

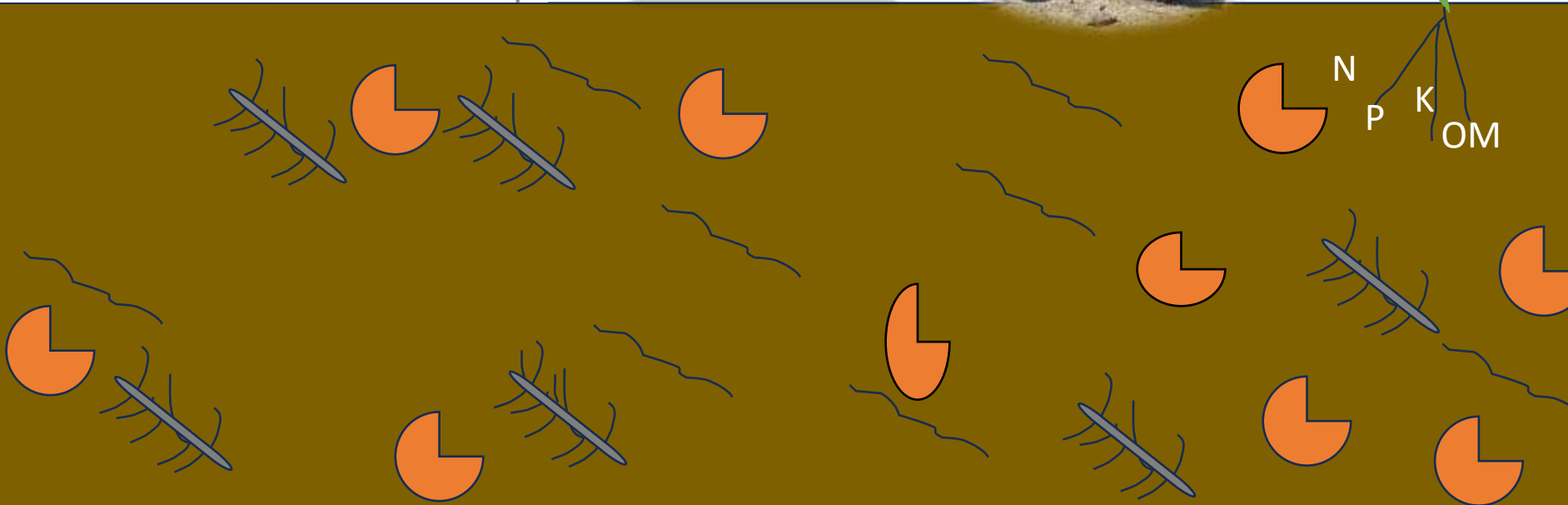
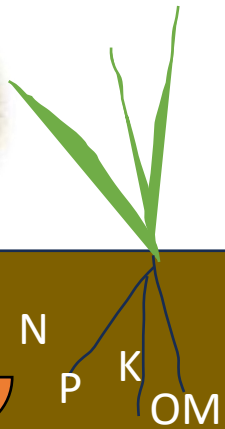
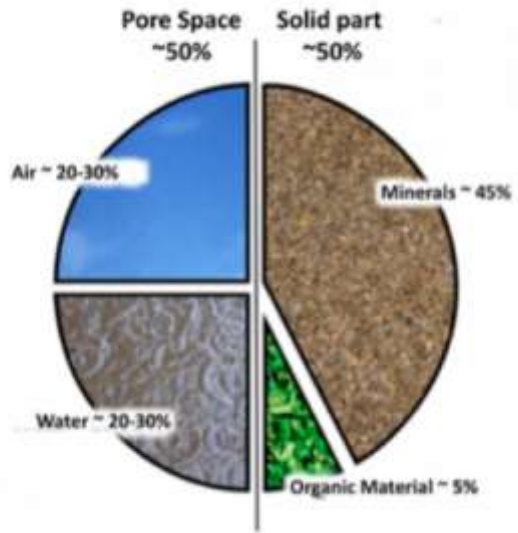


မြေဆီလွှာစီမံခန့်ခွဲမှု တိုးတက်ရန်အတွက်
မြေဆီလွှာ အာဟာရနှင့် မြေကြီးဂုဏ်သတ္တိများအား
စစ်ဆေးခြင်း



Khin Khin Wai(ph.D)
Deputy Staff Officer
Land Use Division
.11.2023

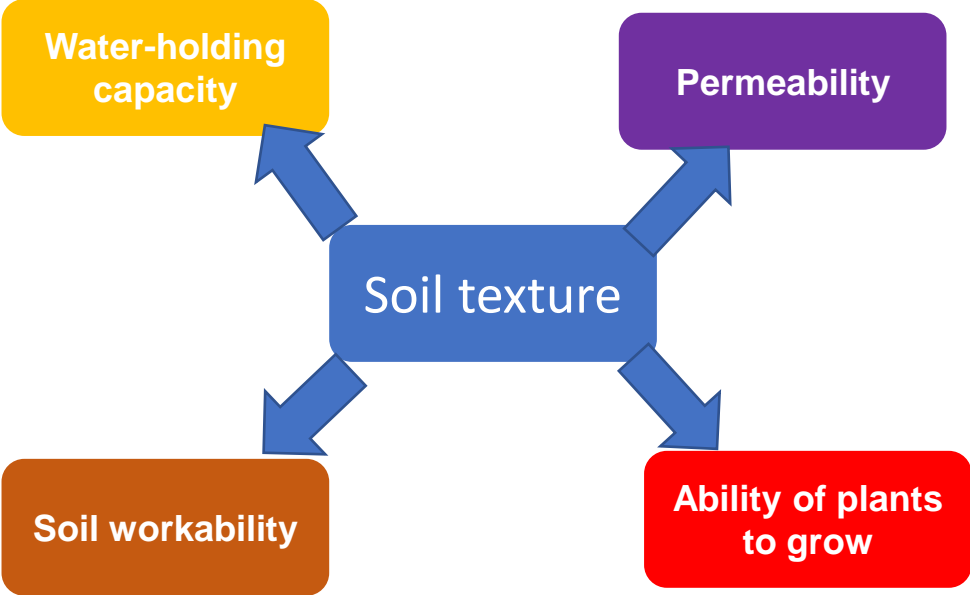
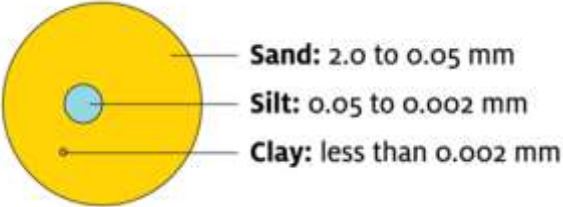
မြေဆီလွှာ





Soil texture (မြေသားအနုအကြမ်း)

- Soil texture (such as loam, sandy loam or clay) refers to the proportion of sand, silt and clay sized particles that make up the mineral fraction of the soil.
- Texture is important because it influences:

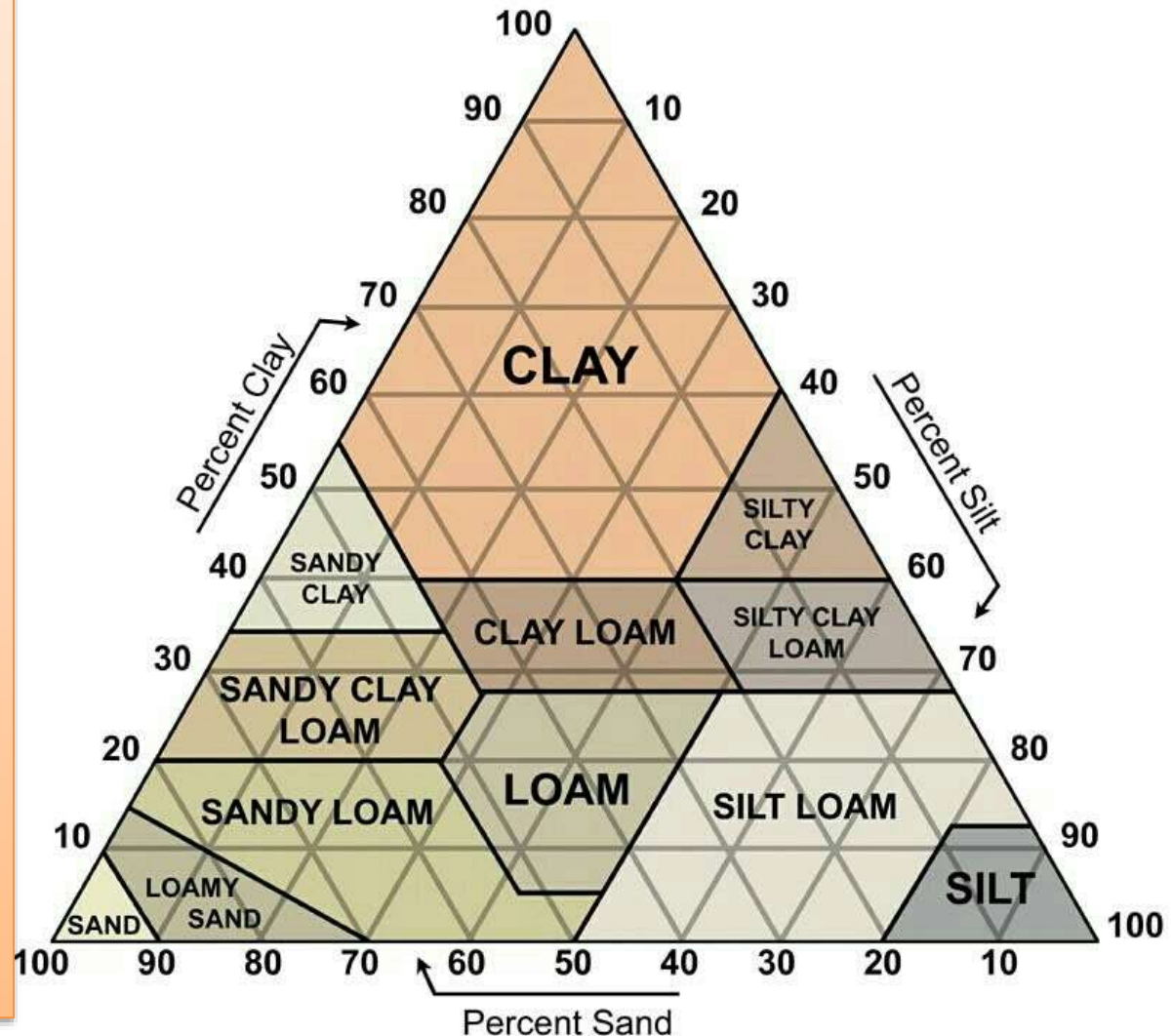


Determination of soil texture in laboratory

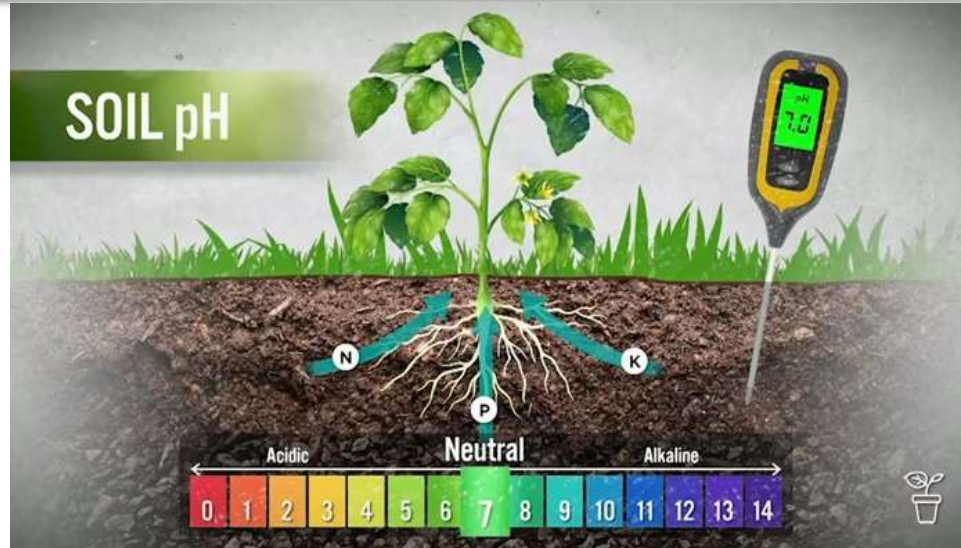
Relative proportion of sand, silt & clay always adds up to 100%

Determination of Soil texture

- ◆ The percentage of sand, silt and clay may be tested in the laboratory.
- ◆ After soil test, may be determined textural class of the soil by referring to the textural triangle.
- ◆ The relative amounts of sand, silt, and clay may be determined in the field using ribbon method.

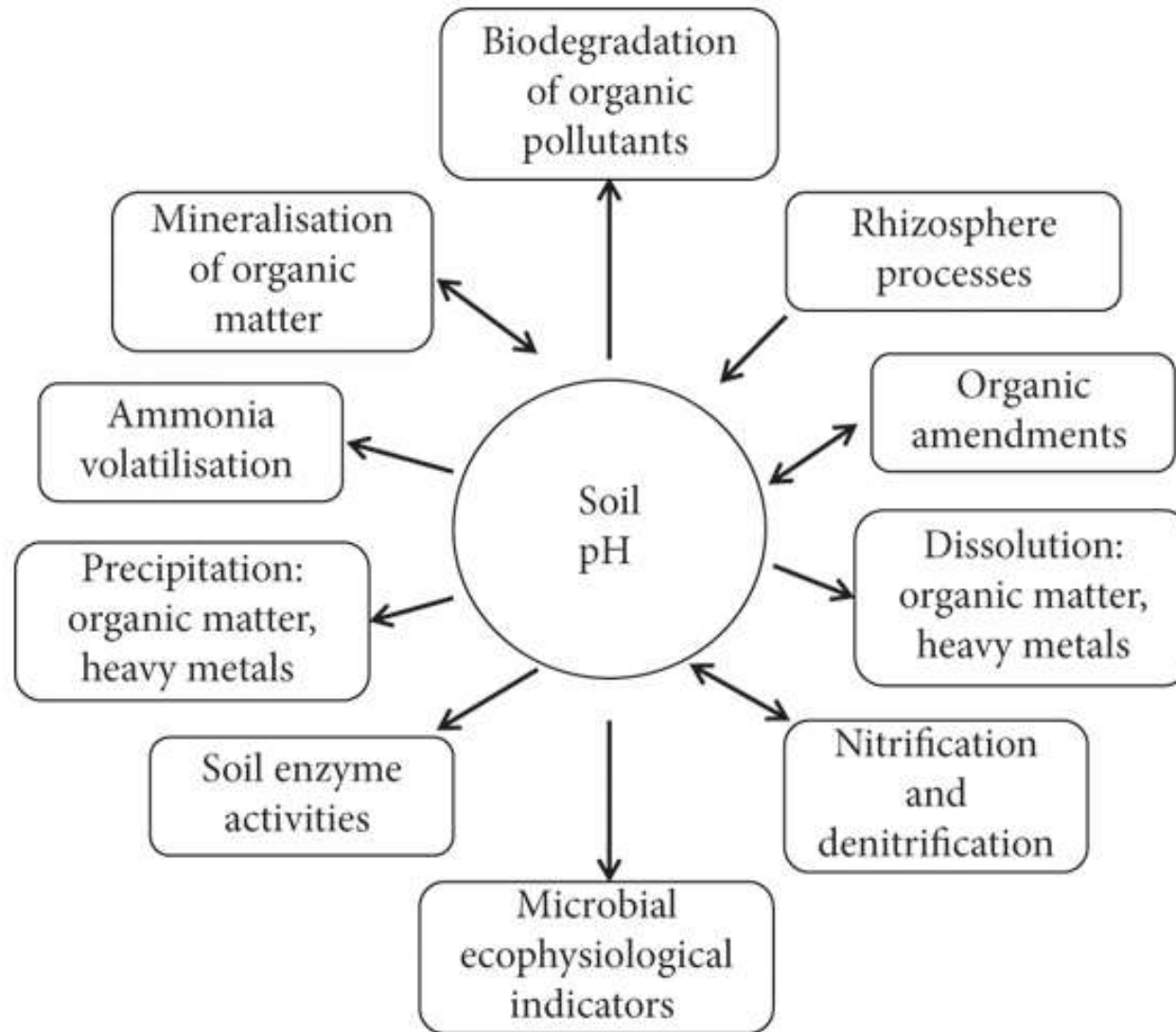


soil pH

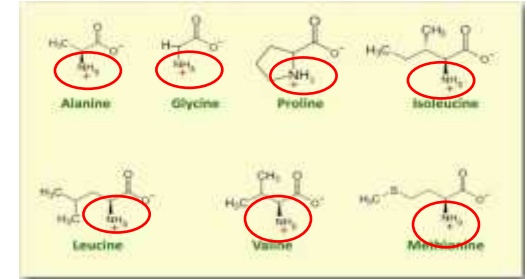
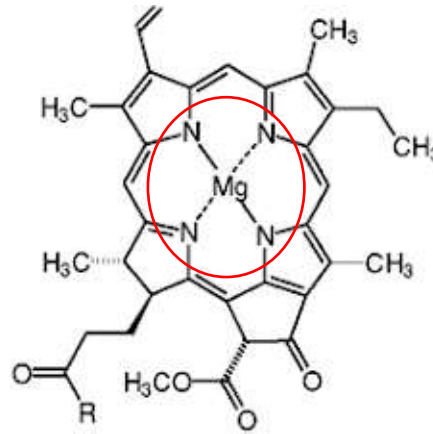


- ◆ Soil pH is an extremely important component of soil quality and health.
- ◆ If the soil pH becomes too acidic or too alkaline, it will impact and reduce the soil nutrients, therefore hindering crop production.
- ◆ When soil pH is outside the optimal range, less nutrients are available to plants, potentially causing deficiencies.
- ◆ To acidify soil, add gypsum, compost, manure, and mulch.
- ◆ To make soil more alkaline, add lime to soil. Clay soils will need more added than sandy soils.

Soil pH



Role of nitrogen for the plant



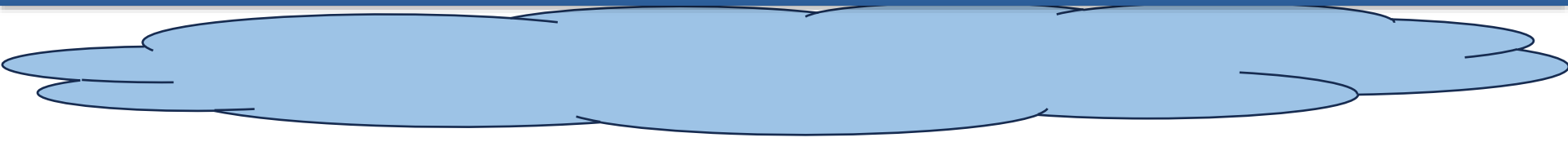
many compounds of plant, such as chlorophyll, amino acid, nucleotides, proteins, alkaloids, enzymes, hormones and vitamins

➤ အစာချက်: နေရောင်ခြည်မှ စွမ်းအင်ကို အသုံးပြု၍ ကာဗွန် ဒိုင်အောက်ဆိုဒ် နှင့် ရေကို ဂလူးကို့စ် အဖြစ်သို့ ပြောင်းလဲ

Figure-Amino acid structure

➤ အမြစ်၊ အဖူး ပန်းပွင့်ချိန် တို့ကို ထိန်းညှိပေး။
 ➤ နက်ထရိုဂျင်သည် အပင်များ ရှင်သန်ကြီးထွားရန်အတွက် မရှိမဖြစ်လိုအပ်

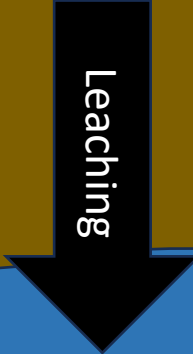
Nitrogen loss



Urea 240
Kg

Volatilization
24-36Kg

NH_3



NO_3^-

NO_3^- NO_3^-

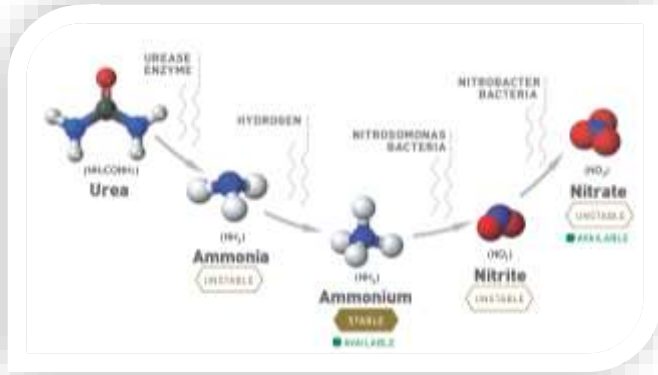
10 mg/L of NO_3^-

NO_3^-



NO_3^-

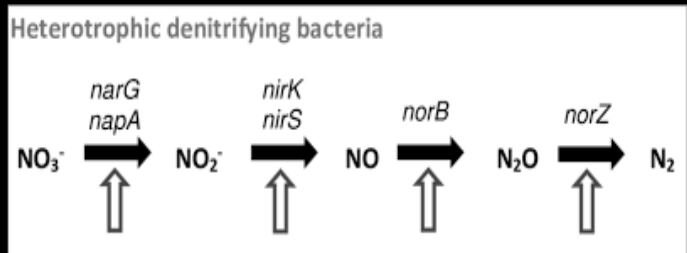
Nitrogen loss



3-9% in russia (Kudeyaruov,

မိုးများ၊ ရေသွင်းများ၊ သံမြေ

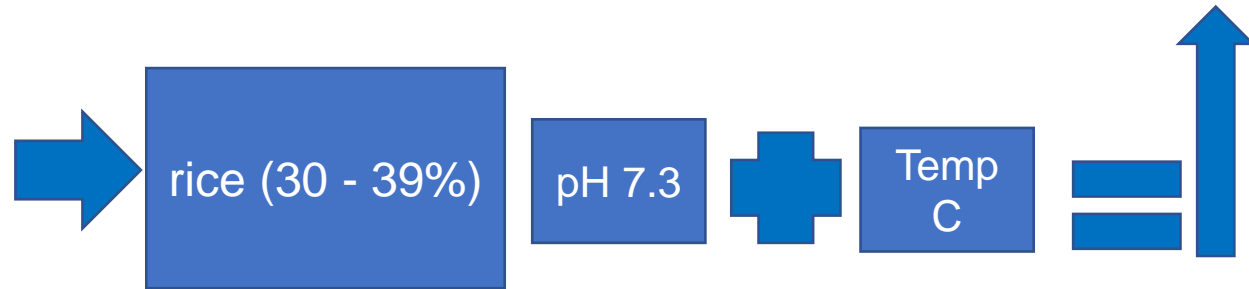
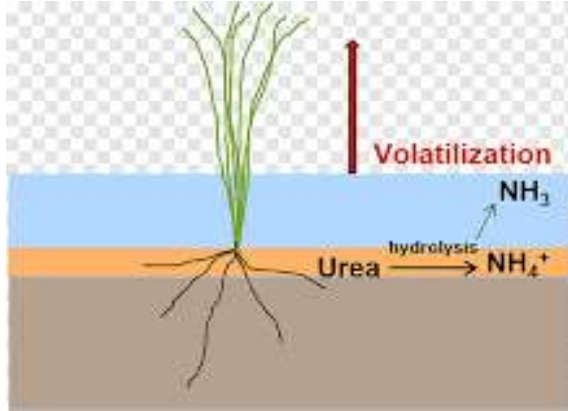
ရေညစ်ညမ်း



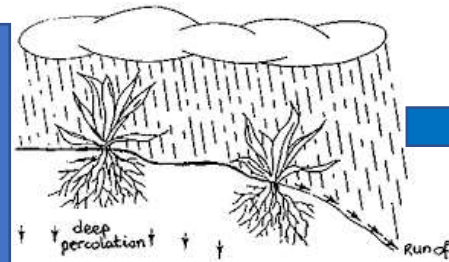
10% in lowland rice (De Datta et al. 1991)

Nitrification of 0 - 2 mm, denitrification of 1.5 - 5.0 mm (Arth and Frenzel, 2000).

Nitrogen loss

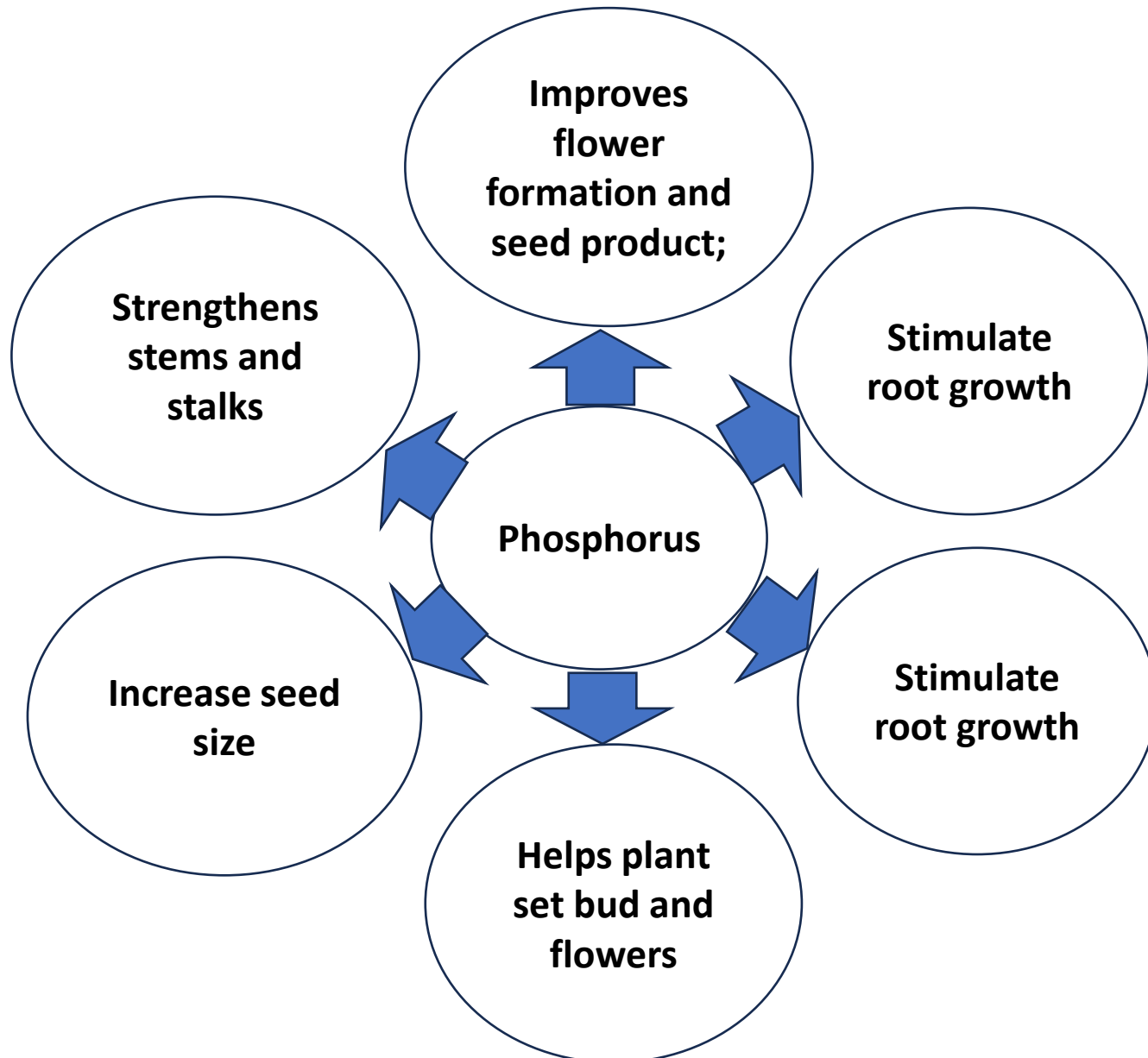


18.3 kg/ha from
upland rice fields
in china (Peng et
al. 1995)

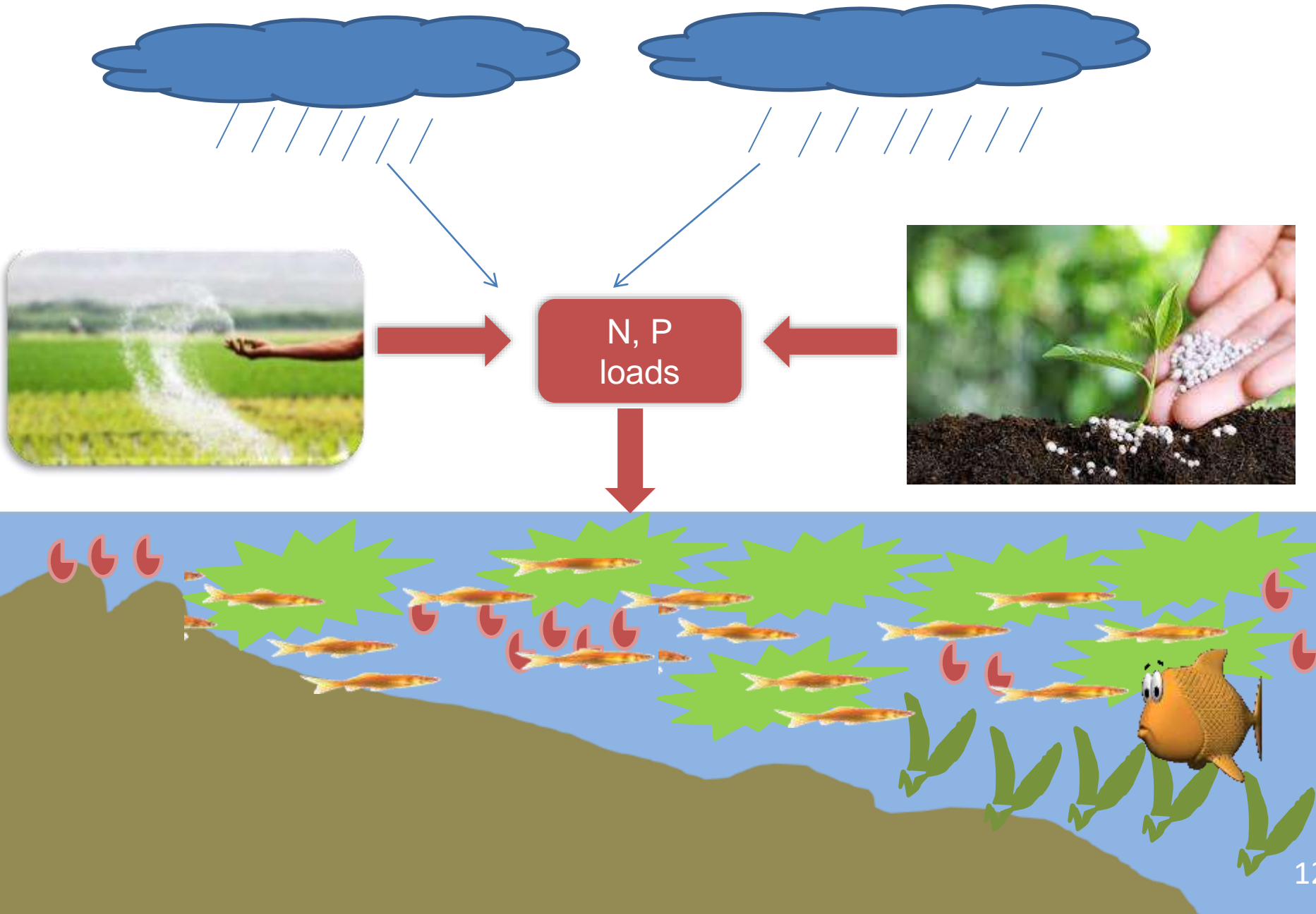


4 - 16 Kg N/ ha in
Japan Craswell and
Velk
(1982)

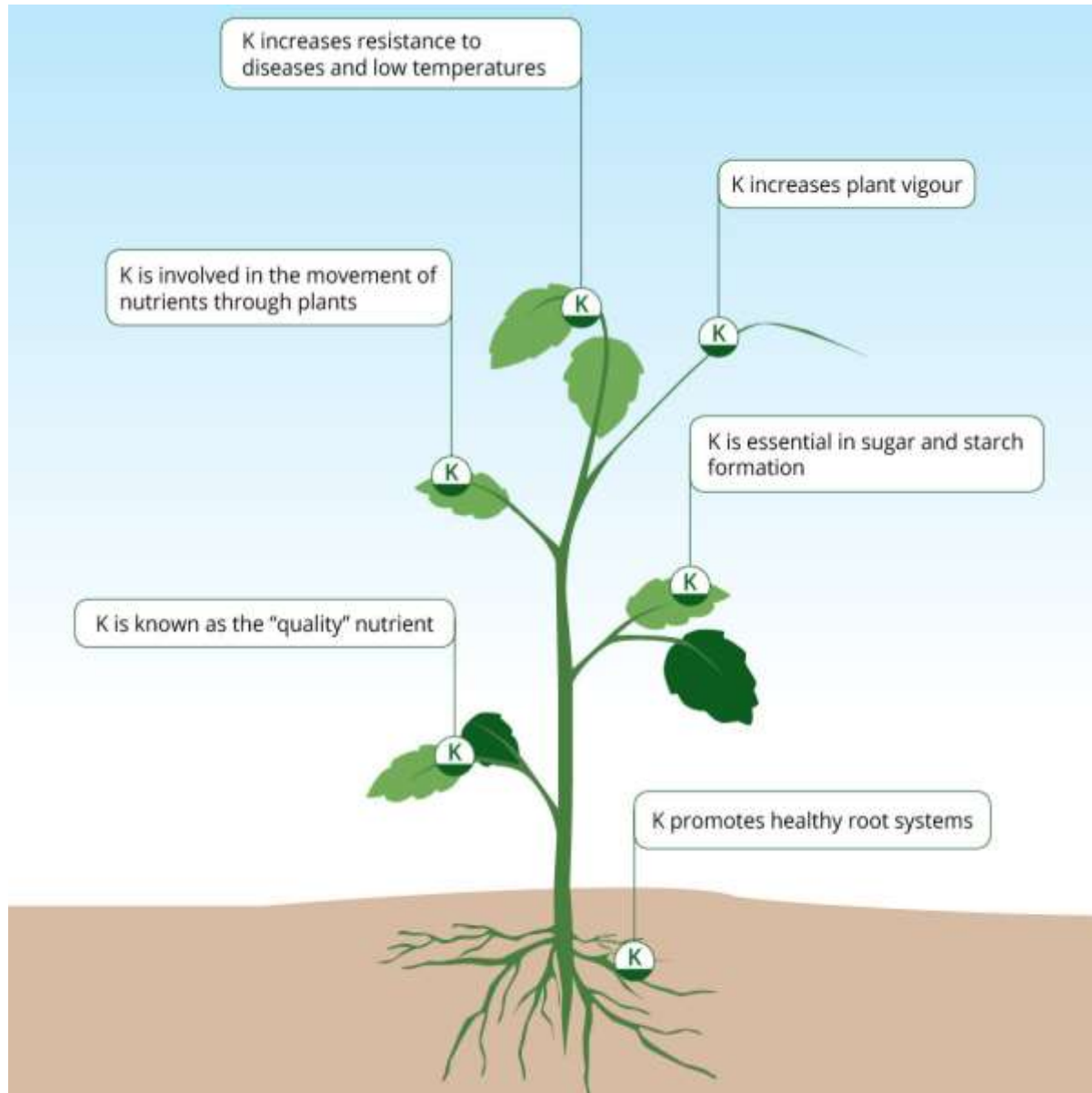
Role of Phosphorus for the plant



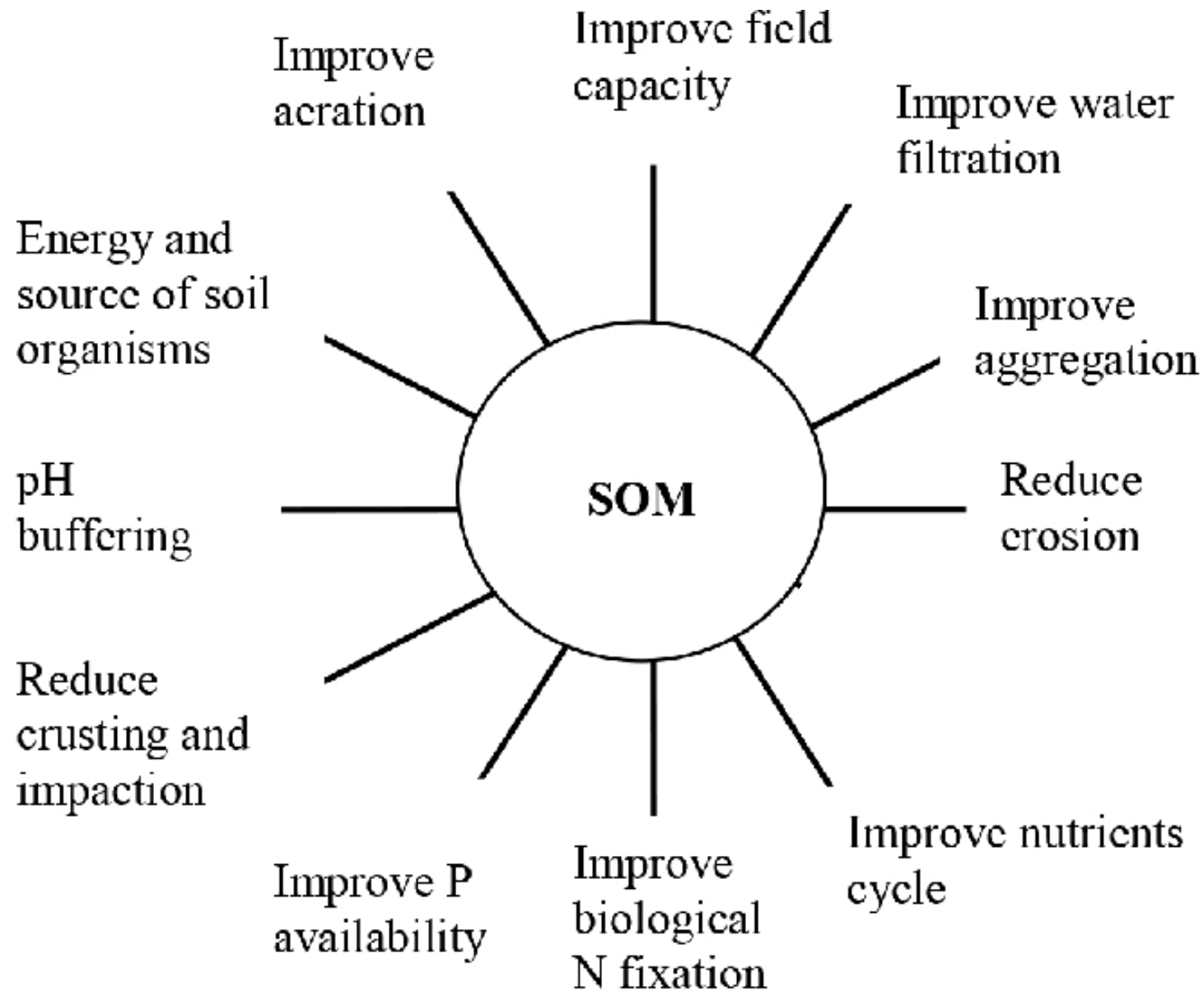
Eutrophication



Role of Potassium for the plant



Soil Organic Matter (SOM)



The importance of soil analysis

- Soil analysis gives valuable information, essential for soil quality improvement.
- By tracking the exact amount of soil nutrients, a farmer can easily adjust fertilization in accordance with soil and crop requirements.
- A soil sample provides you information on nutrients yours may be lacking. Different nutrient levels give you different information on what you need to add.
- The pH level in the soil. This will help identify if your soil needs lime.
- The plant available nitrogen, phosphorus and potassium levels. This will tell you if you need to apply fertilizer to meet your crop needs and yield goal.
- You can also request things like the percent organic matter level in the soil and recommended amounts of nitrogen, phosphorus, and potassium to apply.

Farmer benefits

These benefits can help farmers by:

- Improving yields and profitability because you are providing necessary nutrients to your crops.
- Increasing consistency of nutrient availability across a field.
- More uniform crop growth. This also helps individual plants stronger against weeds and simplifies other processes like cultivation and spraying.
- More uniform plant maturity. This can help simplify crop harvesting and drying along with improving market quality.
- Allowing fine-tuning of which nutrients are most needed. Helping you allocate your fertilizer **dollars** to those nutrients that will give you the greatest profit increase.
- A soil sample provides you information on nutrients yours may be lacking. Different nutrient levels give you different information on what you need to add.

Environmental benefits

- The biggest impact soil testing has on environmental benefits mean:
- More efficient use of plant nutrients means less losses from leaching or runoff into waterways.
- Poorly nourished crops leave less plant residue to hold soil in place.
- Plant residue helps build soil and saves it from wind and water erosion.
- Providing the right levels of nutrients helps increase yields and may help reduce the need for intensively farming marginal land.

The best time for soil analysis

- For example, soil sampling for annual crops should be taken after the harvest.
- On the other hand, the best time for a soil analysis of perennial crops is during the dormancy stage.
- How often will a farmer analyze his soil, will depend entirely on him; whether he is ready to invest in soil quality and a higher yield or not.
- Quality and balanced soil are crucial factors for achieving higher yields.
- Farmers should collect soil samples frequently in order to detect any changes that could affect crop yield.
- **It's recommended to perform a soil analysis every 3-4 years.**
- However, it would be ideal to practice soil analysis as often as possible, especially when growing annual crops in a crop rotation in which case, it is recommended to take soil analysis after every third crop in the rotation.

Advantages of Soil sampling

- ◆ အမျိုးမျိုးသော ဓာတုဗေဒ၊ ရုပ်ပိုင်းဆိုင်ရာနှင့် ဇီဝမြေဆီလွှာဆိုင်ရာ ဂုဏ်သတ္တိများကို မြင်သာအောင် ပြပေး
- ◆ မြေဆီလွှာတွင် အာဟာရဓာတ် လုံလောက်နေပြီဆိုပါက မလိုအပ်သော အာဟာရများ ထပ်မံထည့်ခြင်းကို တာဆီးပေး
- ◆ သီးနှံအထွက်နှုန်းကို မြှင့်တင်ရုံသာမက အပင်အာဟာရချို့တဲ့မှုကို ခွဲခြားသိမြင်နိုင်စေရန်နှင့် ဓာတ်မြေဩဇာပိုလျှံသော အသုံးချမှုမှ ညစ်ညမ်းမှုကို လျော့ချရန် မရှိမဖြစ် လိုအပ်
- ◆ အချိန်အခါအလိုက် မြေဆီလွှာစမ်းသပ်ခြင်းသည် အာဟာရစီမံခန့်ခွဲမှု တွင် အလွန်အရေးကြီးသော အစိတ်အပိုင်းဖြစ်ပြီး စပါး၊ ပဲပုပ်၊ ပြောင်းနှင့် အခြားစိုက်ပျိုးရေးသီးနှံများ ထွက်ရှိရေးအတွက် အထောက်အကူ ဖြစ်စေရန် အရေးကြီးသော အချက်အလက်များကို ပံ့ပိုးပေး။

Advantages of Soil sampling

- ✓ သီးနှံအထွက်နှုန်းတိုး
- ✓ လုံလောက်သော/အကျိုးရှိသော အာဟာရစီမံခန့်ခွဲမှု
- ✓ ပတ်ဝန်းကျင်ညစ်ညမ်းမှု လျော့ချပေးခြင်း
- ✓ ကုန်ကျစရိတ်သက်သာစေခြင်း
- ✓ မြေဆီလွှာကျန်းမာရေး တိုးတက်ကောင်းမွန်စေခြင်း

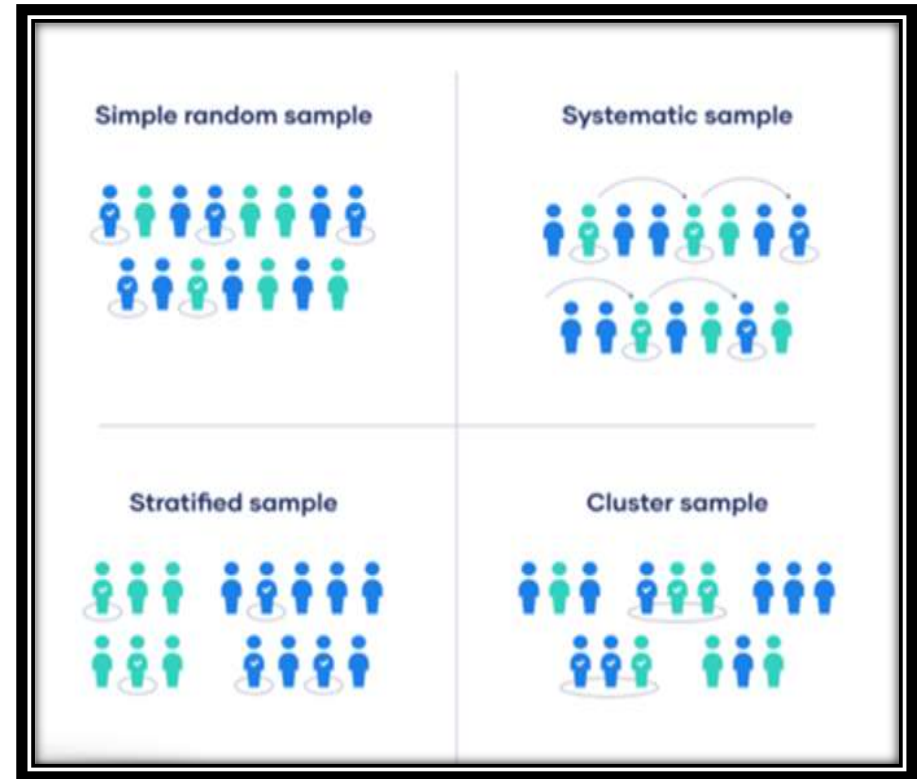
Factors to be analyze

- ✓ pH
- ✓ organic matter
- ✓ Major nutrients (N,P,K)
- ✓ EC
- ✓ SAR (Sodium Adsorption Ratio)
- ✓ Sodium carbonate
- ✓ Cations (Ca^{2+} , Mg^{2+} , N^+ , K^+)
- ✓ Anions (Cl^- , SO_4^{2-} , NO_3^- , CO_3^{2-} , HCO_3^-)
- ✓ Heavy metals (As, pb, Cr, Cd, Ni)
- * GAP crops- **Hm must check**

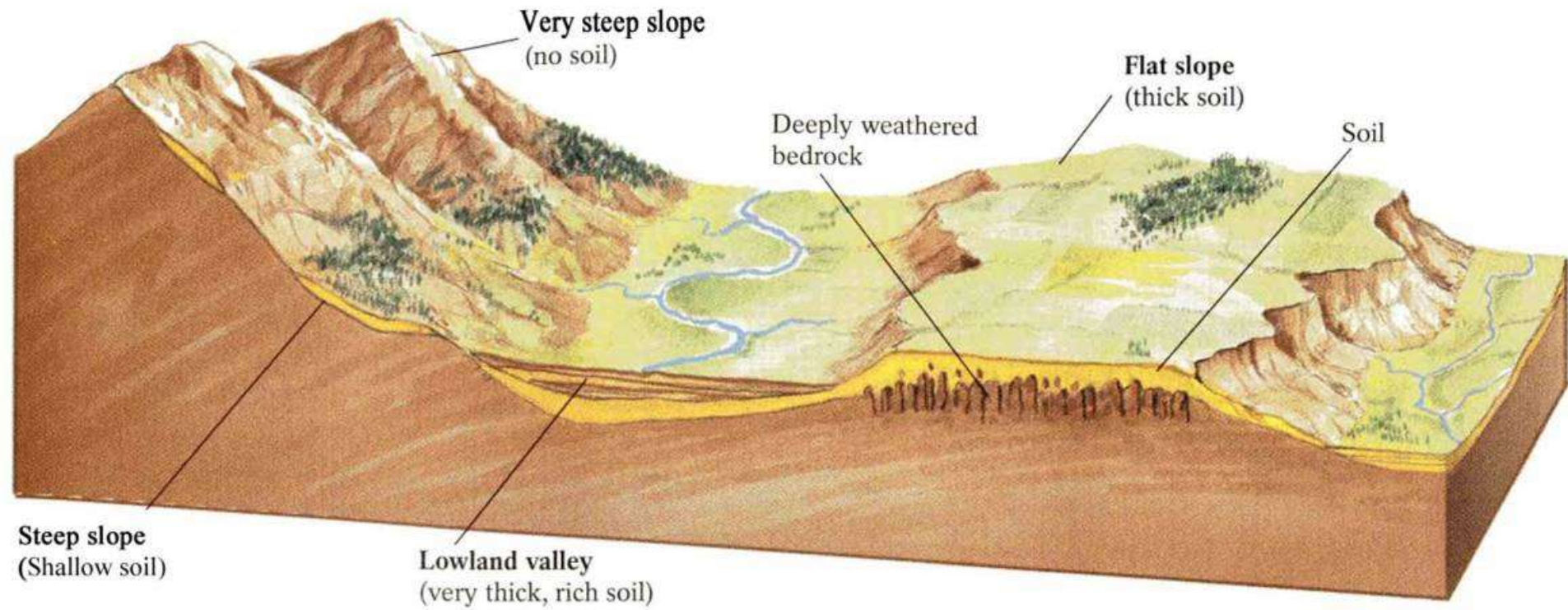
Sampling methods

Sampling methods include

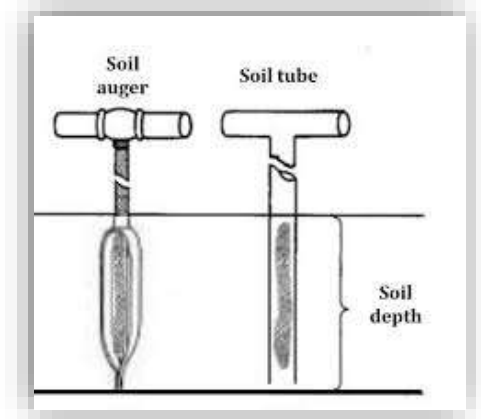
- ① simple random sampling,
- ② systematic sampling,
- ③ stratified sampling, and
- ④ cluster sampling.



Topography



Equipments for sampling



မြို့နယ်အမည်-
ကျေးရွာအမည်-
မြေနမူနာအမှတ်-
ကွင်း/ဦးပိုင်-
မြေအနက်-
LU/LC-
ရက်စွဲ-

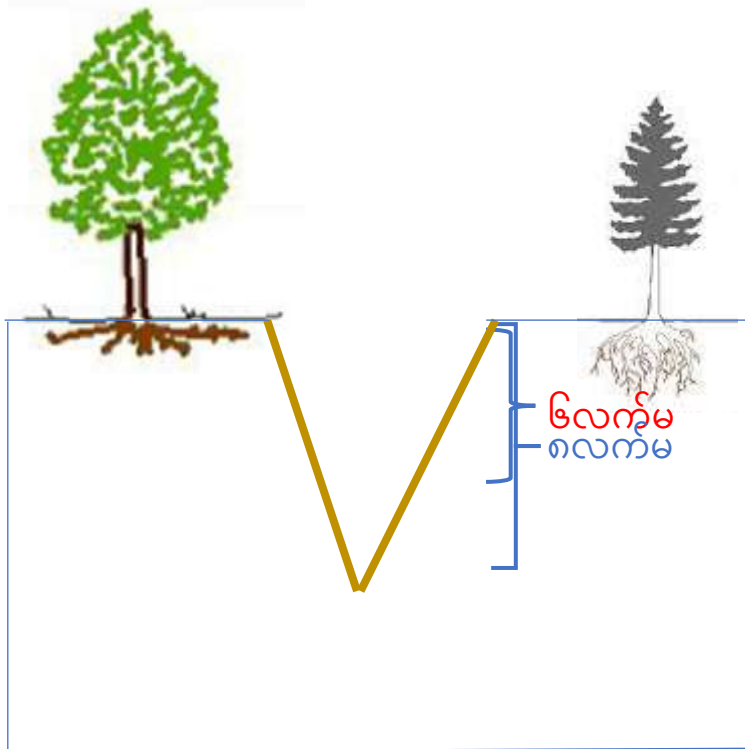


Avoid area in soil sampling

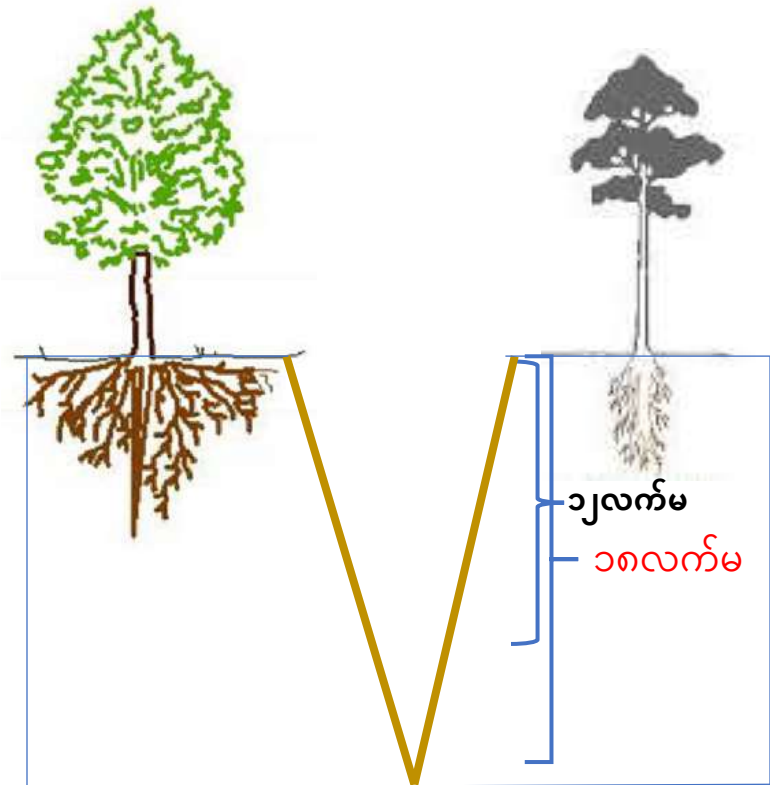


Soil depth for sampling

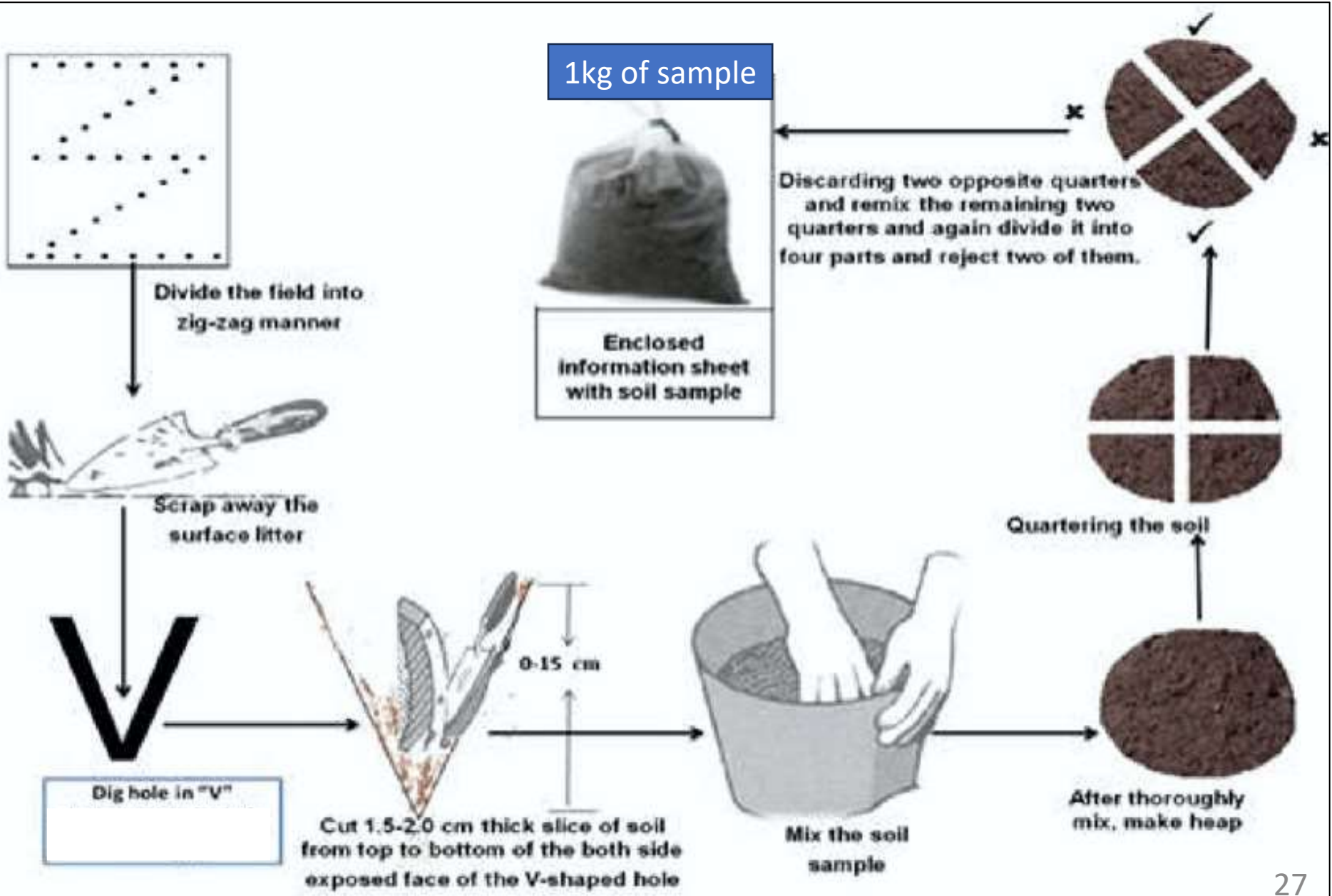
နှစ်ချင်းသီးနှံများ



နှစ်ရှည်သီးနှံပင်များ



Soil sampling procedure



မြို့နယ်အမည်-

ကျေးရွာအမည်-

မြေနမူနာအမှတ်-

ကွင်း/ဦးပိုင်-

မြေအနက်-

LU/LC-

ရက်စွဲ-

Factors should be followed in water sampling

- ◆ စက်ရေတွင်း၊ အဝီစိတွင်း၊ ရေလျှံတွင်း၊ ရေတွင်း ၂၀မိနစ်ခန့် ရေစုပ်ပြီးမှ နမူနာယူ
- ◆ ရေကန်၊ ဆည်၊ အင်းအိုင် ၊ ရေလှောင်ကန် မှ ရေယူပါက ကန်ဘောင် သို့ ကမ်းစပ်အကွာမှ ရောပေအနက်မှ ယူ
- ◆ ပိုးမွှားသန့်စင်ထားသောပုံးဖြင့် ရေခပ်ယူနိုင် ၊ ရေတွင်ပါလာသော အမှုက်များကို ဖယ်ရှားရမည်။
- ◆ ရေနမူနာထည့်မည့် ရေဗူးအား ၎င်းရေဖြင့် ၃ ကြိမ် ဆေးရမည်။
- ◆ ချောင်း၊ မြောင်း၊ မြစ် တို့တွင် ရေစီးအသန်ဆုံးနေရာမှ ရယူ
- ◆ ဆေးရုံ၊ စက်ရုံ၊ မြူနီစပယ်စွန့်ပစ်ရေ၊ မွေးမြူရေးခြံများ၊ စသည်တို့မှ ဖြတ်သန်းစီးဆင်းလာသော ရေများ အား ရေနမူနာမယူသင့်ပါ။



Sediment sampling

- Sediment is collected from beneath an aqueous layer either directly, using a hand-held device such as a scoop, spoon, shovel, or auger.
- Grab samplers for collecting surface sediments, thereby providing material for the determination of **horizontal distribution** of variables and
- Core samplers for collecting a depth profile of sediments, thereby providing material for determination of vertical distribution of variables

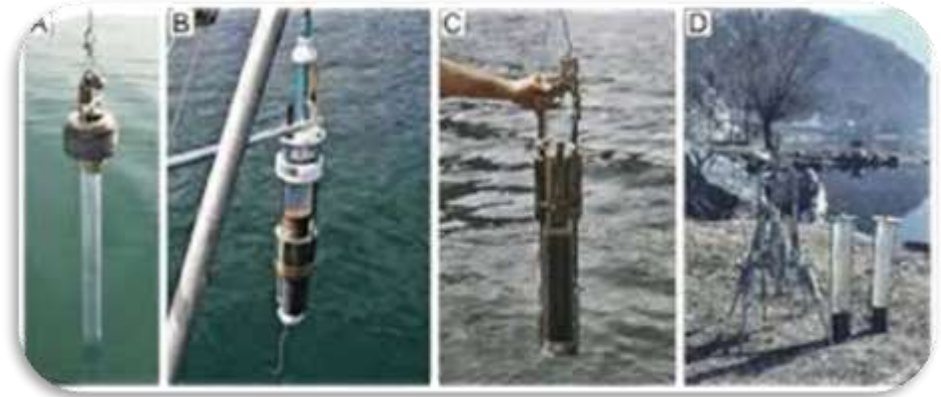
Sediment sampling with scoop or spoon

- Scoops and spoons are inexpensive, widely available, non-mechanical, and easy to use.
- If the surface water body is wadeable, the easiest way to collect a sediment sample is by using a stainless steel scoop or spoon shallow waters.
- Attaching the scoop to telescoping poles allows for collection of sediments in deeper waters.
- Care should be taken when the scoop is raised through the water column or is passed through a river current during retrieval to minimize the loss of extremely fine material.
- Some disadvantages to using a scoop or spoon includes: limited sample volume; possible loss of very fine material during retrieval; not useable in waters greater than 4-5 feet deep.

Sediment sampling with Scoop



Types of core sampler



Core samplers for sediment sampling: Gravity collectors (A, B), Limnos (C), and Jenkin (D).

Cares and management

- When using a boat or other sampling platform, **all engines** should be **turned off**.
- The samples should be collected **upstream** from the engines or any other machinery that may release exhaust fumes/oils into the sample.
- Sampling equipment and supplies that may come into contact with the sample should be **cleaned and decontaminated** in accordance with the decontamination procedures in the sampling plan.

What Happens After Soil Analysis?

- Depending on the results of the soil analysis, a farmer can easily manage soil requirements for a certain crop.
- The results will indicate you in case that you needs to add lime in order to manage soil acidity.
- Liming rates are usually determined by taking into account soil type, depth of tillage, and limestone quality.



THANK YOU