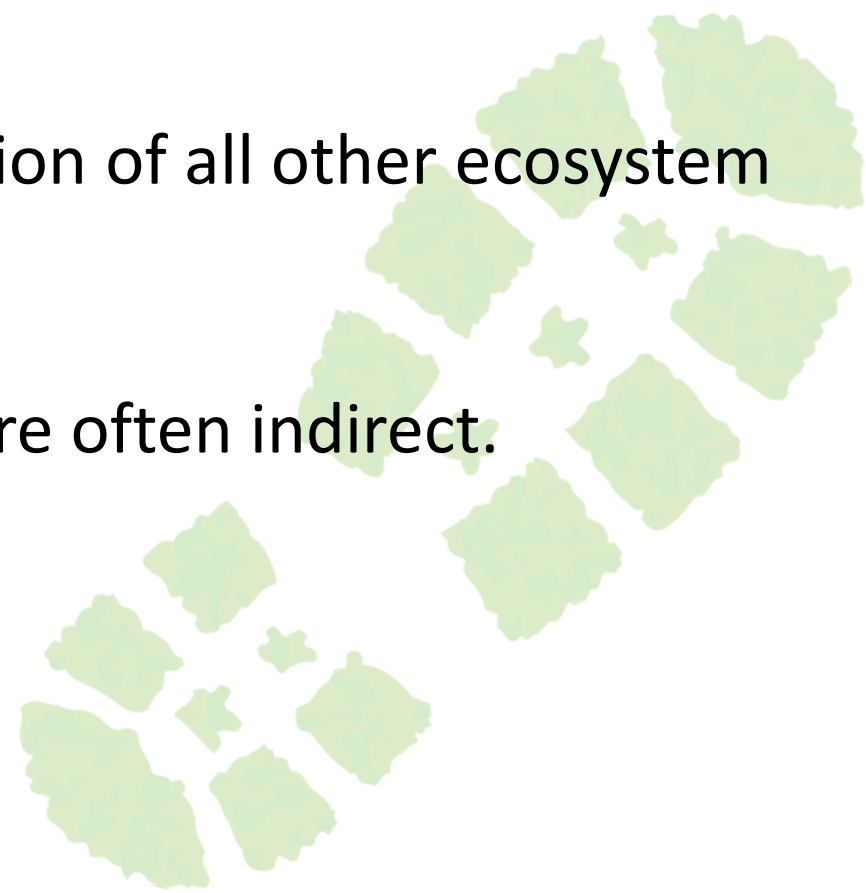
**....it's more like this.**



## Supporting services

Necessary for the production of all other ecosystem services.

Their impacts on people are often indirect.

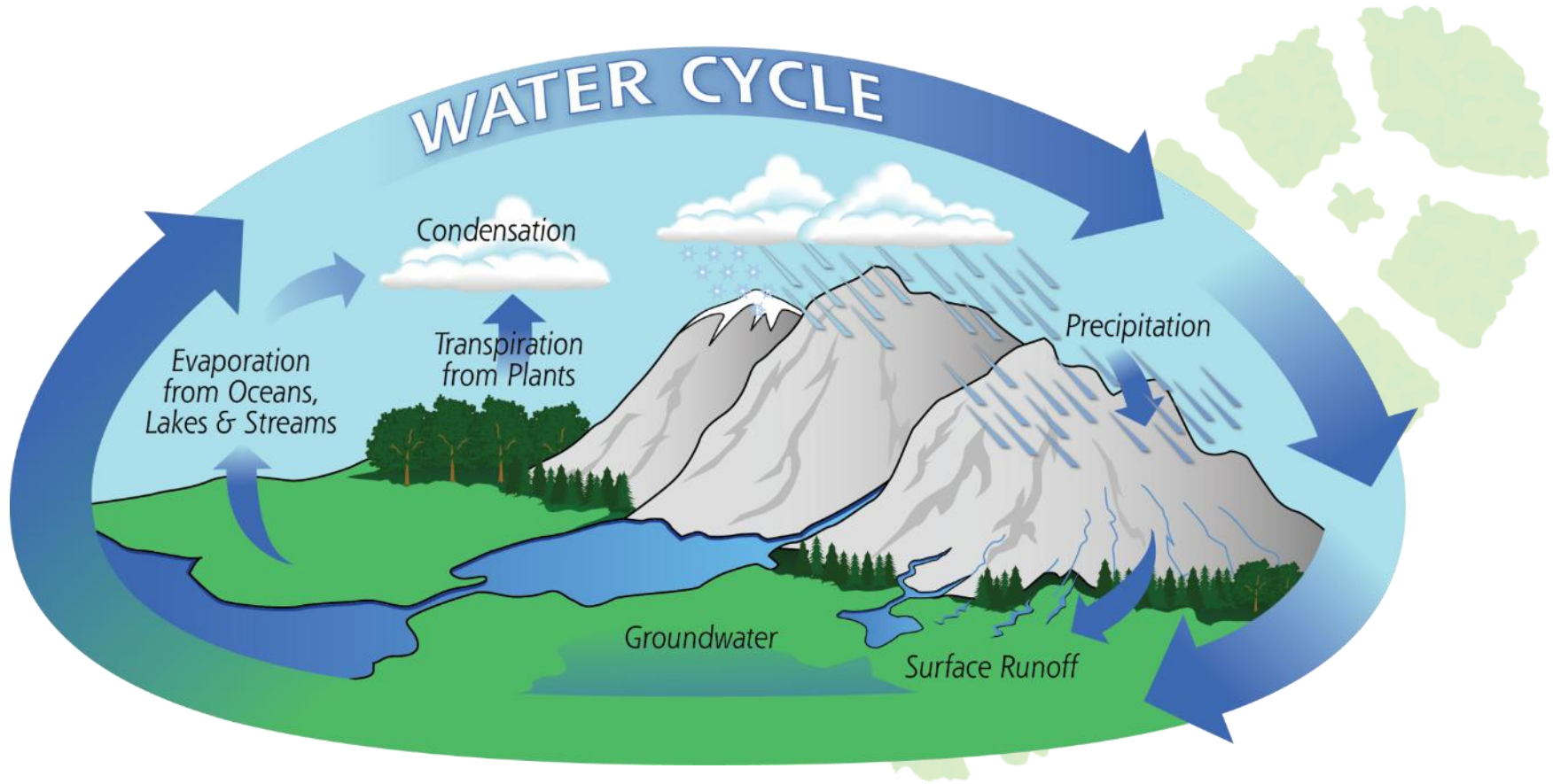


### Supporting services – WATER CYCLE





### Supporting services – WATER CYCLE

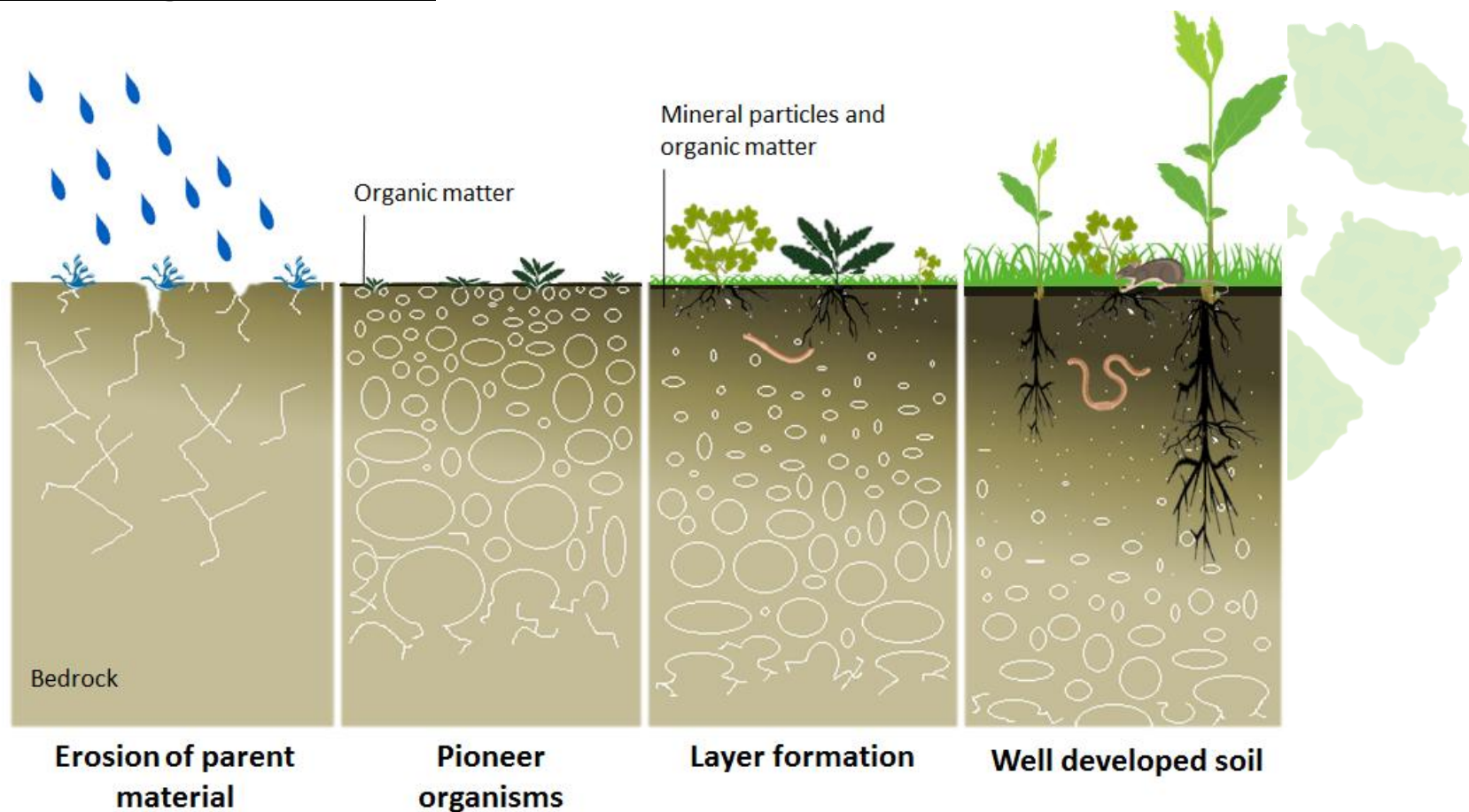


### Supporting services - SOIL FORMATION





### Supporting services – SOIL FORMATION

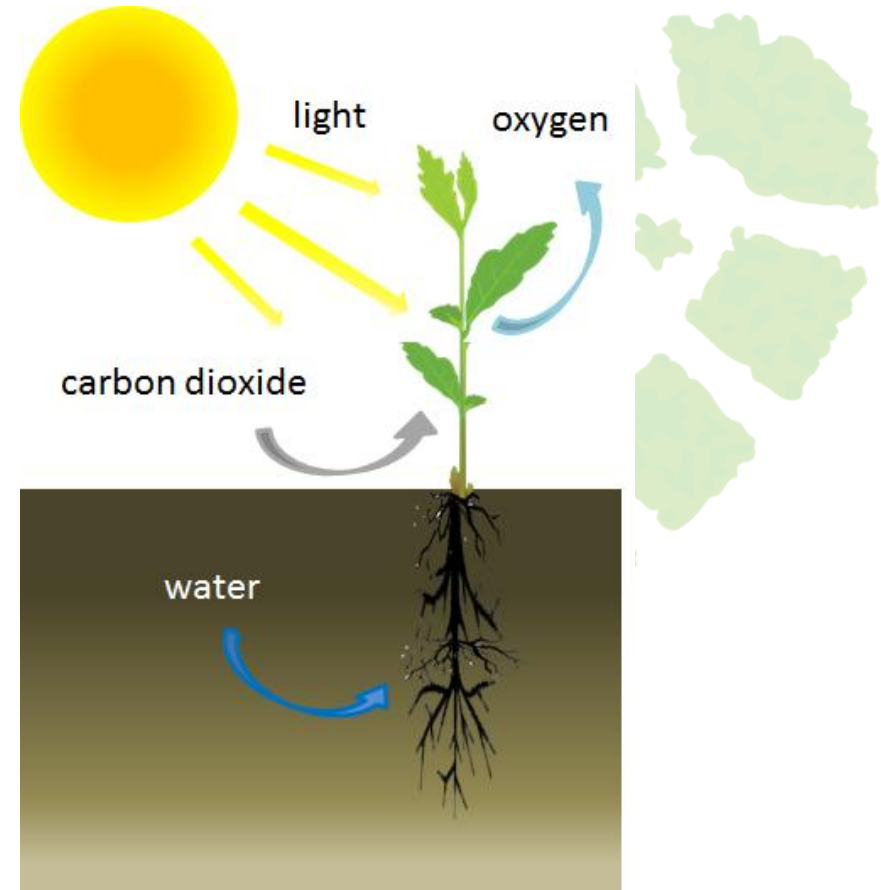
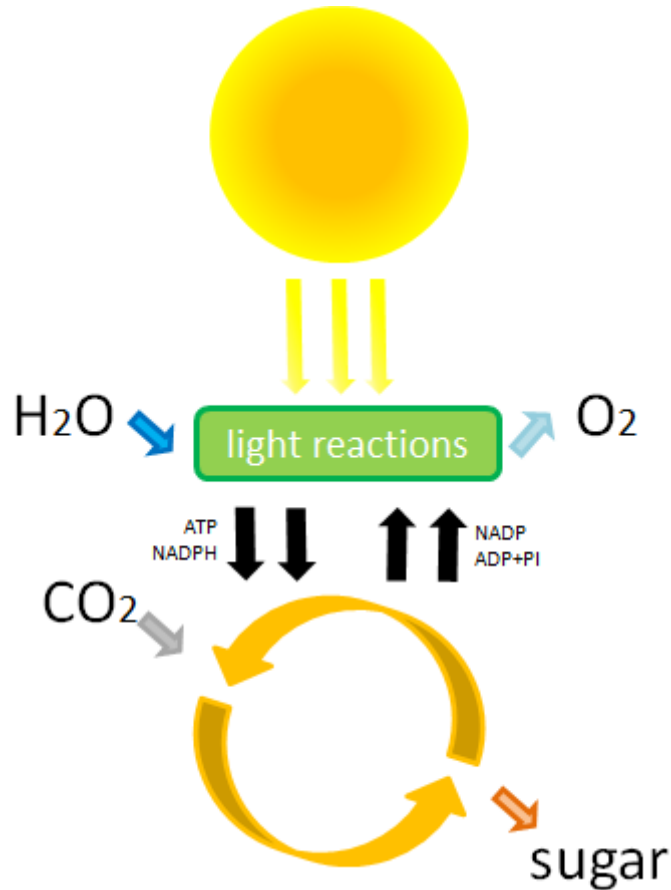


### Supporting services – PHOTOSYNTHESIS



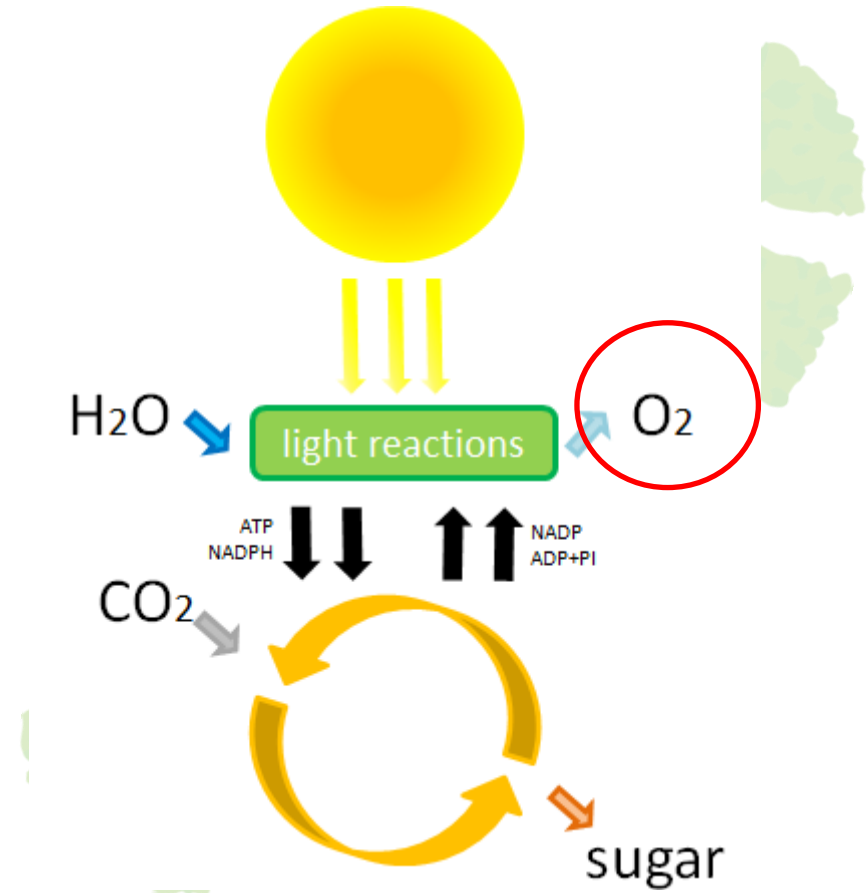


### Supporting services – PHOTOSYNTHESIS



## Supporting services – PHOTOSYNTHESIS

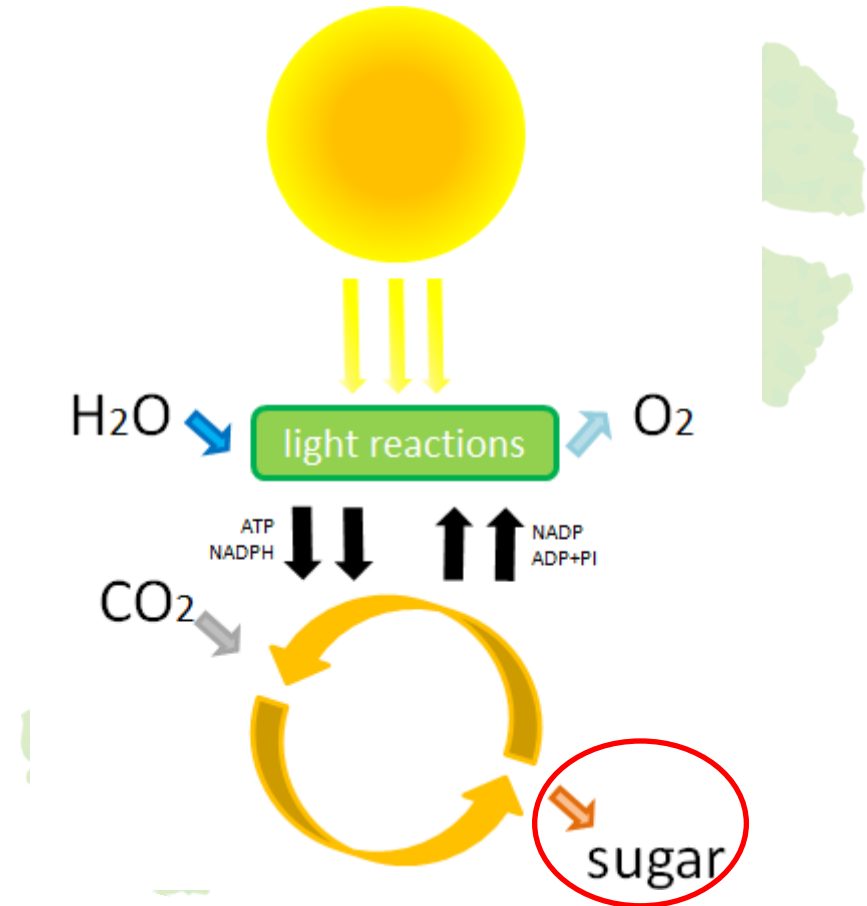
- Oxygen





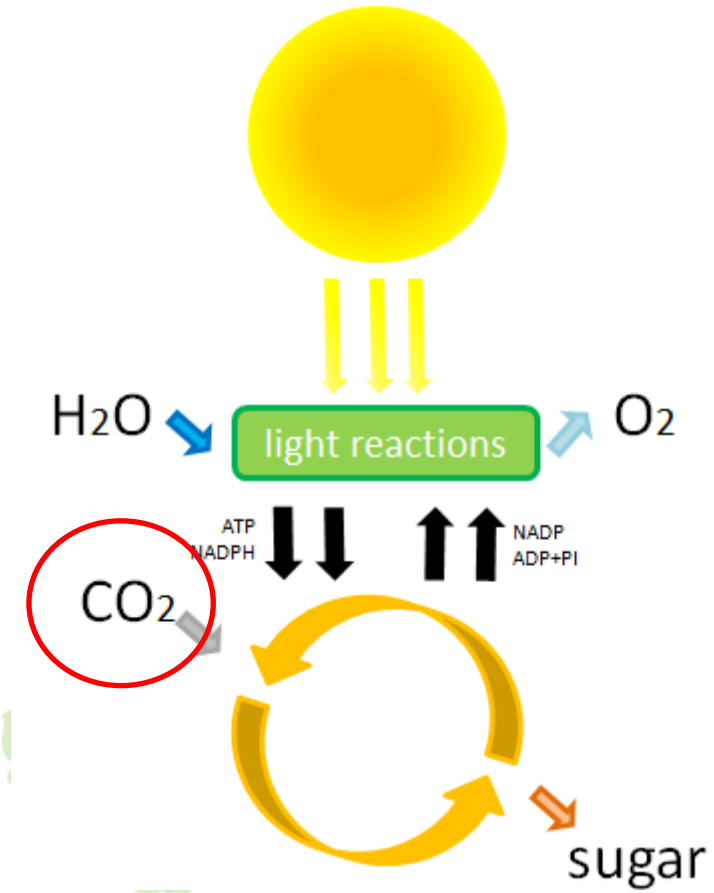
### Supporting services – PHOTOSYNTHESIS

- Oxygen
- Primary production



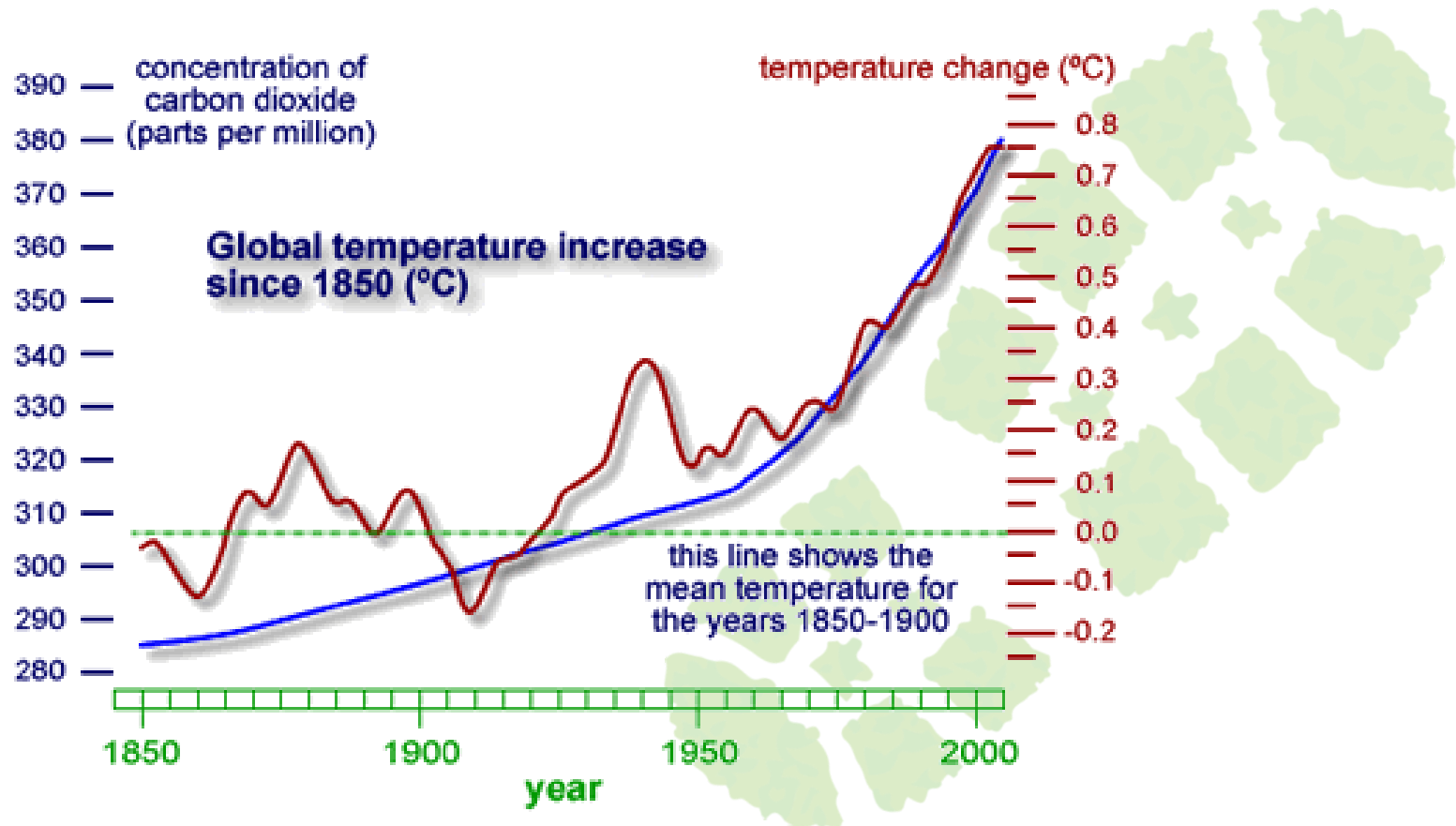
### Supporting services – PHOTOSYNTHESIS

- Oxygen
- Primary production
- Carbon sequestration





### Supporting services – PHOTOSYNTHESIS



### Supporting services – NUTRIENT CYCLING





### Supporting services – NUTRIENT CYCLING

#### Producers





### Supporting services – NUTRIENT CYCLING

#### Primary consumers



### Supporting services – NUTRIENT CYCLING

#### Secondary consumers





### Supporting services – NUTRIENT CYCLING

#### Tertiary consumers





### Supporting services – NUTRIENT CYCLING

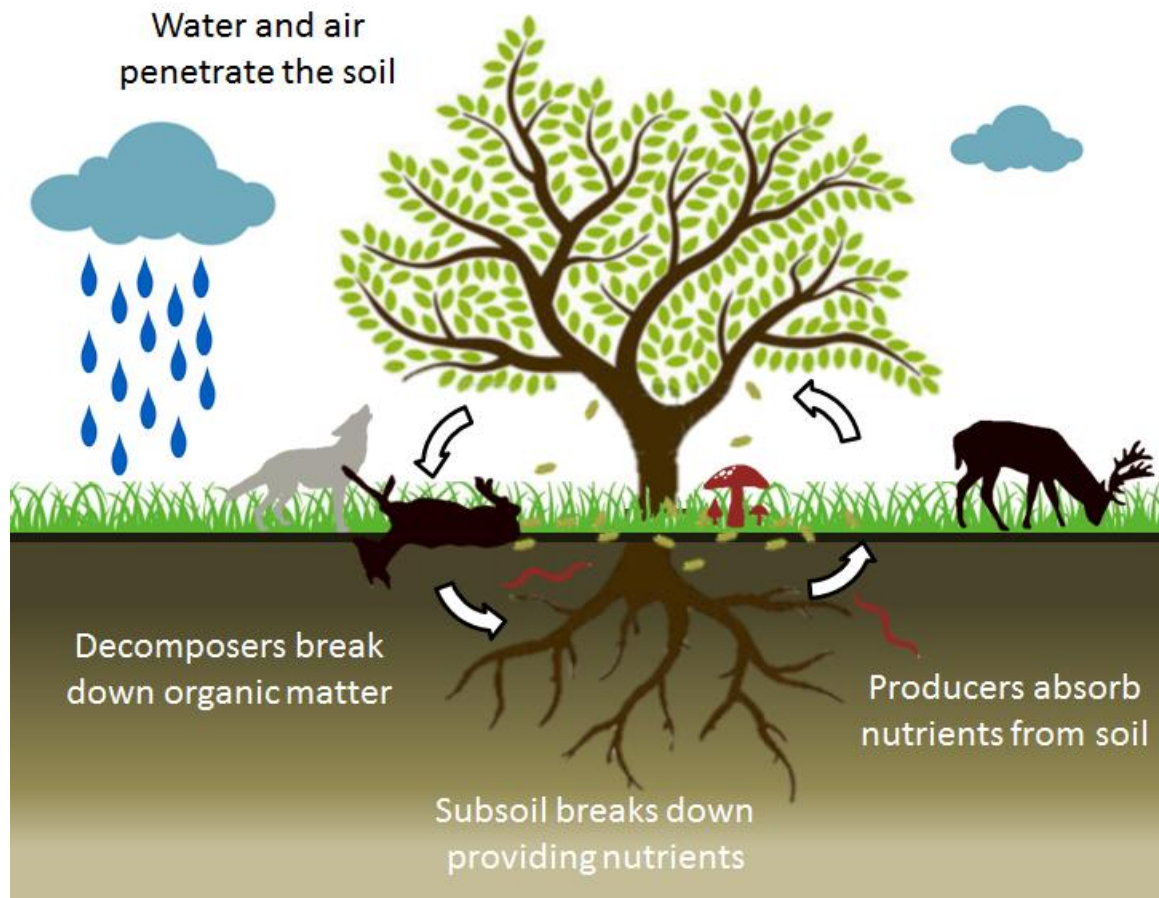
#### Decomposers



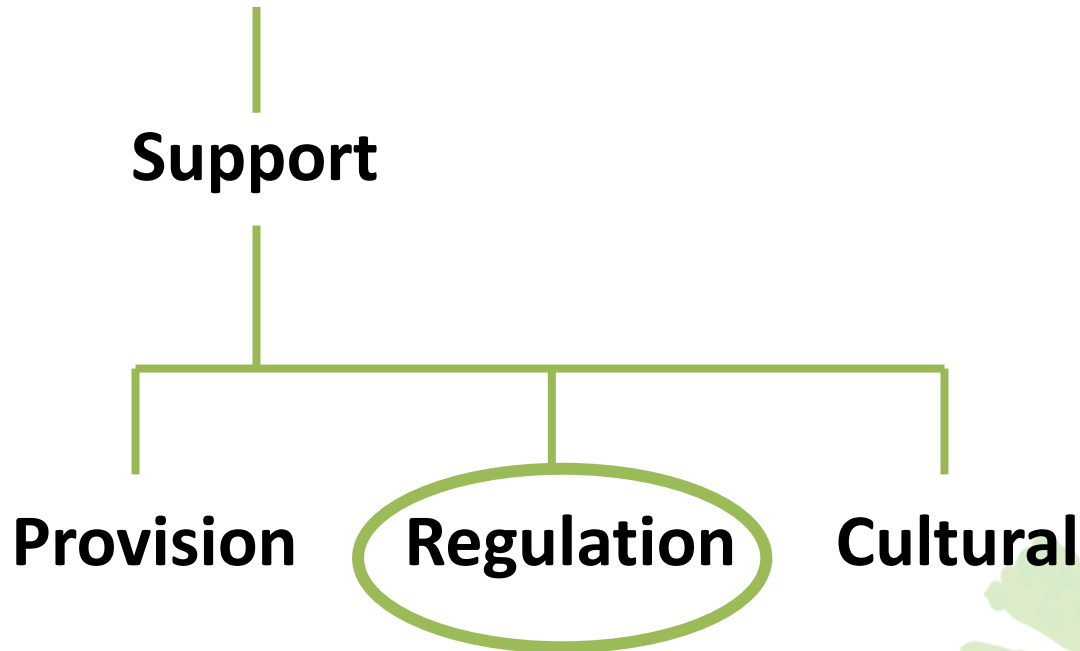
### Supporting services – NUTRIENT CYCLING

#### Essential elements:

- Carbon
- Phosphorus
- Potassium
- Iodine
- Nitrogen
- Calcium
- Iron
- Etc...



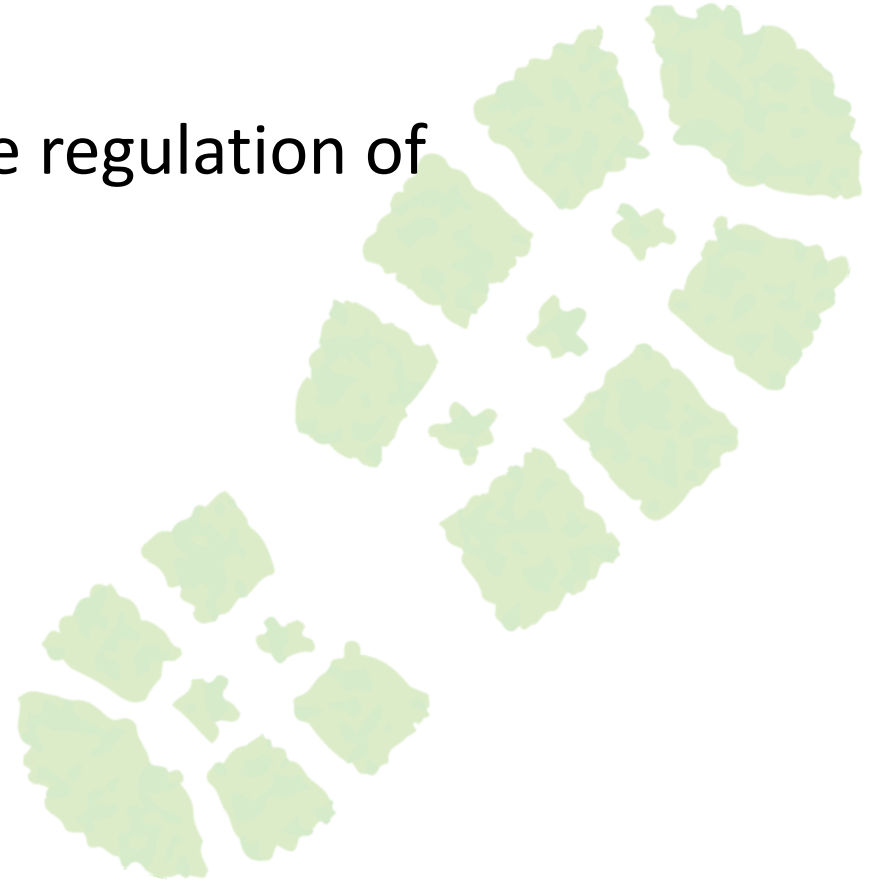
### Ecosystem services



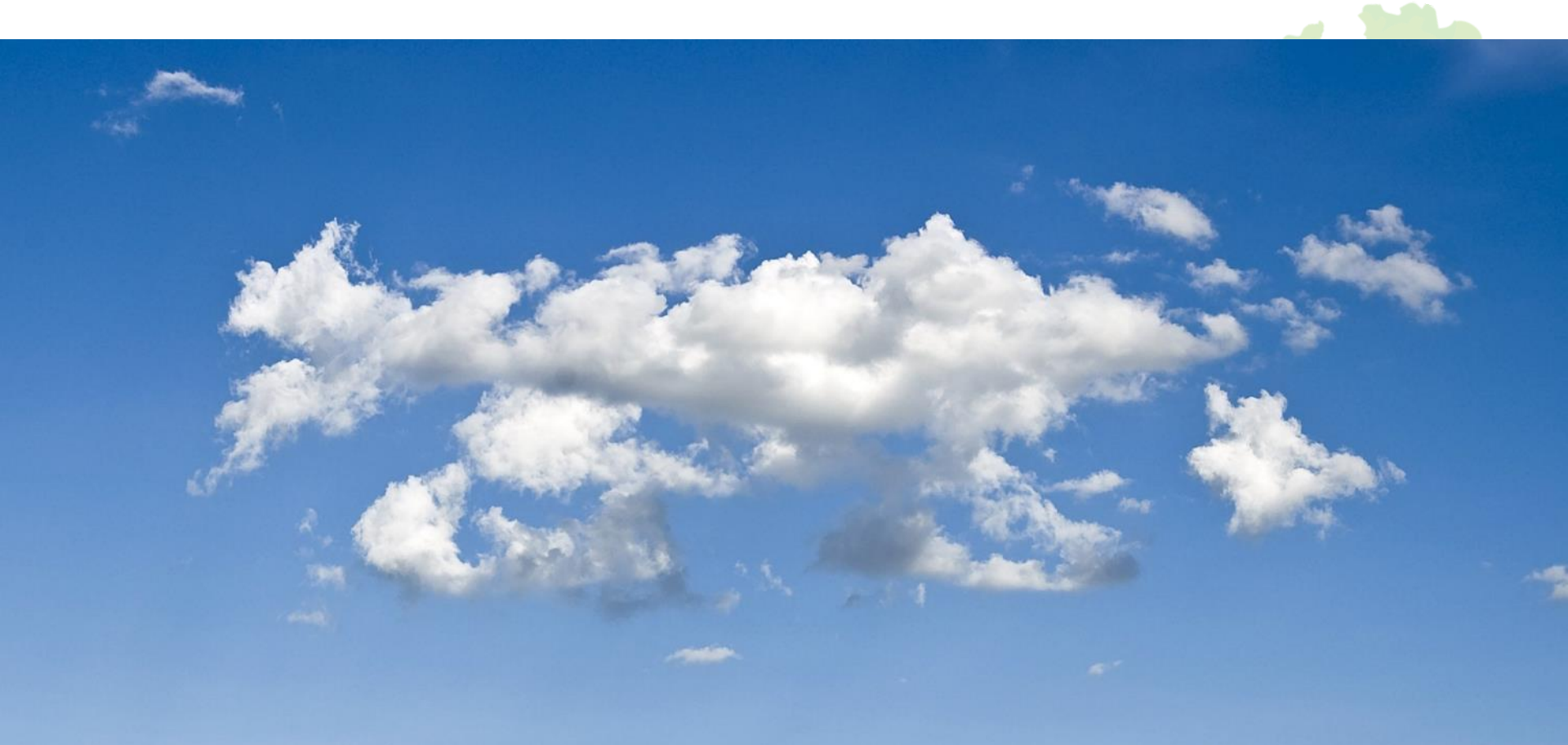


## Regulating services

Benefits obtained from the regulation of ecosystem processes.



### Regulating services – Air quality regulation



### Regulating services – Climate regulation





### Regulating services – Water regulation

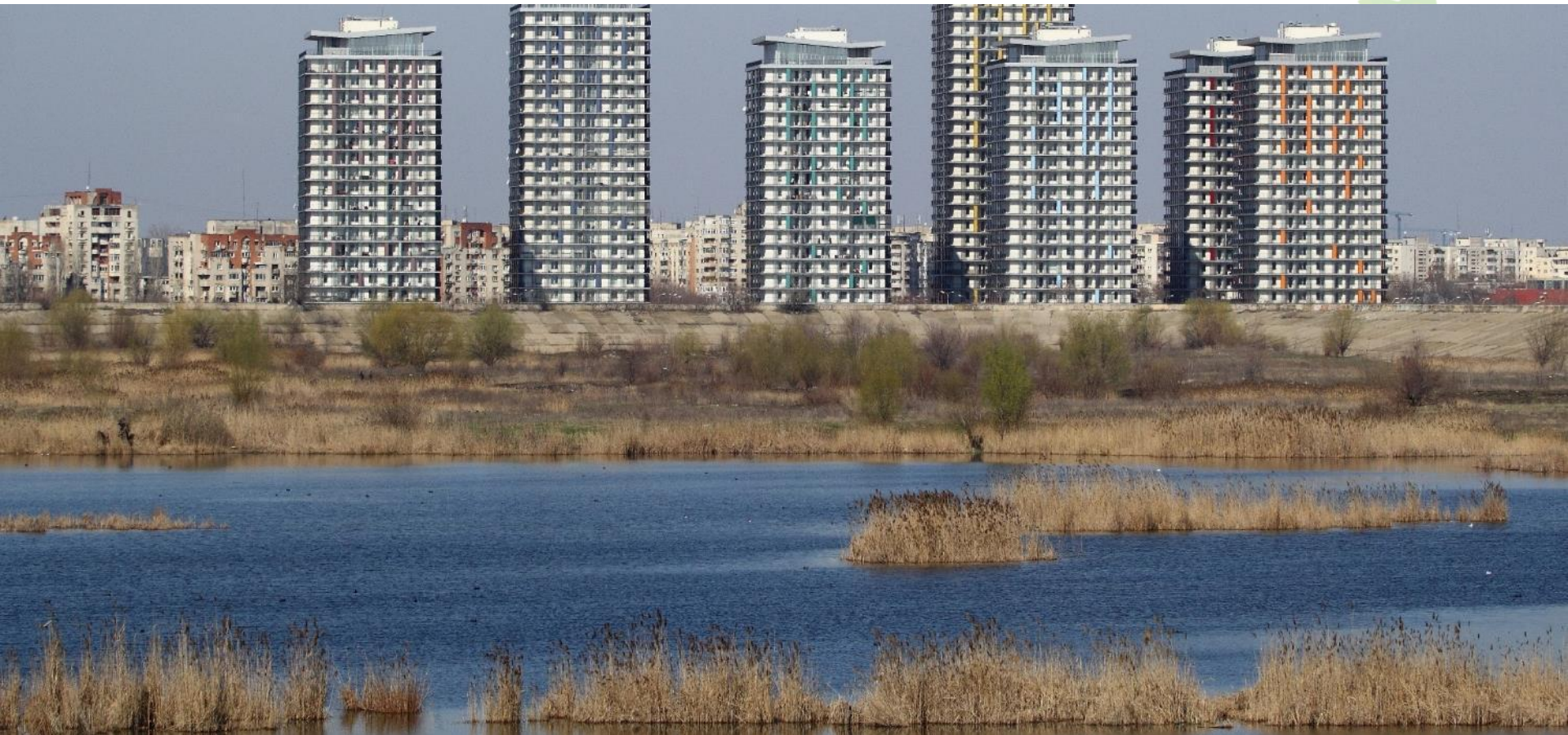


### Regulating services – Erosion regulation



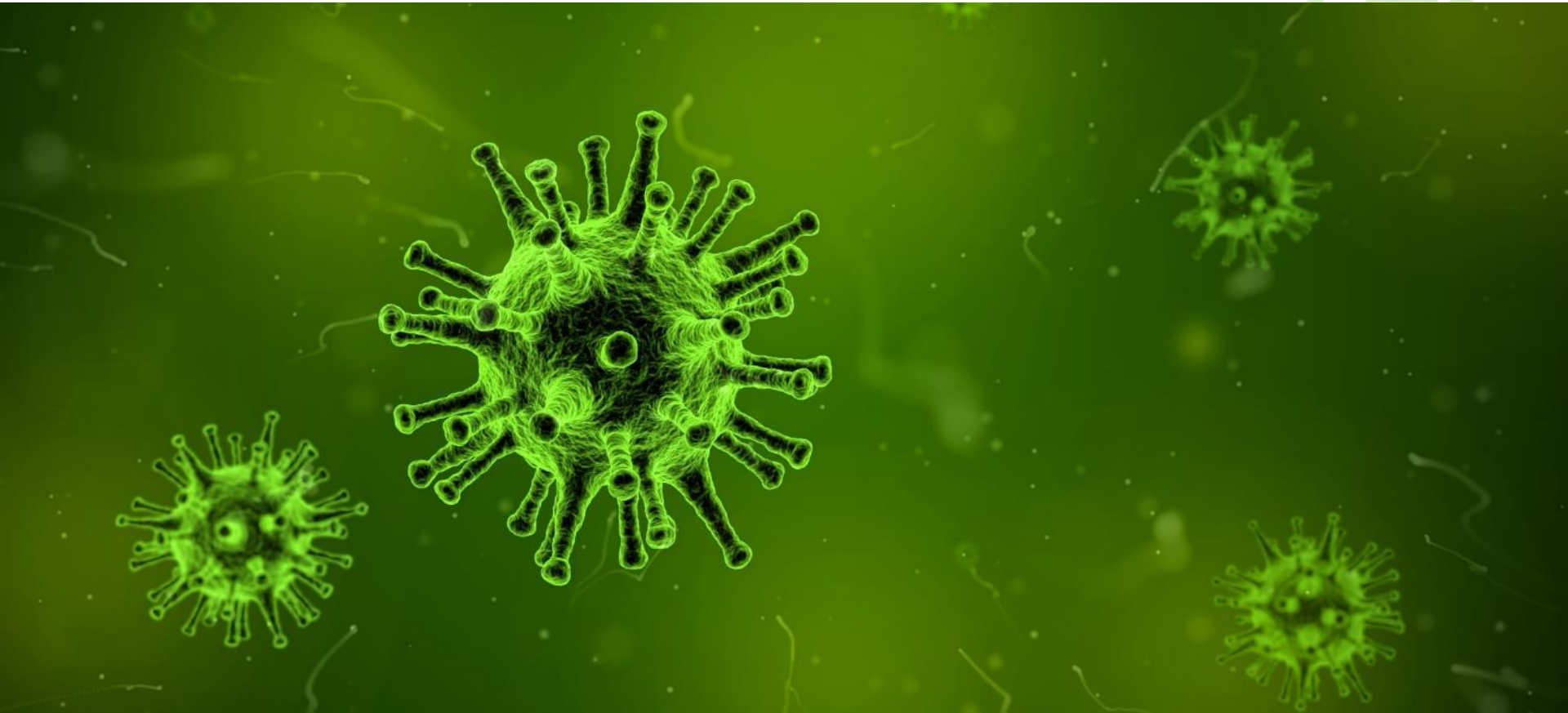


### Regulating services – Water purification and waste treatment





### Regulating services – Disease regulation



### Regulating services – Pest regulation



### Regulating services – Pollination

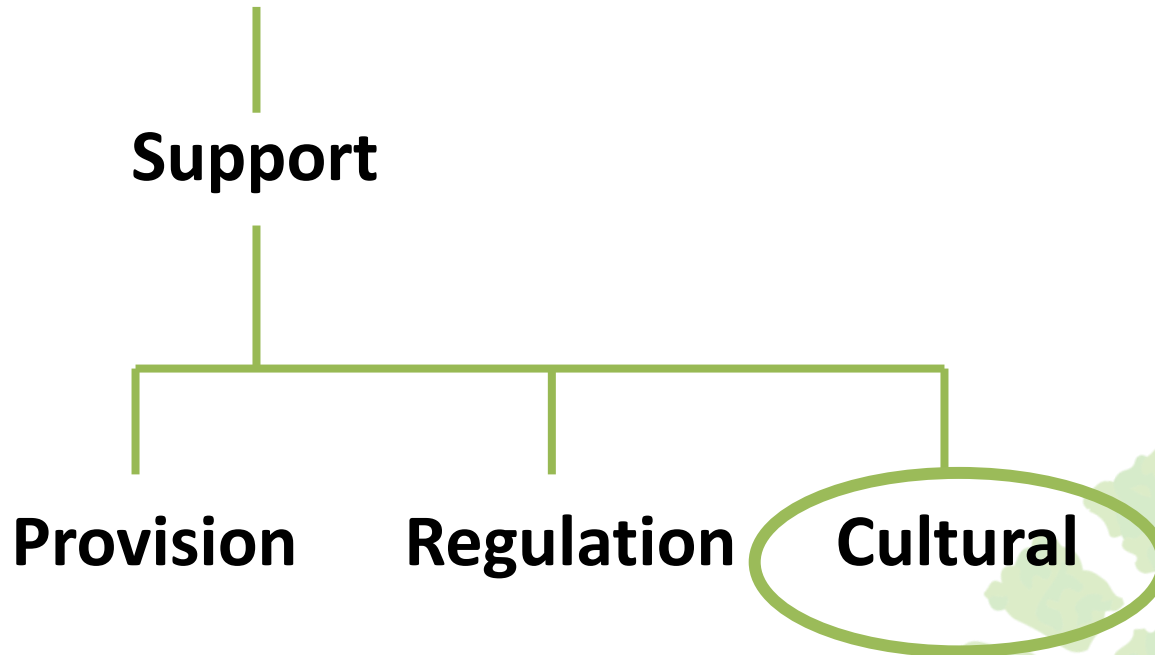




## Regulating services – Natural hazard regulation

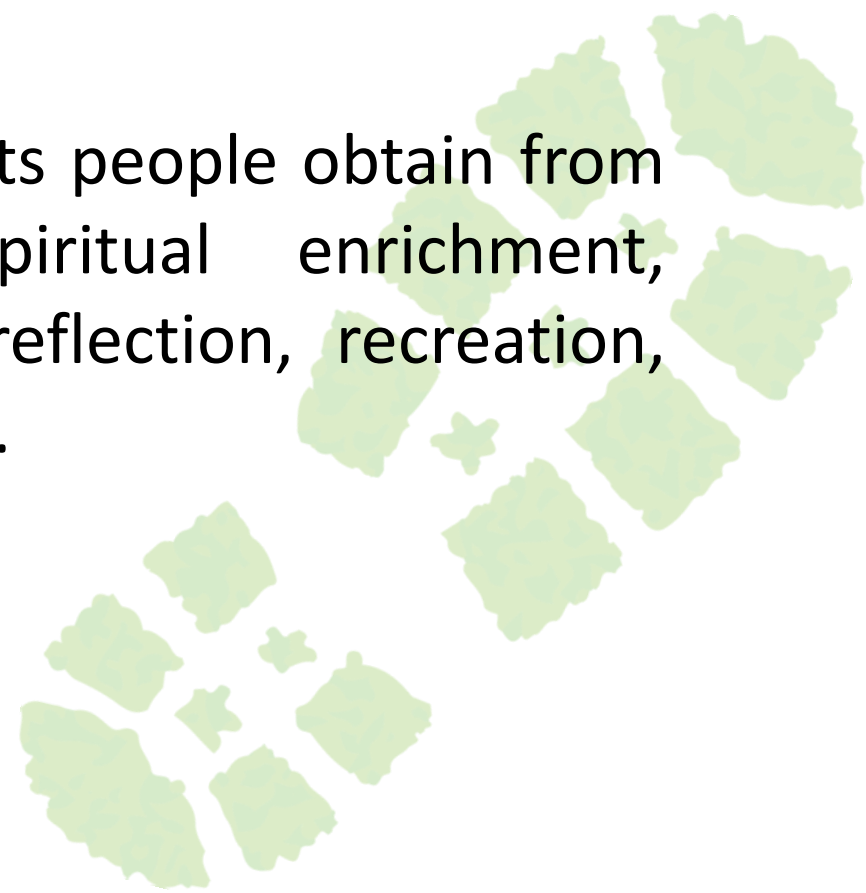


### Ecosystem services



## Cultural services

Nonmaterial benefits people obtain from ecosystems through spiritual enrichment, cognitive development, reflection, recreation, and aesthetic experiences.





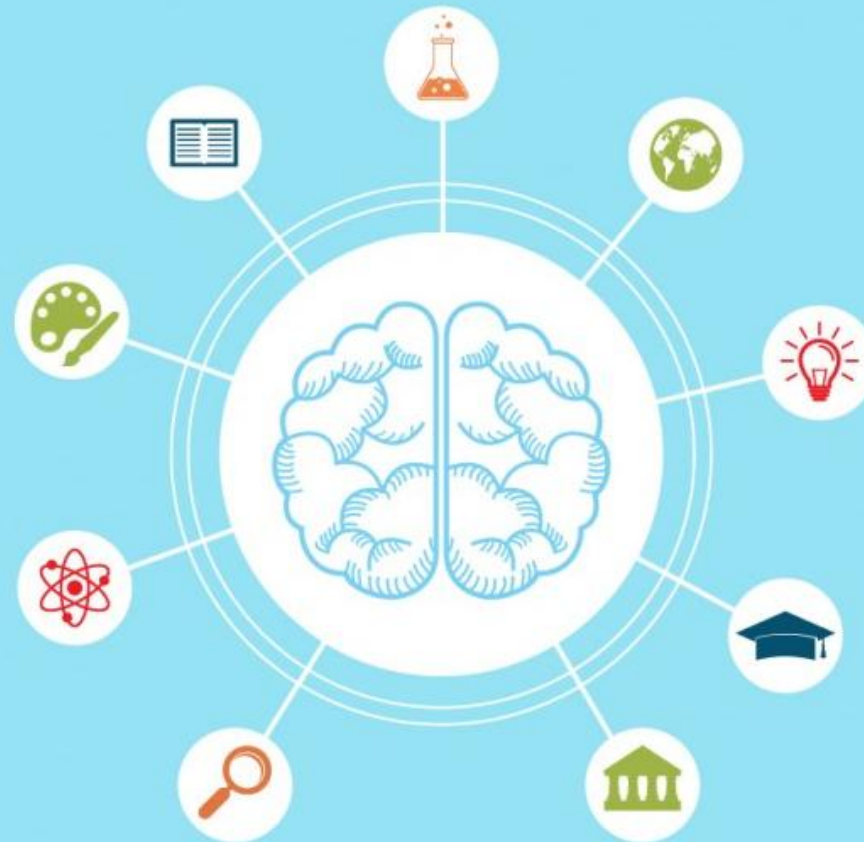
### Cultural services – Cultural diversity



## Cultural services – Spiritual and religious values

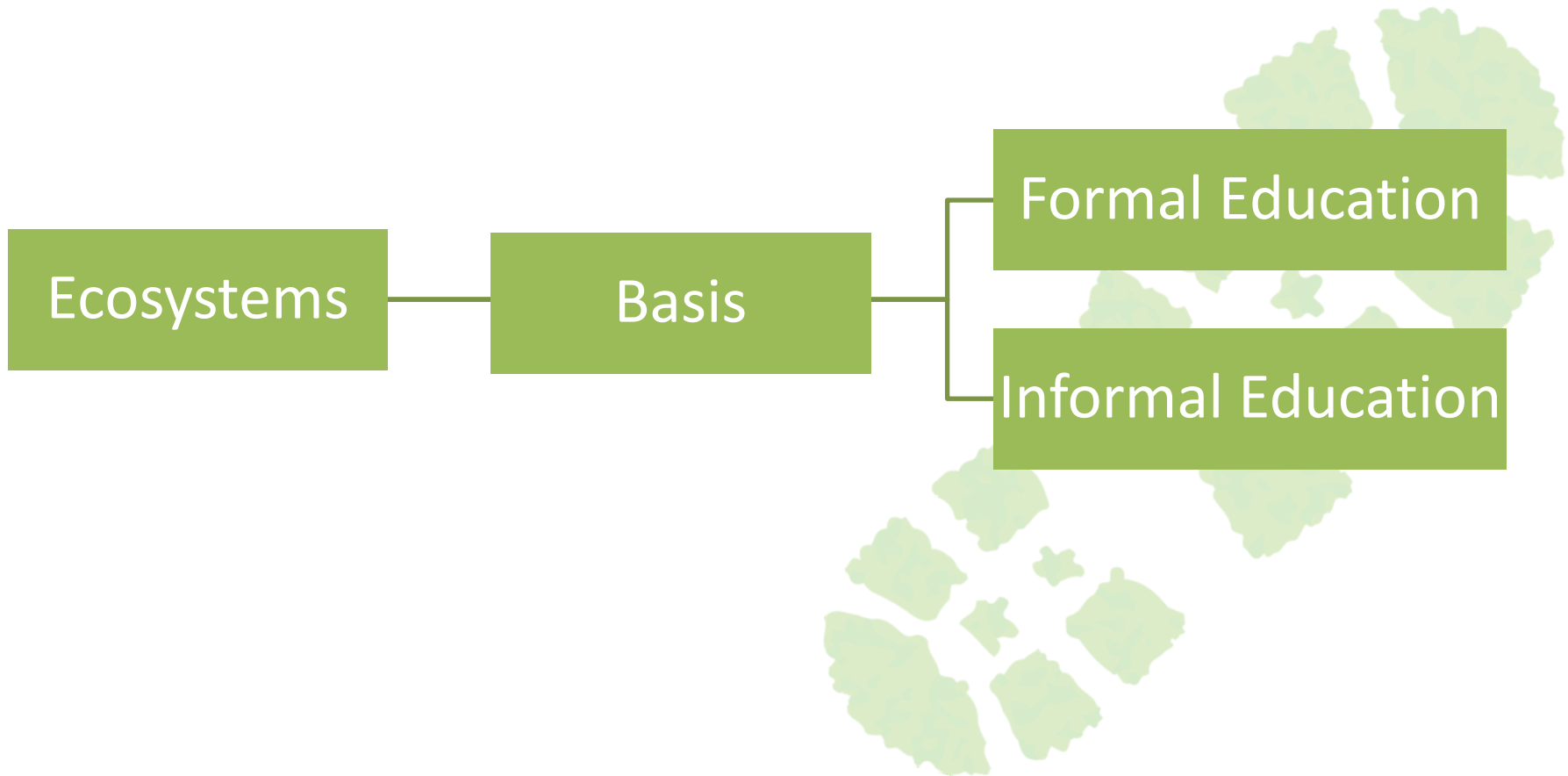


### Cultural services – Knowledge systems





## Cultural services – Educational values



## Cultural services – Inspiration

*Stay close to*

NATURE

*It will never fail you*

- Frank Lloyd Wright -

### Cultural services – Inspiration





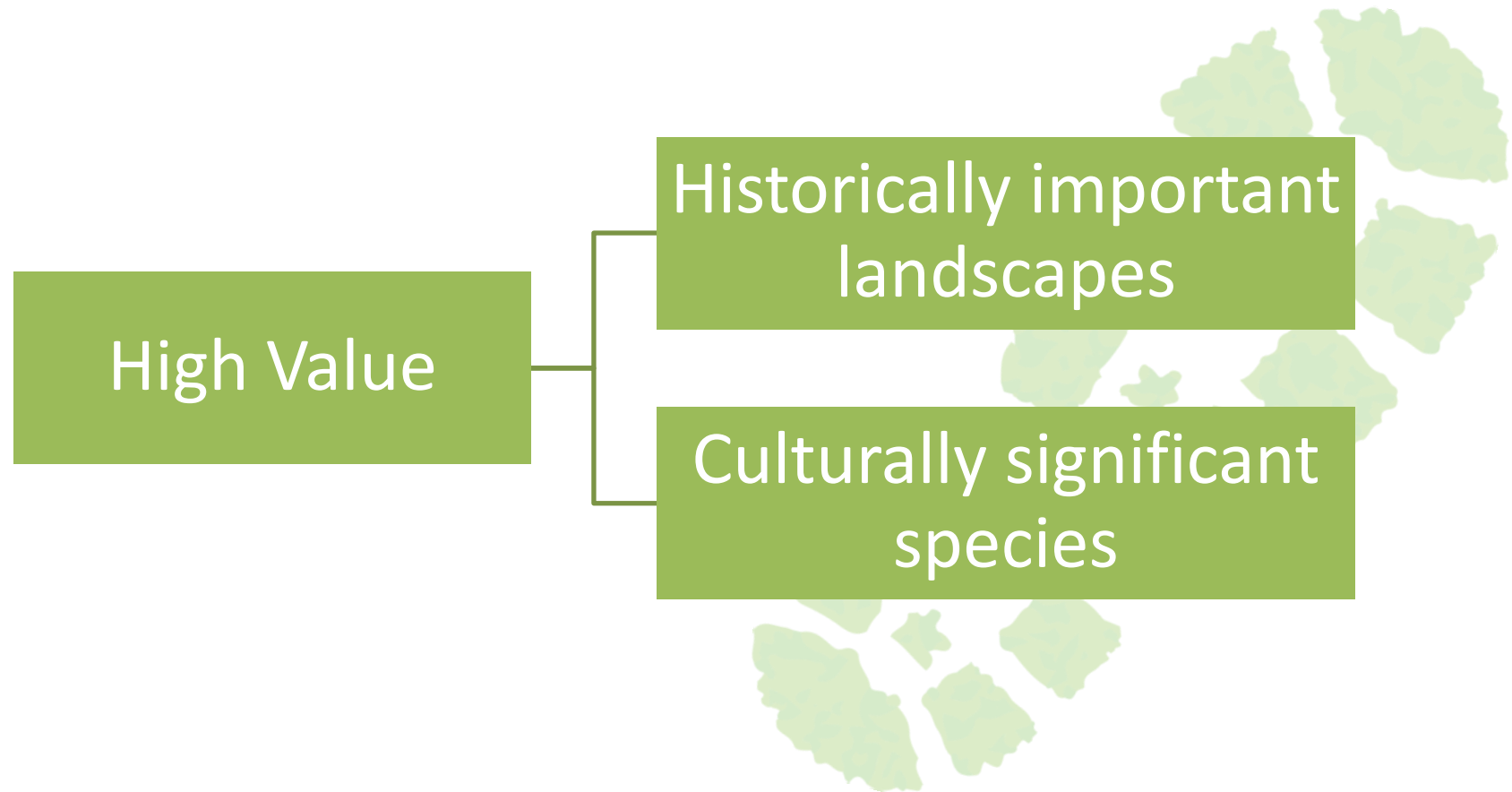
### Cultural services – Aesthetic values



### Cultural services – Social relations



## Cultural services – Cultural heritage values





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### Cultural services – Cultural heritage values





### Cultural services – Recreation and ecotourism



### Cultural services – Recreation and ecotourism

#### YELLOWSTONE NATIONAL PARK, 2013



### Supporting

- Soil formation
- Photosynthesis
- Nutrient cycles
- Water cycle
- ...

### Provisioning

- Food                      Fiber                      Fuel
- Fresh water              Genetic resources              ...

### Regulating

- Climate regulation      Water purification      Pollination
- Pest regulation          Disease regulation          ...

### Cultural

- Recreational              Aesthetic values              Inspiration
- Cultural diversity          Educational                      ...