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SOLE OF AGRICULTURE

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As we know our sole is agriculture but today we will know about sole of our agriculture . once in your life time you need to be a doctor a lawyer a teacher but every day you need to be a farmer to full fill your primary needs , As you are mature enough I hope you know your primary or utmost essential need , as our indo- Australian plate or continent of Gondwana land is India, It is an agricultural land that you absolutely say like that this India contain 70-80% people belongs to marginal farmer which depend on agricultural trade and practices for financial stability . you might be belonging from that background so you also can relate most that what problem a farmer are dealing with , I can definitely say that if you want to be a people who want to serve the solution of problem faced by our society you can take the agriculture as you core subject and by taking this you would able to know more about how to maintain sustainability with proper management in your community's land so that farmer can stretch out all the benefits for their crop and they could make our Hashtag success that #Green India .

Today am going to give a brief outline about our land and soil , how the soil should be and how we rectifying them to maintain a proper health plan of soil , you indeed know that how soil is important for our agriculture so we can't ignore our sole of agriculture which is soil – it's just only 4 word but that means a lot , in our tradition we have also given the pride of mother to her so you can guess how important is this for our culture and also for our economic growth purpose .

AS our general language – "soil is our mother which full fill our primary need and act as a medium for our oxygen bank (tree)."

As a agriculturist – " soil is a natural body which originated by rock's parent material through weathering process which not only help in growth of crop but also provide proper nutrient mineral and organic matter for development of crop."

ARTICLE OUTCOME

After reading this you will get to know about your soil in details , such as

- Type of soil present in your locality
- What a soil should have their physical characteristics
- Constituent of your local soil like your soil have any deficient or toxicity
- Also you able to know about how soil take water air and how they maintain their temperature colour and how they affect the plant
- By taking agriculture as your carrier you will also know about various interesting subject like pathology agronomy lets talk about soil science – you will capable to deals with the soil problem and how to manage them.

Lets go and just discuss briefly about soil I hope this article will give you a basic idea about our soil .

Soil have 4 component

1. Mineral of soil (45%)
2. Air (25%)
3. Water (25%)
4. Organic matter (5%)

5% organic matter present in whole over the earth's soil but if you talk about our India soil contain less than 0.5% of organic matter.

ORIGIN OF SOIL

As I have mentioned above that the soil is originated from parent material of rock. So lets have little bit discussion on rocks that – Rocks are of mixture of two or more minerals which are of basically 3 type

1. Sedimentary rock- these rock formed by pre- existing and consolidated rock which formed through 4 stage weathering , transportation , deposition , transportation.
2. Igneous rock- igneous rock formed by solidification of molten magma e.g- granite , basalat
3. Metamorphic rock - due to some physical (high temperature pressure) changes and chemical changes both igneous and sedimentary rock chemically change from it's original form to different that called metamorphic rock .

Then comes to how the parent material or regolith form by the process of weathering , in weathering earth crust (rock) breaking down to form the parent materials for soil formation , it again of 3 type

1. Physical weathering – it is mechanical disintegration of heat and cold factor which helps in breakdown of rock such as change in temperature , frost , action of glacier wind movement atmospheric electric phenomena .
2. Chemical weathering – it is the transformation of original rock mineral to a new compound having both chemically and physically different by the influence of chemical changes by complex minerals.
3. Biological weathering – in this process different living organisms became the main cause of weathering , such as man , animals , root , higher plant , microorganisms etc are main causes .

SOIL LAYER AND IT'S PROFILE

Soil have different vertical horizon which is arranged vertically and contain regolith called soil profile .

Layer of soil – O, A ,B ,C ,R

In o layer organic matter converted to humus called humification and colour is dark black and also called as surface soil. When water or minerals mix and leached down or percolate into the soil from upper layer to lower layer is called elevation which occur in A horizon. The mobilized solution deposited at another lower horizon which is called illuvation which occur in B horizon. The unconsolidated materials underlying the solum (A+B horizon) same as the parent material of solum which occur in c horizon . so hence A+B+C HORIZON is regolith and R HORIZONE IS for rock .

SOME PHYSICAL PROPERTIES OF SOIL

Physical properties means it is the soil texture, structure , porosity , density , consistency etc .

Texture of soil - in short if we tell texture of soil is the ratio of sand silt and clay present of that soil. By using the hydrometer we can measure our % of sand silt and clay in our soil and by textural class we can also find out the soil type. As loam soil contain near about 33-34% of silt sand and clay so it is more fertile and suitable for our cultivation purpose .

Always remember according to USDA

Soil size of clay - <0.002mm
Soil size of silt – 0.002-0.05mm
Fine sand – 0.10-0.25 mm
Coarse sand – 0.50-1.00mm
And according to ISSS
CLAY - <0.002mm
Silt -0.002-0.02mm
Fine sand – 0.02-0.2mm
Coarse sand – 0.2-2mm

SOIL STRUCTURE

In short if we tell it is the arrangement or organization of primary particle (clay , silt, sand) which define certain pattern called soil structure .

Classification of soil structure –

Types of structure –

1. Plate like –this type mainly seen in compacted soil , if it arrange with thin layer of plate like structure called laminar if thick then it is named as platy .

2. Prism like- commonly found in subsoil of horizon when top of aggregates is rounded then it is columnar but when the top of aggregates or ped are arrange prism like or have clean cut then it is named as prismatic soil .

3. Block soil – it is found in subsoil of horizon which have good drainage capacity good aeration and penetration , in this types ped are arrange in 3-d structure when the face and edge of soil is flat then it is named as angular and when they are rounded then it is sub angular.

4. Sphere like – soil are arrange in generally rounded and sphere like peds if soil is less porous then it is granular if more porous then crumby .

Class of structure –

1. Very fine or very thin
2. Fine
3. Medium
4. Coarse or thick
5. Very coarse or very thick

Grade of soil –

1. Structure less or single grain – there are no visible aggregate or ped structure , e.g – silt , sand
2. Week – poorly , non durable ,indistinct ped
3. Moderate – moderately developed ped durable and distinct
4. Strong – very well form ped , durable and distinct

DENSITY OF SOIL –

It is the weight per unit volume of substance which express in gm/cc cubic c.m

D = M/V

These are of 2 type

1- Particle density –it is the weight of solid part of soil per unit volume and it is also termed as true density , generally in normal soil particle density is = 2.65 gm/cc.

2- Bulk density –it is the weight of dry soil of solid and pore space of soil per unit

volume , generally it varies from – 1-1.70 gm/cc and it is always less than particle density.

** if the porosity of soil is more and the bulk density of that soil is less

** if we consider the structure of soil the granular soil have more bulk density then crumby.

** if we consider texture of soil the sandy soil have more bulk density than clay soil

So hence porosity is inversely proportional to bulk density .

POROSITY OF SOIL-

It is the void present in soil , in this void or pore the water or air present . then again pore are of 2 type

- Macro pore – large size pore which allow air and water movement at ease , commonly seen in sandy soil
- Micro pore – small size pore are generally referred to as a micro pore in which air and water is restricted to some extend and this characteristics seen in clay soil .

% porosity = 100(1- bulk density/ particle density) .

SOIL AIR -

As we know, air contributes 25% of soil and it is equally important as like water . gaseous interchange or exchange between soil and atmosphere takes place , gaseous exchange by 2 process a- mass flow b- diffusion .soil contain more co2 then atmosphere and less o2 than atmosphere , co2 increases in soil due to microbial action and in presence of more soil moisture and more organic matter which leads to toxin production in soil , and also in absence of o2 organic matter reduces to Aldehyde or alcohol which is not favourable for plant , so for a good farming soil aeration should be good .

SOIL TEMPERATURE AND COLOUR –

Source of soil heat is basically solar radiation , biochemical reaction , conduction, exposure , vegetation etc ,and also loss of soil heat also occur by radiation , conduction , evaporation ,perception etc which have great impact on soil temperature .in which soil water retention capacity(clay) and organic matter is more those soil shows low temperature than other, means it slowly warm up .

Soil colour are determine by the comparison with munsell colour, if organic matter is more in soil then it have seen dark black colour , if iron contain is more in soil then it have seen red in colour , if silica then white and if more water present in soil it have seen bluish in colour .

SOIL WATER -

It is an excellent solvent which is primary need for any plant growth . fine texture soil and have high organic matter soil have greater water retention capacity than other soil , and if the temperature of a soil is cool then it have seen more water holding capacity.

Soil water are classified into 2 type

1. Physical classification
2. Biological classification

Physical classification – Again 3 type a- gravitational water b- capillary water c – hygroscopic water

Gravitational water – it may be define as water that held at potential greater than -1/3 bar and that portion of soil water will drain freely from soil by the force of gravitational force . It have no used for plant .

Capillary water – it retain on the soil particle by the surface force it held so strongly that gravity can not able to remove it , molecule of capillary water are free and mobile and are present in liquid state , main thing is plant root are able to absorb it and it lies between -1/3 to -31 bar .

Hygroscopic water- it is very tightly present on the surface of soil, it generally present in non liquid state and it is not get easily separate from soil until unless the soil is not more heated , and it is not used for plant but yes some microbes use this .

BIOLOGYCAL CLASSIFICATION –

Available water – water which is lies between wilting point and field capacity
Unavailable water – this include the whole of hygroscopic water with part of capillary water bellow wilting point .

FIELD CAPACITY -

Water present over the soil against down ward pull after fill out all the pore present in the soil .

WILTING POINT –

As the moisture content fall a point is reached when the water is held so tightly that the plant root can't draw it and plant begins to wilt , it means the point at which water supply stop that is called permanent wilting point.

SOIL TYPE –

- Alluvial soil
- Red soil
- Black soil
- Arid/desert soil
- Laterite soil
- Saline soil
- Marshy soil
- Forest soil
- Sub-mountain soil
- Snow field soil

As I belongs to odisha so our soil type is mostly laterite soil but at some place. In districts of Koraput, Rayagada, Nawrangpur, Malkanagiri, Keonjhar,Ganjam, Kalahandi, Nuapada, Bolangir,Dhenkanal and Mayurbhanj , presence of excess amounts of oxides of iron imparts red colours to the soil. The soils of the former four districts are heavier in texture and the rest of the districts have light textured soil. The soils have angular or subangular blocky strucuture.

In districts of Puri, Ganjam , malkangiri,Kalahandi, Nuapada, Bolangir, Sonepur, Boudh,Sambalpur, Bargarh and Angul covering an area of 0.96 m. ha. of lands black colour of the soil is seen due to presence of titaniferous magnetite ,humins, bitumins etc. These soils are formed due to weathering of basic rocks in the low lying areas. These soils are heavier in texture having clay content more than 30 percent.

In districts of Puri, Khurda, Nayagarh,Cuttack, Dhenkanal, Keonjhar, Mayurbhanja and Sambalpur. Lateritic soils are seen this is characterised by compact vesicular structure and rich in hydratedoxides of iron and aluminium with small amountsof manganese, titanium and quartz. Degraded laterites are honey combed structure and found in the districts of Khurda and Cuttack.

These soils are loamy sand to sandy loam in the surface having hard clay pan in the subsoil, crusting is its problemin upland literite. Presence of higher amount of exchangeable aluminium and manganese results in slightly acidic to strongly acidic soil with pH ranging between 4.5 to 5.8.

In districts of Balasore, Bhadrak Jagatsinghpur, Kendrapara, Puri, Khurda and Ganjam Saline soils are seen which are rich in soluble salts of chloride and sulphate in conjunction with sodium and magnesium. Soils of lacustrine sediments of lake Chilika also get affected by salts due to flooding of brackish lake water.

In the districts of Phulbani, Kandhamal, Rayagada and parts of Ganjam and Nayagarh cover about 0.17 m.ha. t seen as brown to gray brown colour, light texture and acidic in reaction. Organic matter and nitrogen content of the soils are medium to high. Phosphorus and potash content are medium.

Like this u can get a good outline about your local soil and manage them according to their need and make them healthy, you can give your soil a appropriate treatment as a soil doctor after reading more on this so I think I have given all short outline of soil and for more information you can take Agriculture as your core subject and follow the soil science part .