26TH NATIONAL CHILDREN'S SCIENCE CONGRESS

SCIENCE, TECHNOLOGY, INNOVATION FOR CLEAN, GREEN, HEALTHY NATION

FOCAL THEME
ECOSYSTEM AND ITS SERVICES

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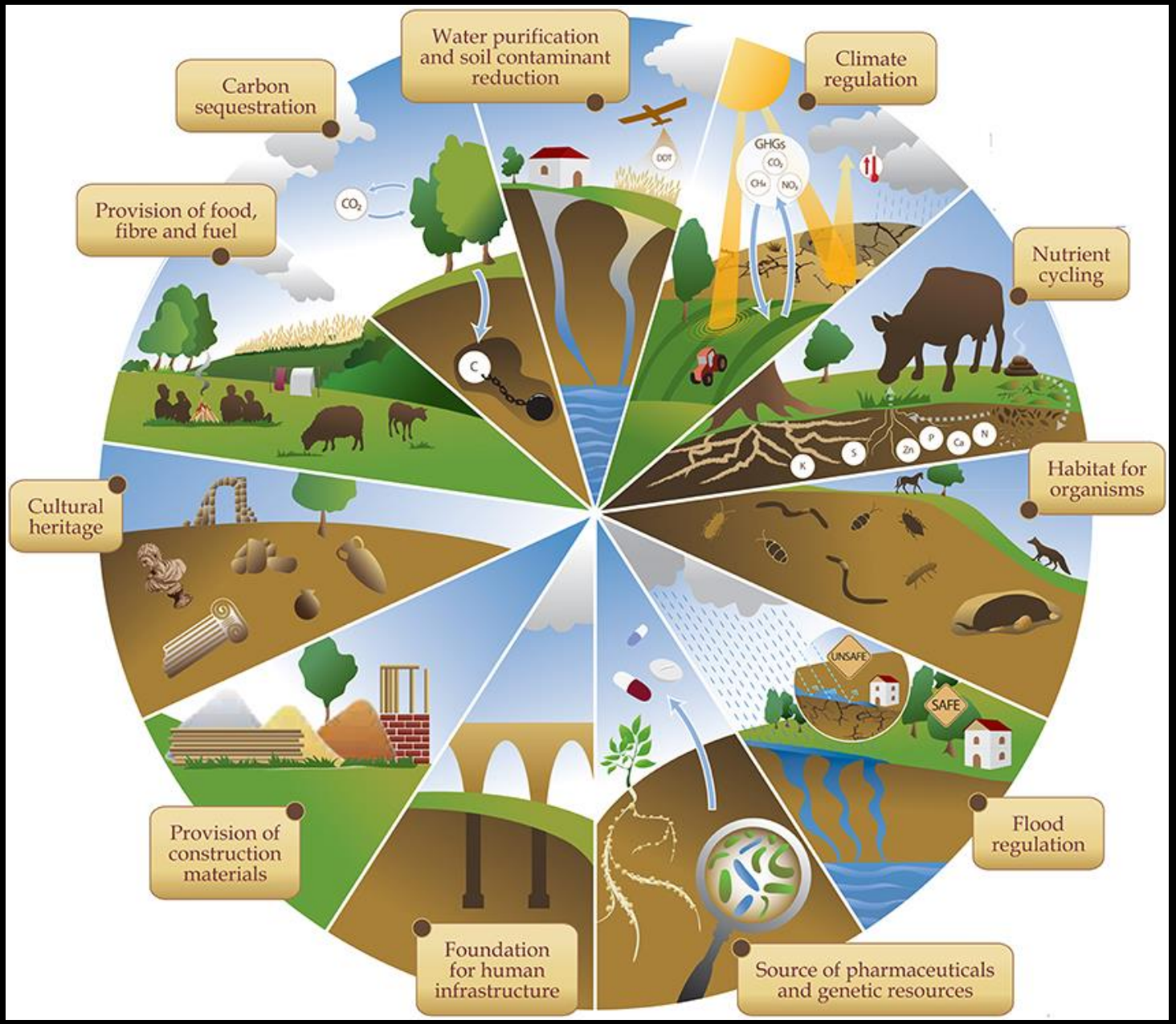
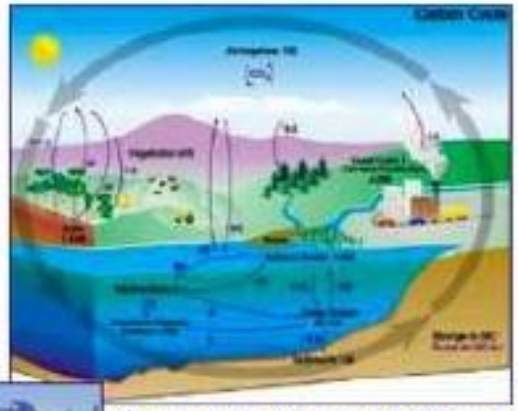
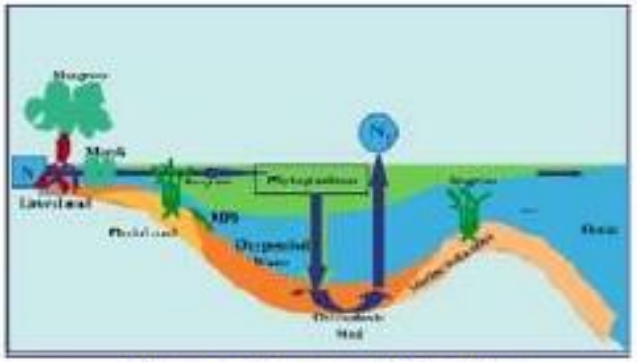

Water purification and soil contaminant reduction
Climate regulation
Carbon sequestration
Provision of food, fibre and fuel
Nutrient cycling
Cultural heritage
Habitat for organisms
Provision of construction materials
Flood regulation
Foundation for human infrastructure
Source of pharmaceuticals and genetic resources
GHGs
UNSAFE
SAFE
DDT



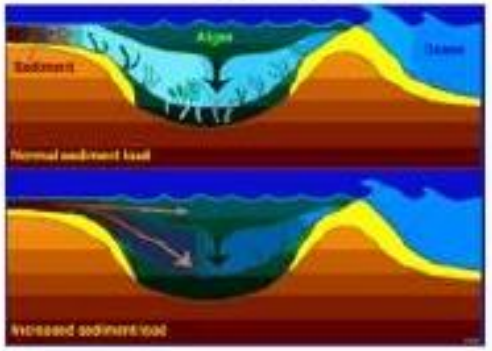
Atmospheric and Climate Regulation

Flood Attenuation/ Storm Surge Protection



Biogeochemical Cycling

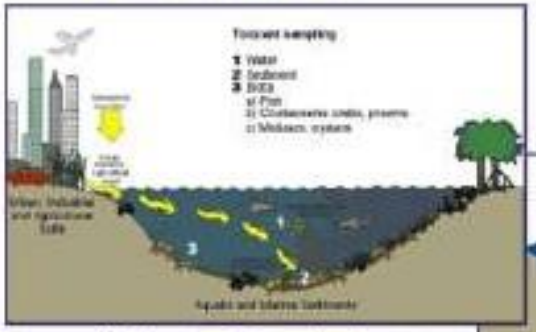
Recreation / Aesthetic



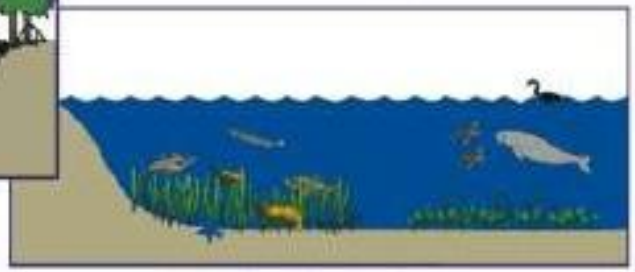
Soil and Sediment Regulation

Food and Fiber

Water Quality and Supply



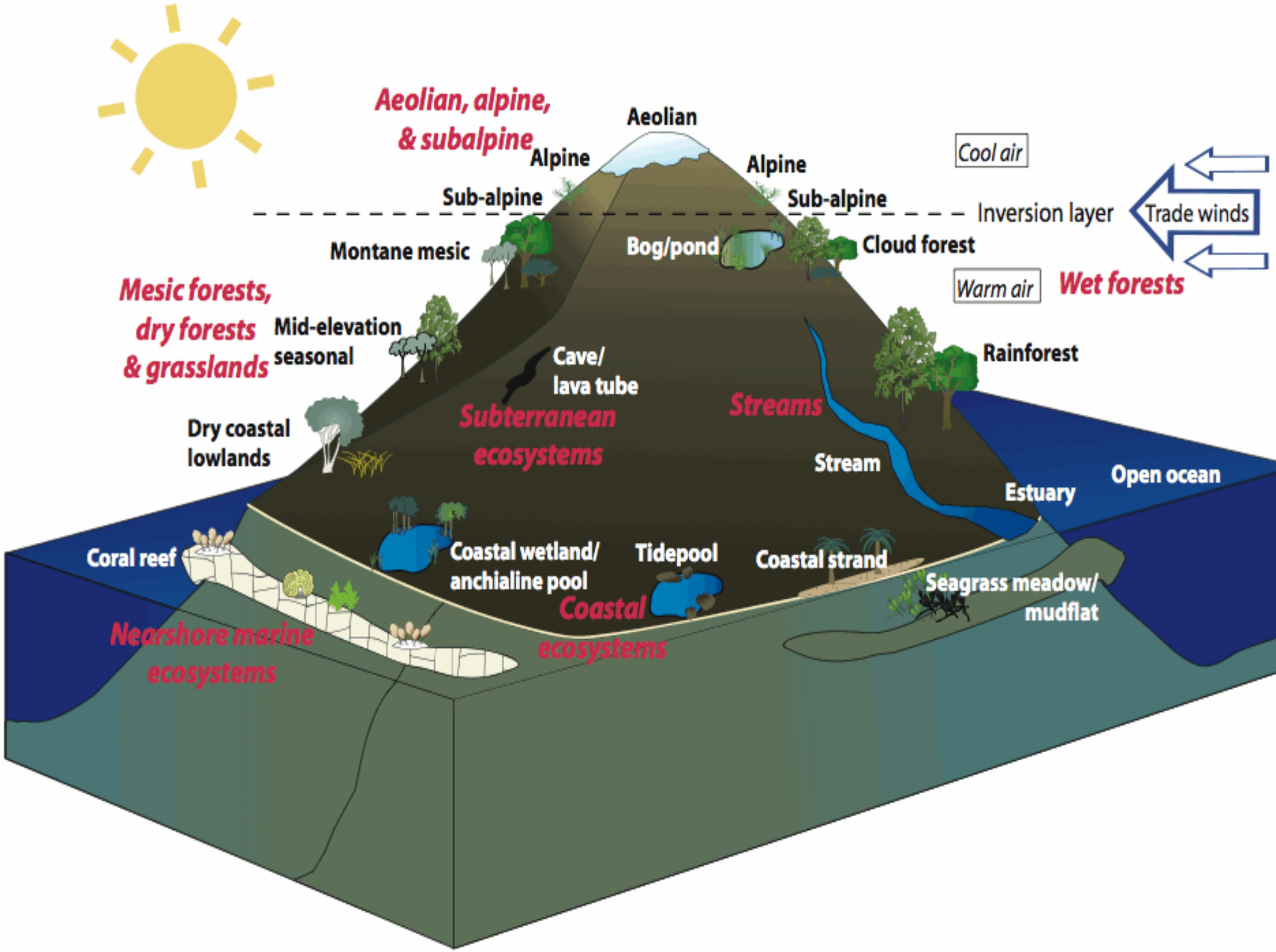
Waste Regulation



Habitat/Fisheries

Pest and Disease Regulation


SUPPORTING
PROVISIONING
CULTURAL
REGULATING
Ecosystem Services
What Nature provides us for free
Food
Soil Formation
Photosynthesis
Biodiversity
Habitat
Stewardship
Aesthetic
Recreation
Education
Clean Water
Fish
Wood
Pollination
Cool Temperatures
Control Flooding
Purify Water
Store Carbon
Clean Air


Aeolian, alpine, & subalpine
Aeolian
Alpine
Alpine
Sub-alpine
Sub-alpine
Cool air
Inversion layer
Trade winds
Montane mesic
Bog/pond
Cloud forest
Warm air
Wet forests
Mesic forests, dry forests & grasslands
Mid-elevation seasonal
Cave/ lava tube
Rainforest
Subterranean ecosystems
Streams
Dry coastal lowlands
Stream
Open ocean
Estuary
Coral reef
Coastal wetland/ anchialine pool
Tidepool
Coastal strand
Seagrass meadow/ mudflat
Coastal ecosystems
Nearshore marine ecosystems

Tropical Rainforest

Temperate Forest

Coniferous Forest (Taiga)

Tropical Grassland (Savannah)

Temperate Grassland

Mediterranean

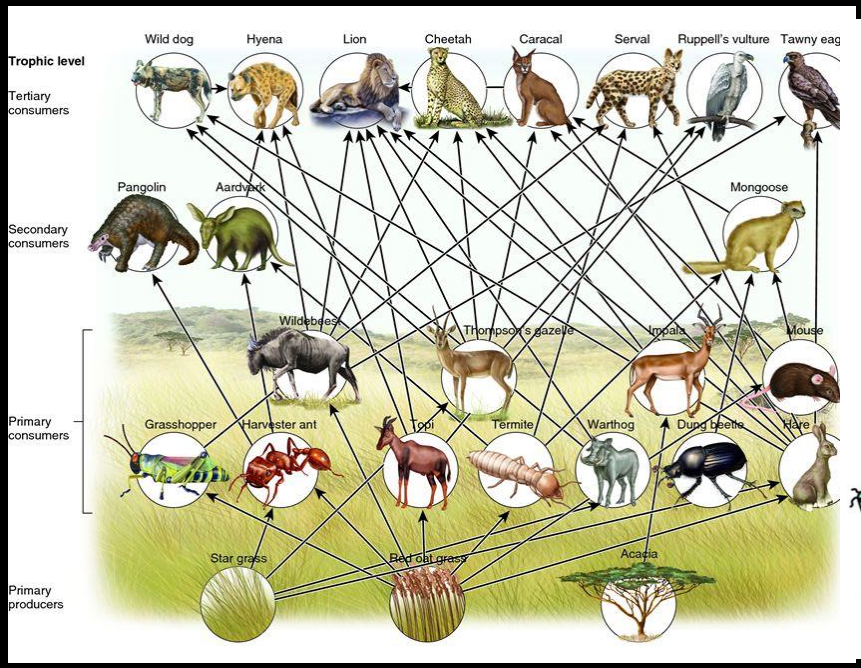
Desert

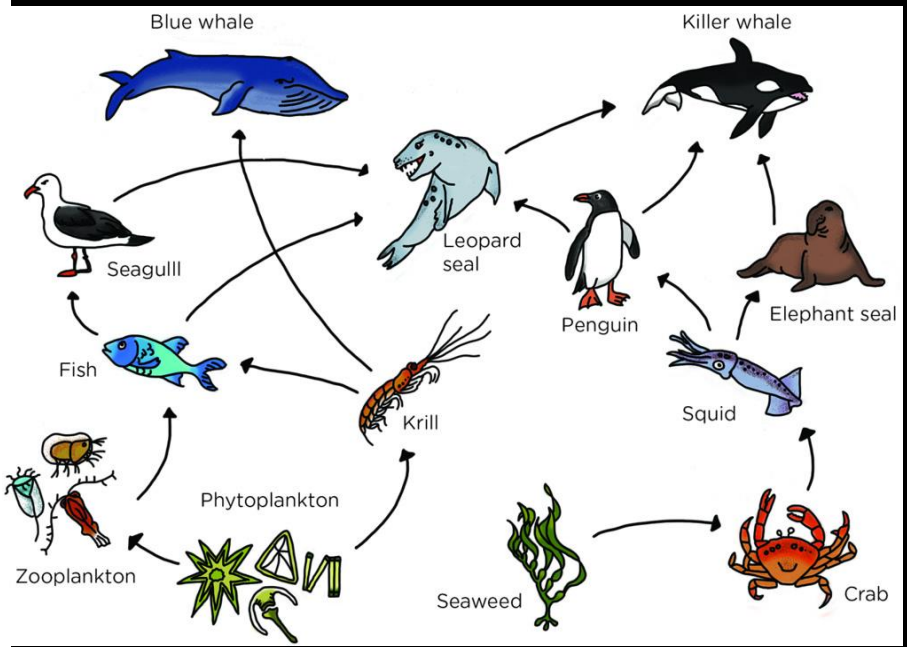
Tundra

Mountain

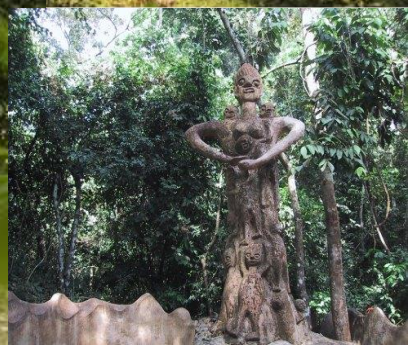
ECOSYSTEM DAMAMGE

FOOD WEB


Trophic level
Tertiary consumers
Secondary consumers
Primary consumers
Primary producers
Wild dog
Hyena
Lion
Cheetah
Caracal
Serval
Ruppell's vulture
Tawny eag
Pangolin
Aardvark
Mongoose
Wildebeest
Thompson's gazelle
Impala
Mouse
Grasshopper
Harvester ant
Topi
Termite
Warthog
Dung beetle
Hare
Star grass
Red oat grass
Acacia


Blue whale
Killer whale
Seagulll
Leopard seal
Penguin
Elephant seal
Fish
Krill
Squid
Phytoplankton
Zooplankton
Seaweed
Crab

கோவில் காடுகள்
(Sacred Groves)



கோவில் காடுகள்
(Sacred Groves)

Human uninhabited area

Collect FMB from revenue department

Use GPS location and Google Map

Physically measure total extent

Plant and Animal diversity Assessment

(Genetic diversity and Species richness)

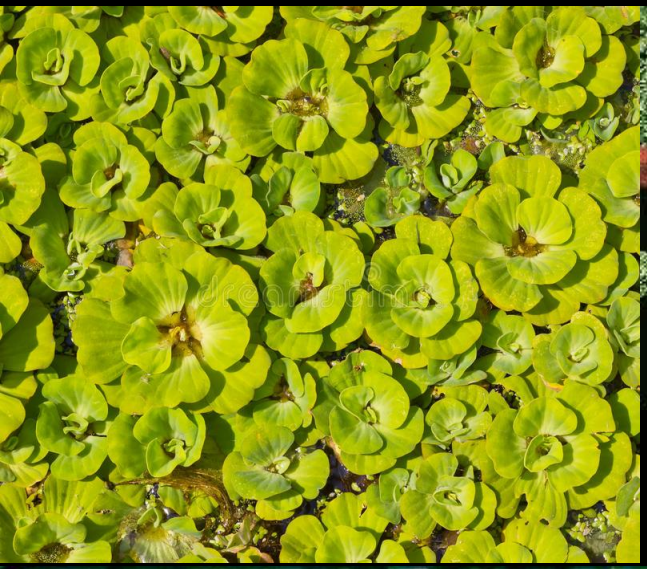
Alien species

Invasive Species

கோவில் காடுகள்
(Sacred Groves)

- Find out ecosystem services
- Discuss is there any conservation efforts by the local community
- Plan conservation activity with local community and students
- Implement possible activities with students
- Submit a report to the Local Administrative Body, PO- DRDA and Press.

கலைச்செடிகளின் மாற்று பயன்பாடு
Alternate use of aquatic weeds



Eichornia

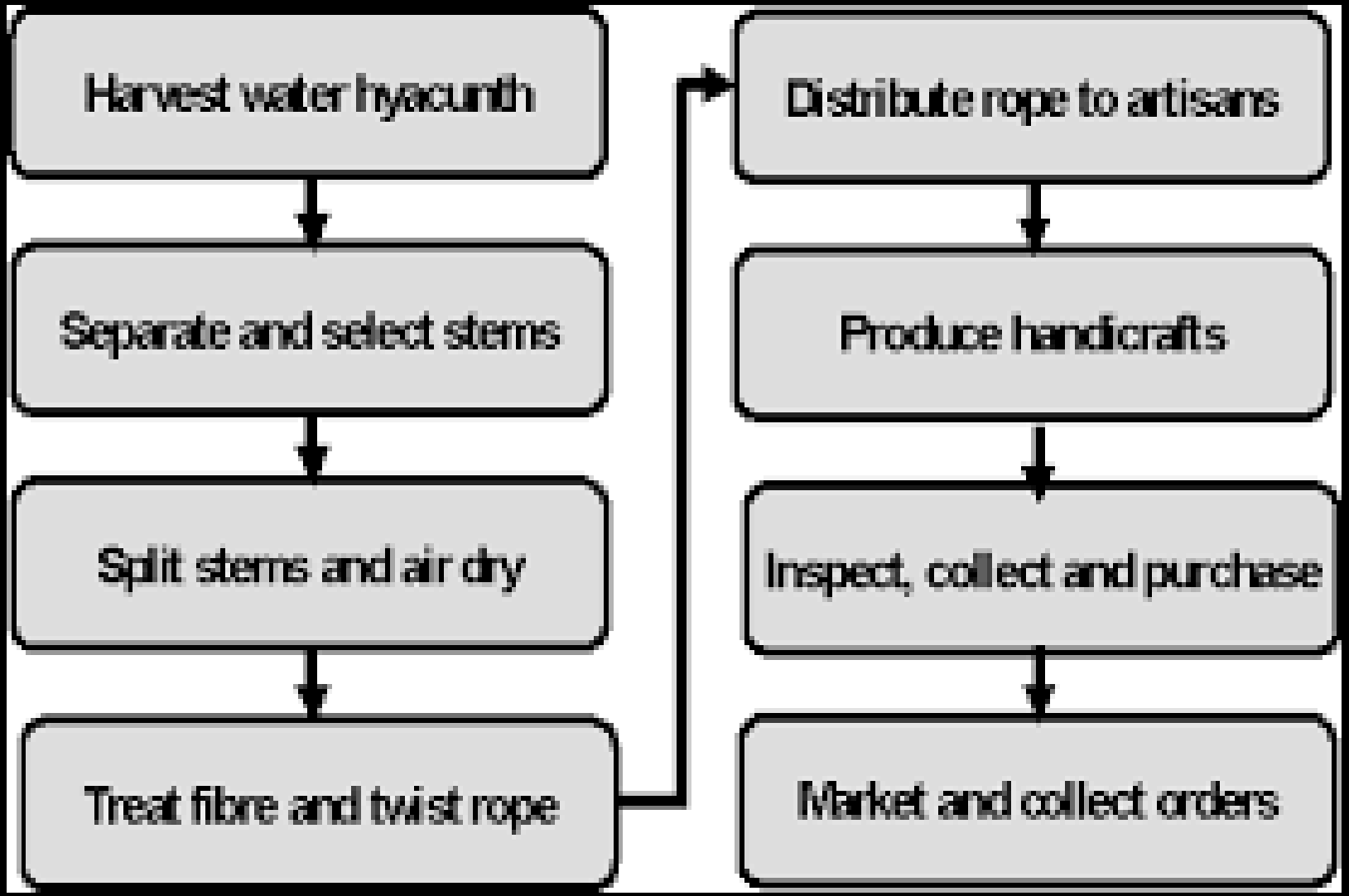
STEM HARVESTING AND DRYING

FIBER AND PRODUCTS

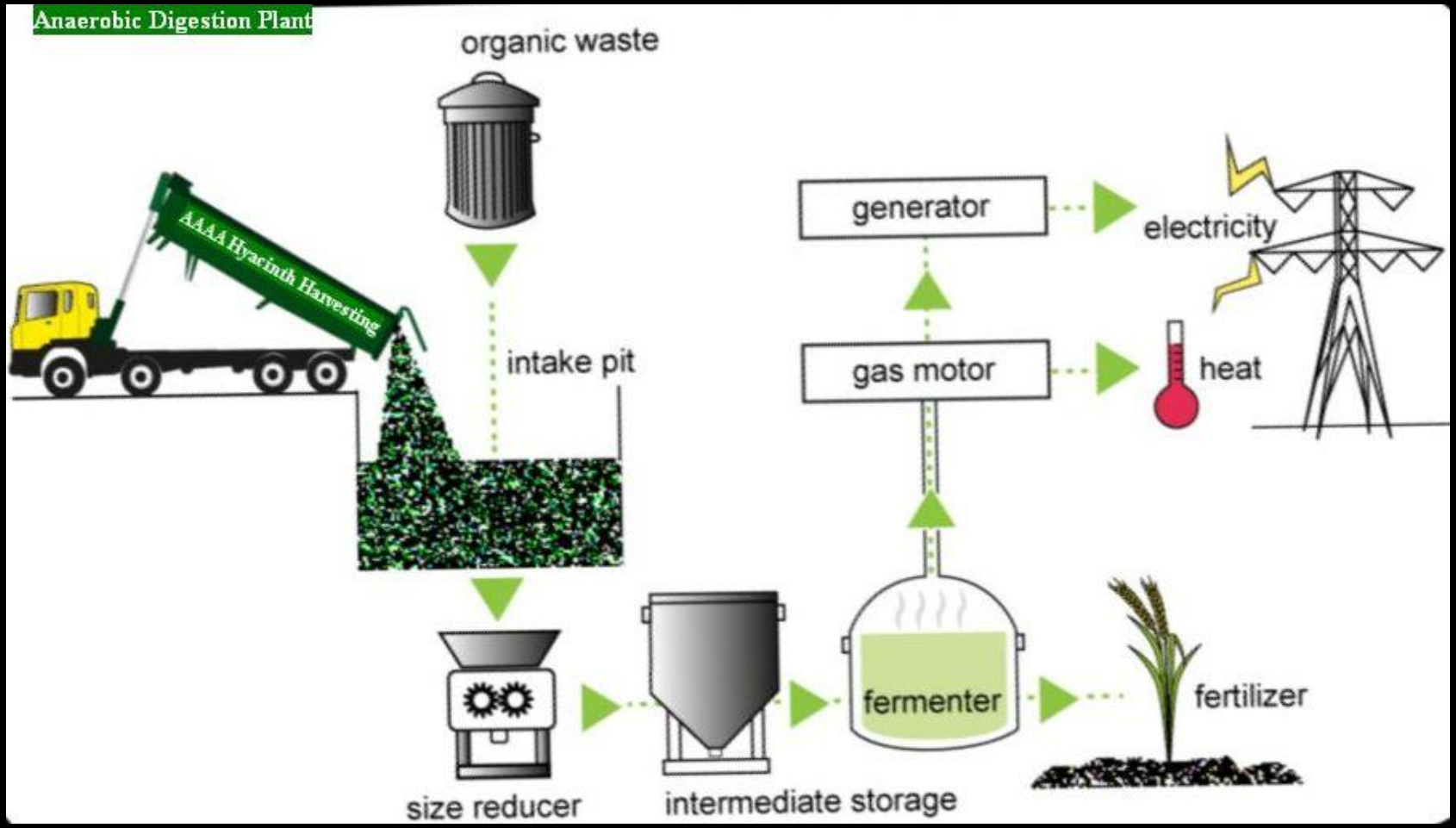

gettyimages
ZenRial


iStock

PROCEDURE- 1


Harvest water hyacunth
Separate and select stems
Split stems and air dry
Treat fibre and twist rope
Distribute rope to artisans
Produce handicrafts
Inspect, collect and purchase
Market and collect orders

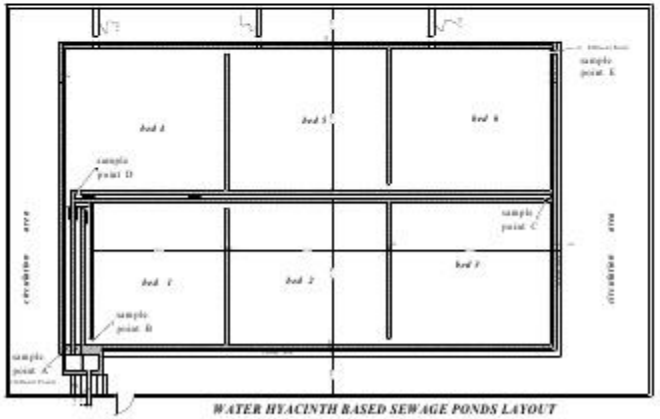
PROCEDURE -2


Anaerobic Digestion Plant
organic waste
AAAA Hyacinth Harvesting
intake pit
generator
electricity
gas motor
heat
fermenter
fertilizer
size reducer
intermediate storage

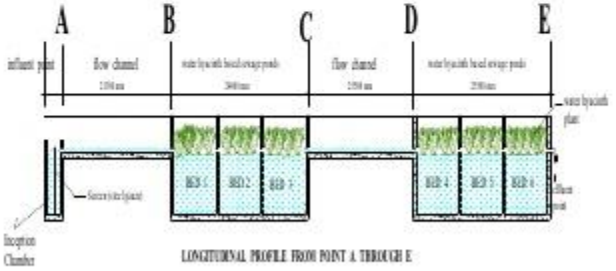
PROCEDURE -3

Innovation to Sewage Treatment: The Water Hyacinth Option

- A water hyacinth based biological treatment plant was designed and constructed at the Service Area of University of Lagos .
- The plan and section through the treatment plant is as shown below.



WATER HYACINTH BASED SEWAGE PONDS LAYOUT



Introduction Continued

- We examined the effect of the growth of water hyacinth as a form of constructed wetland with surface flow on selected sewage quality parameters on weekly basis for a period of 24 weeks.

- Observation after 24 weeks show:
  - 100% - Colour
  - 92.95% - Turbidity,
  - 84% - BOD
  - 88% - TDS,
  - 76% - Nitrate,
  - 87% - Phosphate
  - 99.65% - e-coli

- It is concluded that the use of water hyacinth plant on domestic sewage pond is a viable and cheaper alternative method of domestic sewage treatment

BANANA TREE WASTE

BANANA FIBER AND FABRIC

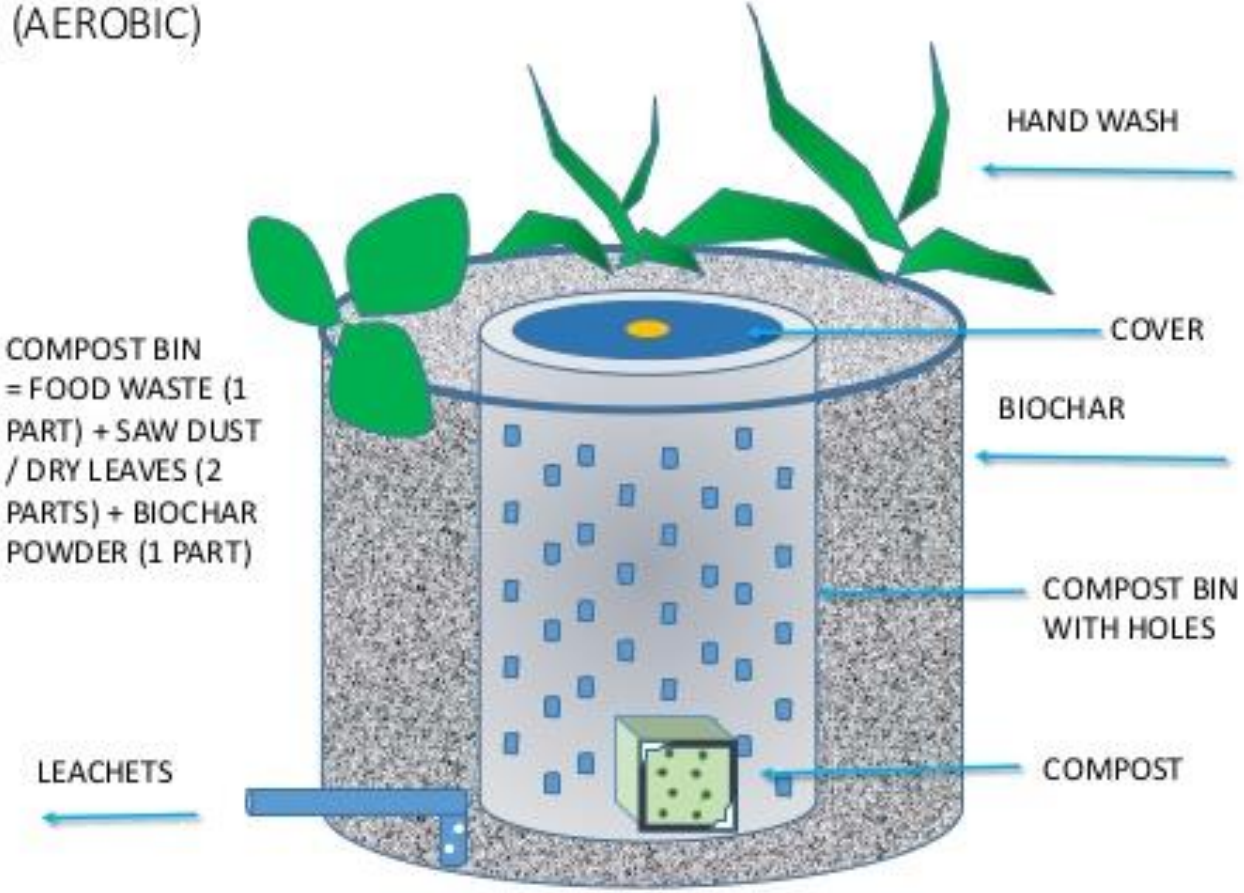
AGAVE FIBER

ELEPHANT GRASS

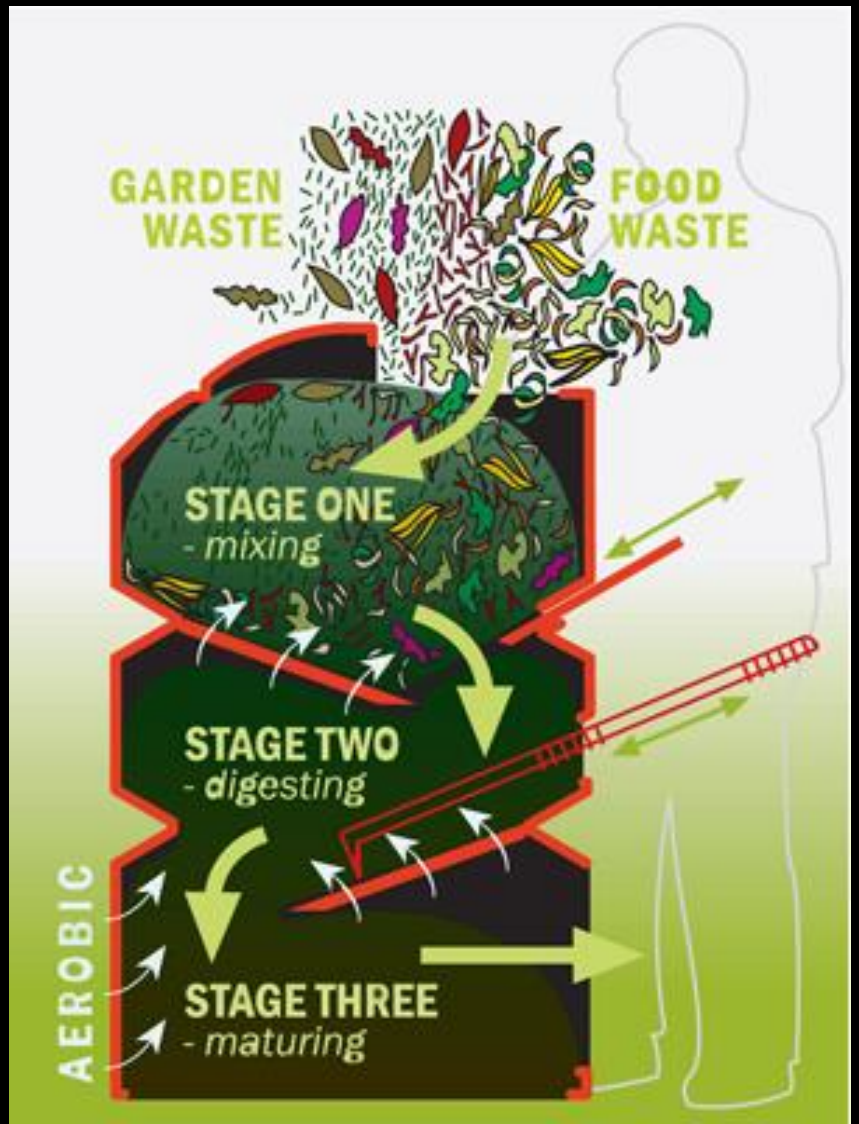
Ipomoea

Cut , compost and prepare manure

Aerobic compost



Aerobic compost



MEASURE THE FOLLOWING PARAMETERS

Total NPK (macro nutrients)

Organic carbon

C/N ratio

pH

Cu, Zn, Fe, Mn *etc.* (micronutrients)

Convert per ton

WEEDS ARE THE DOCTORS OF THE SOIL

PROBLEMATIC SOIL

APPROACH

1.Mark soil area in sq. m

2. Collect soil sample as per standard procedure and analyze soil parameters - pH, Ec., Organic carbon, NPK, texture, C& N ratio, Micronutrients viz. Cu, Zn, Fe, and Mn.

3.Collect seeds of weeds

4. Apply 10 grams /sq.m.

5. Sprinkle water and allow them to grow for 2 months.

6. Harvest and estimate the biomass

7. Repeat soil test

8.Compost the biomass collected

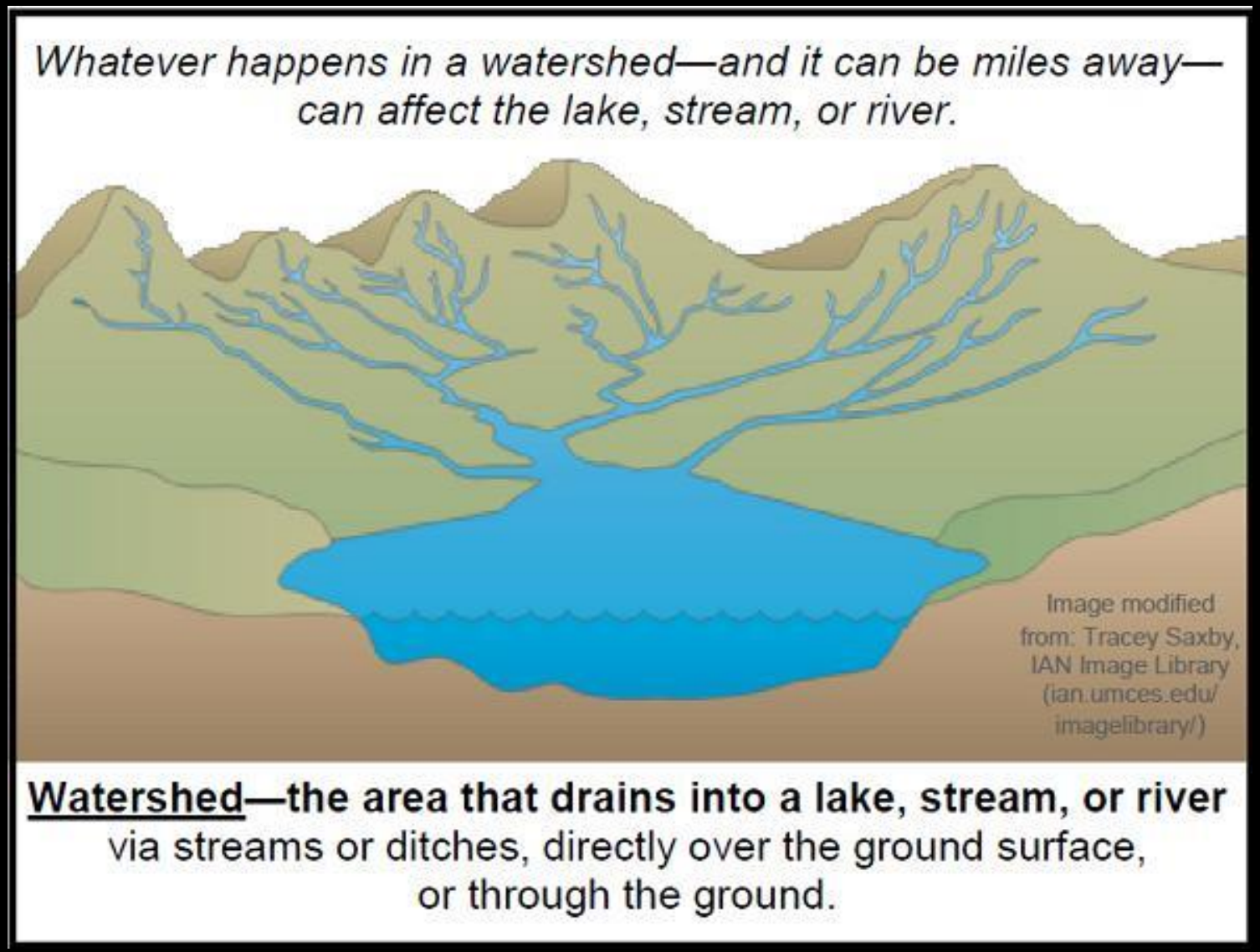
9. Apply the compost in the same soil

10. Apply the compost uniformly in the soil.

11. Repeat soil test

12. Compare the results.

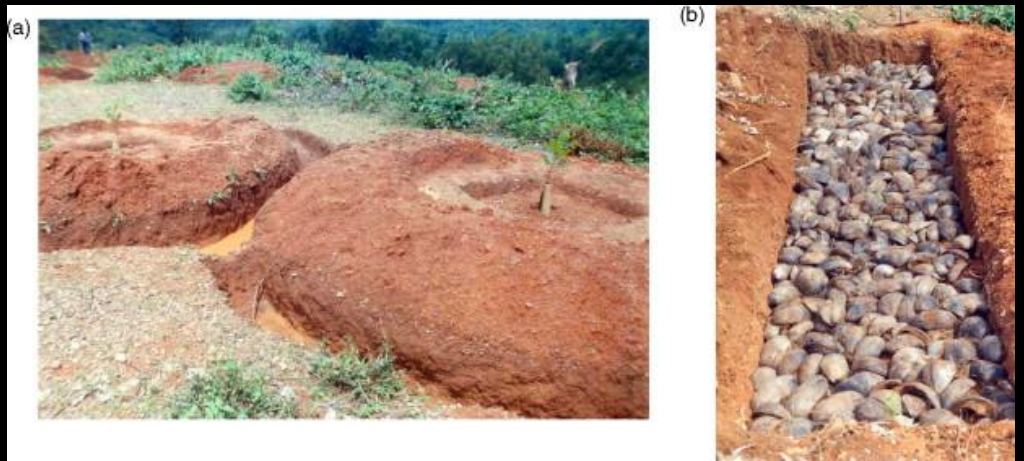
நீர்பிடிப்பு பகுதிகளில் தண்ணீரை பாதுகாக்கும்பொருட்டு எவ்விதமான வழிமுறைகளை கையாள்வது என்று ஆய்வு செயலாம்



CONTINUOUS CONTOUR TRENCH

Storage pond & Percolation pond

Trenching



இயற்கை விவசாயம் மற்றும் ஏனைய விவசாய நிலங்களில் மண்ணில் உள்ள உயிரினங்கள் குறித்து ஆய்வு செய்யலாம்

Soil Fauna

Classes of Soil Fauna

Soil fauna belong to one of three size limit classes:

- Macrofauna (>2mm, width)
- Mesofauna (0.1-2mm, width)
- Microfauna (<0.1mm, width)

PROCEDURE

1.Select an organic and conventional farming land for comparison
2. Select same type of land preferably adjacent land
3. Select same type of crops cultivated
4. Prepare a frame of 1 sq.m. size.
5. Put the frame in 4 or five different places of the lanfd at random.
6. Remove 15 cm depth soil and put it in a bucket
7. Dissolve the soil by adding water
8. Use 2mm sieve
9. Collect the animals , count and categorize with the help of a Zoologist
10. Population density, species diversity and species richness can be calculated .
11. Compare the two lands and give inference.

சாணம் போன்ற விலங்குகளின் கழிவு மூலம் பரவிய தாவரங்கள் குறித்தும், மேய்ச்சல் நிலங்கள் குறித்தும் ஆய்வு செய்யலாம்

1.Collect 1kg of dried cow dung and goat dung

2.Crush it with bare hand and make it powder

3.Measure 100 grams from each dung

4. Mark four one sq.m. area in your school. Assign separate number as 1,2,3 and 4.

5.Turn the soil up and town to 15 cm depth and mix well

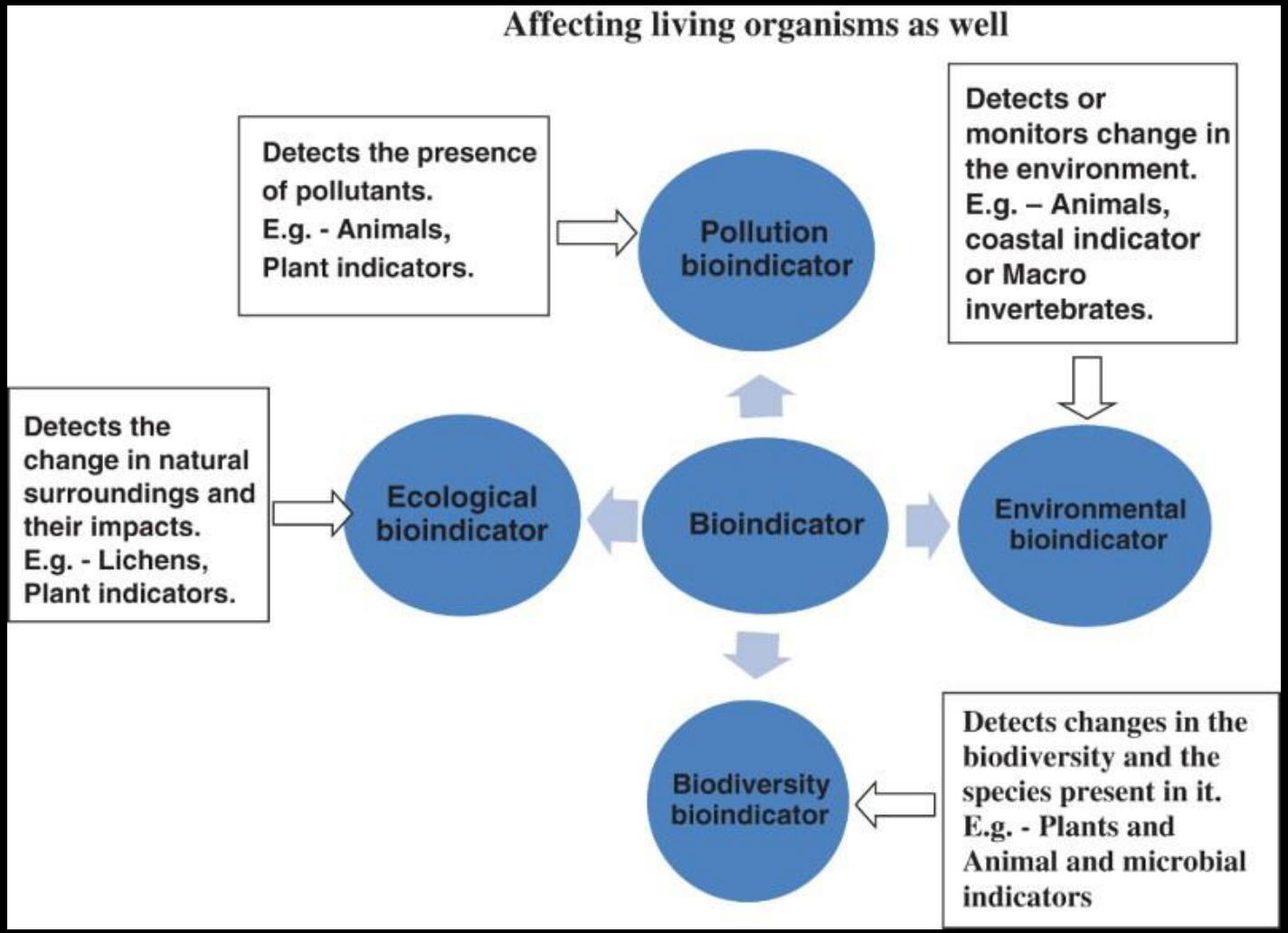
6. Now spread the dried cow dung and goat dung in separate plots i.e. in 1 and 2 .

7.Compost the same cow dung and goat dung and use it plot number 3 and 4 separately.
8.Sprinkle water at uniform interval
9. Allow the weeds to grow for 2 months.
10. Now count the number of weeds, types of weeds and quantity of biomass generated.
11. You will understand how weeds are spreading through animasl and effect of composting in weed control.

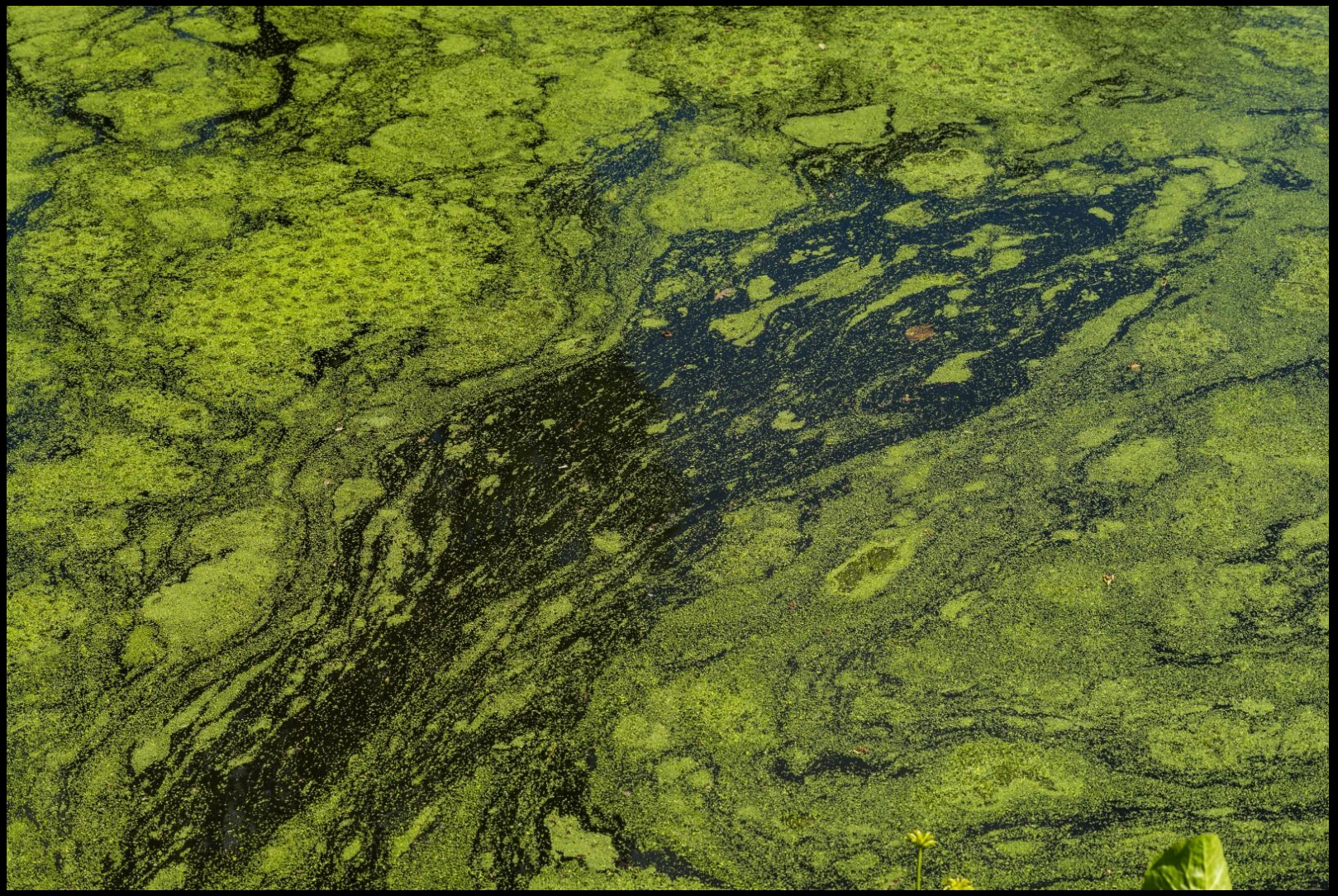
ஊடுருவி தவர்ங்களால் உள்ளூர் தாவரங்கள் மற்றும் காடுகளில் ஏற்பட்ட மாற்றங்கள் குறித்து ஆய்வு செய்யலாம்

Prosopis juliflora

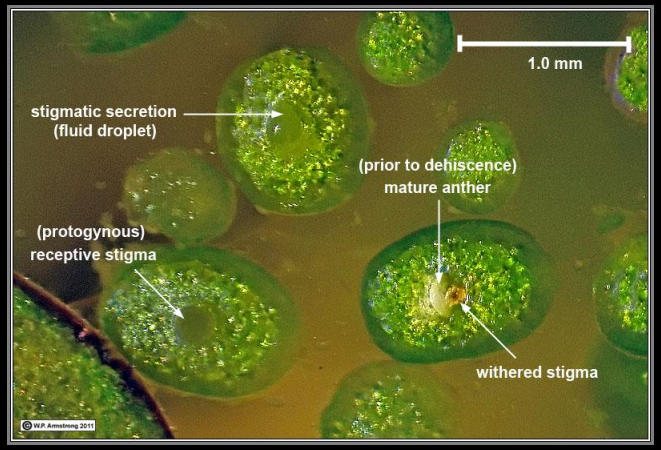
மாற்றங்களை தெரிவிக்கும்/ சுட்டிக்காட்டும் உயிரினங்கள்
(BIOLOGICAL INDICATORS)



Algal bloom



Wolffia globosa
Biological indicator for Cadmium pollution



Disappearance of Lichens in the forest indicates increased levels of SO_2, Sulfur and Nitrogen

Acacia tetragonocarpa

நமது உடைமைகளை சேதபடுத்தும் பூச்சி இனங்களும்
அவற்றின் இயற்கை எதிரிகளை பற்றியும் ஆய்வு செய்யலாம்
(Pest and Predator study)

Insect Pest	Insect Predator
Mealy bugs	Lacewing, Ladybug
Mites	Lacewing, Ladybug, Minute pirate bug, **Predatory** mite
Mosquitoes	Praying mantis
Moths	Lacewing, Praying mantis

Insect Pest	Insect Predator
Aphids	Lacewing, Ladybug, Minute pirate bug, Praying mantis
Cabbage loopers	Parasitic wasp
Caterpillars	Minute pirate bug, Parasitic wasp
Cutworms	Parasitic wasp
Flea larvae	Beneficial nematode
Flies	Fly parasite
Fungus Gnats	Fungus gnat predator
Grasshoppers	Praying mantis

Grubs	Beneficial nematode
Leaf hoppers	Lacewing, Ladybug, Minute pirate bug
Leafminers	Leafminer parasite
Mealybugs	Lacewing, Ladybug
Mites	Lacewing, Ladybug, Minute pirate bug, Predatory mite
Mosquitoes	Praying mantis
Moths	Lacewing, Praying mantis

Root weevils	Beneficial nematode
Scale	Lacewing, Ladybug, Minute pirate bug
Slugs	Beneficial nematode
Snails	Beneficial nematode
Thrips	Lacewing, Minute pirate bug
Tomato hornworms	Parasitic wasp
Whiteflies	Minute pirate bug, Whitefly parasite

PREDATORS

ஊடுருவி அயல் இண மீன்களால் நீர் சூழல் மாண்டலத்தில் ஏற்பட்ட தாக்கங்கள் குறித்து ஆய்வு செய்யலாம்

Image 2. *Pterygoplichthys pardalis* (Castelnau, 1855),

INVASIVE CATFISH
IN THE CHESAPEAKE BAY WATERSHED

FLATHEAD CATFISH

- Can grow as long as 4 Feet
- Dark brown to tan

BLUE CATFISH

- Slate blue on the back
- Silvery/white on its underside

WE NEED YOUR HELP!

- **DNR asks anglers to keep any blue and flathead catfish they catch.**
- **Catch and release of these fish is discouraged, as they are invasive top predators and pose a serious long-term threat to our native species.**

IN MARYLAND, IT IS ILLEGAL TO TRANSPORT LIVE BLUE AND FLATHEAD CATFISH INTO ANOTHER BODY OF WATER. VIOLATORS CAN BE FINED UP TO $1,000.

For more information on Maryland's blue and flathead catfish policy, please visit www.dnr.state.md.us/invasives/

To report illegal transport or unauthorized introductions of invasive species please contact the Natural Resources Police at 800-635-8124.

MARYLAND DEPARTMENT OF NATURAL RESOURCES

Chesapeake Bay Program

POLLINATORS

BBC Wildlife

{MOTHS}

Garden tiger moth
Arctia caja
Wingspan 45–65mm. Nocturnal. Locally common in open areas. July to August.

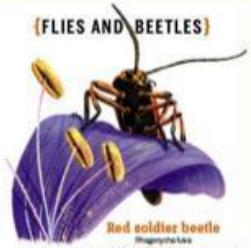
Swallow-tailed moth
Ourapteryx sambucaria
Wingspan 40–50mm. Nocturnal. Various habitats. June to August.

Elephant hawkmoth
Deilephila elpenor
Wingspan 45–60mm. Nocturnal. Often feeds on honeysuckle. May to July.

Hummingbird hawkmoth
Macroglossum stellatarum
Wingspan 40–50mm. Diurnal. Common in gardens. May to September.

Six-spot burnet moth
Zygaena filipendulae
Wingspan 30–38mm. Diurnal. Grassland such as meadows and cliffs. June to August.

{FLIES AND BEETLES}



Red soldier beetle
Rhagonycha fulva
Length 10mm. Often feeds on hogweed and cow parsley, as well as garden flowers. June to August.

Marmalade hoverfly
Episyrphus balteatus
Length 12mm. Abundant on garden and hedgerow flowers. Nearly year-round.

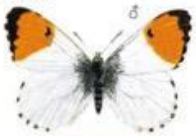
Large (dark-edged) bee-fly
Bombylius major
Length 10mm. Mimics bumblebees. Often feeds on bugle and primroses. March to June.

Drone-fly
Eristalis tenax
Length 12mm. Mimics the male honey bee (drone). Abundant visitor to garden flowers. Nearly year-round.

Hornet hoverfly
Volucella zonaria
Length 20mm. Mimics the hornet. Woodland and gardens. May to October.

{BUTTERFLIES}

Swallowtail
Papilio machaon
Wingspan 76–93mm. In UK, only in Norfolk Broads. May to July.



Orange-tip
Anthocharis cardamines
Wingspan 40–52mm. Common in many habitats. April to June.

Brimstone
Gonepteryx rhamni
Wingspan 60–74mm. Gardens, woodlands, scrubby grassland. June to September.

Small skipper
Thymelicus sylvestris
Wingspan 27–34mm. Rough grassy habitats with tall vegetation. June to August.

Common blue
Polyommatus icarus
Wingspan 29–36mm. Unimproved grassland habitat. May to October.

Brown argus
Aricia agestis
Wingspan 25–32mm. Chalk and limestone grassland. May to October.

Comma
Polygonia c-album
Wingspan 50–64mm. Woodlands, gardens and hedgerows. March to September.

Peacock
Aglais io
Wingspan 63–75mm. Abundant in a variety of habitats. March to September.

Small tortoiseshell
Aglais urticae
Wingspan 45–62mm. Common in many habitats. March to September.

Silver-spotted skipper
Hesperia comma
Wingspan 29–37mm. Chalk downlands; rare. July to September.

Red admiral
Vanessa atalanta
Wingspan 64–78mm. Common in many habitats. March to November.

Small white
Pieris rapae
Wingspan 38–57mm. Abundant in a variety of habitats. April to October.

{BEES AND WASPS}

Honeybee
Apis mellifera
Length 12mm. Domesticated; nests in hives and rests; many habitats. March to September.

Tree bumblebee
Bombus hypnorum
Length 19mm. Found in urban areas, gardens and woods; often nests in bird nestboxes. March to July.

Red mason bee
Osmia bicornis
Length 12mm. Found in a variety of habitats; nests in old walls. March to June.

Common carder bee
Bombus pascuorum
Length 23mm. Found in a variety of habitats. March to November.

White-tailed bumblebee
Bombus lucorum
Length 22mm. Various habitats. March to November.

Tawny mining bee
Andrena fulva
Length 18mm. Found in a variety of habitats; nests in lawns. March to June.

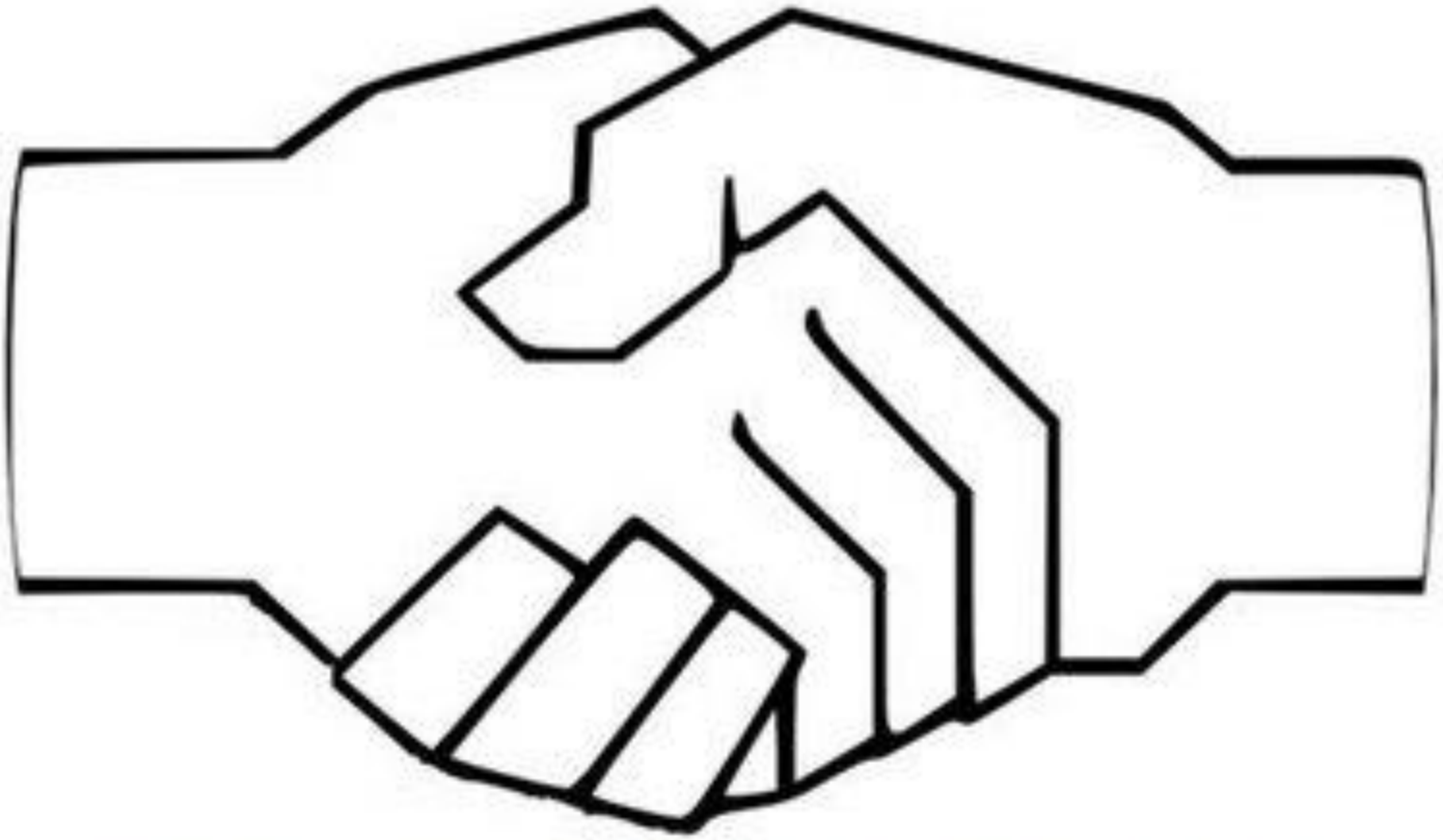
Buff-tailed bumblebee
Bombus terrestris
Length 22mm. Found in a variety of habitats; nests underground. April to August.

Hairy-footed flower bee
Anthophora plumipes
Length 16mm. Various habitats, especially in the south. March to June.

Red-tailed bumblebee
Bombus lapidarius
Length 22mm. Found in a variety of habitats; fond of yellow flowers. March to September.

Ruby-tailed wasp
Chrysis ignita
Length 12mm. Various habitats; often seen on cliffs and dead wood. April to September.

வெவ்வேறு தாவர இனங்க்களின் நீர்தேவை குறித்
குறித்து ஆய்வு செய்யலாம்.



THANK YOU