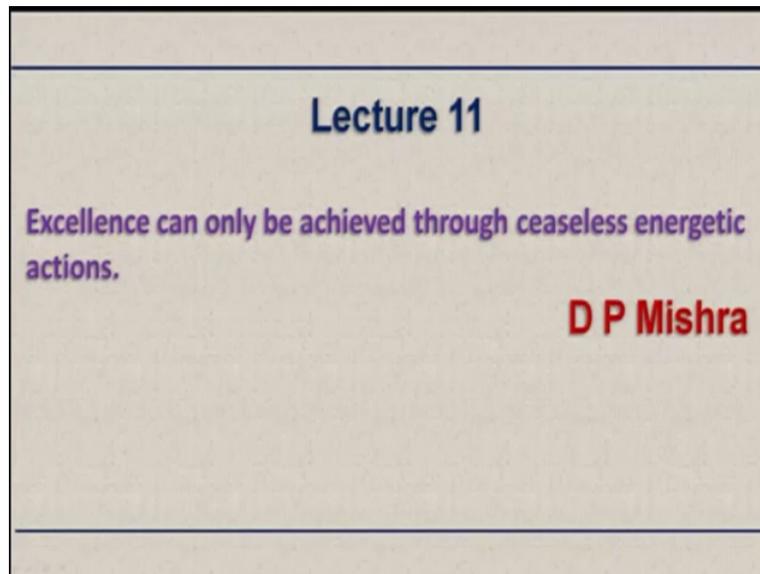


**Introduction to Ancient Indian Technology**  
**Professor D. P. Mishra**  
**Department of Aerospace Engineering**  
**Indian Institute of Technology**  
**Module 3**  
**Lecture No 11**

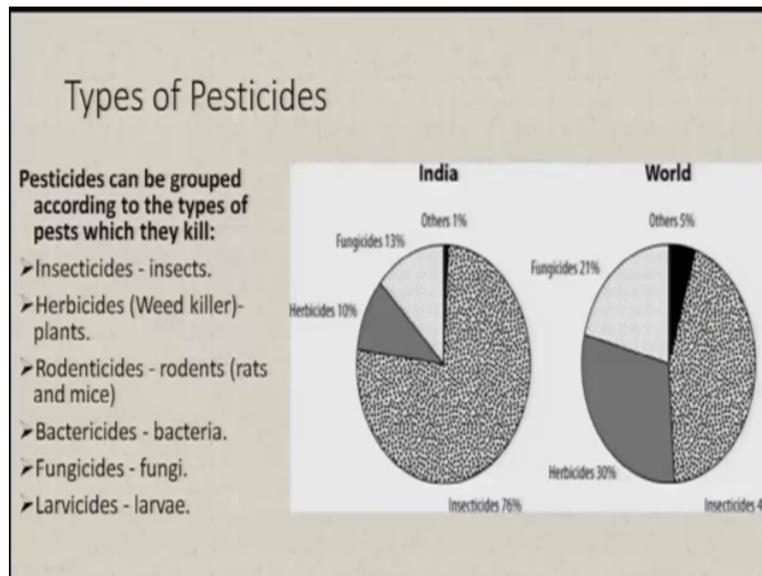
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Let us start this lecture with a thought process. If want to achieve excellence, it can only be achieved through ceaseless energetic actions. You will have to put your 100% then only you can achieve excellence and it should be continuous not that you will achieve. So, let us recall what we learnt. In the last lecture we basically learnt about the green revolution which was being you know introduced in this country with a fan fair and it amounts to be a not really green revolution.

It is basically greedy revolution you can say and it has created lot of problems and which is difficult to solve. And we have looked at also the uses of pesticides and then fertilizers and other thing, we will continue the discussion on how this pesticides you know causing the havoc in the human life. And of course in the last lecture I didn't talk about what are the types of pesticides? You are aware what are available in modern time? Any idea? I'll give an example how you will classify?

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For example there will be mice or the rodent you know in the land there will be also. Similarly there will be weeds, weeds you know? There is a some unwanted plants will be coming up that we need to remove. Yes. Similarly there might be some other what you call insects and other things will be coming. Some there will be larva. So, based on that you know pesticides have grouped according to types of pests which they need to eliminate or kill right. So, that that's why it has been divided, insecticides basically there will be several insects, so you will have to overcome them by killing them by using some chemicals or paralyze them you know by using certain chemicals.

And the Herbicides, which is also known as weed killers because those are unwanted. But we will see now, our ancient time what they were doing and how they were overcoming that problem? They were not thinking that you know like we will see later on that those are really a problem. And rodenticides like I told rodents or may be rats or the mice you know all those things like.

So, those are rodenticides rodenticides one can use it and bactericides, there is bacteria lot of things are coming up which will be you know detrimental for the plant growth and also the seed productions or the grain productions that way. So, those are and of course the fungicides use a fungus will be developed you know like you will have to and larvicides there will be larvae you know so that it will be also affecting the plant growth or the production of the grains.

So, if look at that worldwide it is basically what is the use insecticides is a 44% this is the basically herbicide 30%, and fungicide is more here and others are 5% those are very very small. But in our country India we use insecticides are 76% of course it is in tropical region, we have seen that, we are having lot of what do you call species in the what you call that is what do you call not land mass, we are having actually a lot of insects and then animal you know like kind of things therefore we need to have taken care. Herbicides is basically about 10% we use and fungicide 13% rest is 1%. So, that is the distribution we do I am like an we use as of now. This is I have taken from some research paper.

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**Health Effects of Pesticides**

**Endometriosis**, a disease in which the uterine tissue grows outside the uterus, and a common cause of infertility was virtually unheard of twenty years ago. It now affects 5.5 million women in the U.S. and Canada, about 10-20% of women of childbearing age. The National Institute of Child Health and Human Development noted that only 20 cases were reported in the medical literature prior to 1921. (Colburn, Dumanoski, & Myers, (1996) Our Stolen Future)

**Hypospadias**, a condition in which the urethra is near the base of the penis, not the end as it should be, has doubled in the last 10 years.

**Undescended testicles**, which is linked with later risk of testicular cancer, is increasing. Researchers reported a doubling in cases between 1962 and 1982 in England and Wales. (Colburn and others, 1996)

**Precocious puberty in girls** is now common. A study of 17,077 girls in the US found that the onset of puberty for white girls was 6-12 months earlier than expected and African-American girls experienced puberty 12-28 months earlier than whites. (Herman-Giddens and others, 1997)

**Reduced sperm counts** are documented. Between 1938 and 1990, sperm counts dropped 1.5% each year for American men and 3.1% per year for European men. There was no decrease in men from non-western countries. Low sperm count is a marker for testicular cancer. (Swan and others, 1997)

Fertility Problems are becoming more common and now affect more than two million couples in the U.S.

And if look at this pesticides, we are discussing something about use of you know fertilizers or the ill effect of fertilizers and pesticides we will continue now. There is a various disease, I've taken some of the them, like if you look at Endometriosis is basically a disease in which uterine tissue growth outside the uterus you know like particularly for the women you know a common cause of infertility was virtually unheard of something may be twenty to thirty years back. But today it is more predominant.

It now affects the 5.5 million women in the U.S and Canada ok, and of course in our country we don't have I couldn't manage to get the data but it will be may be more you know if not less. And 10 to 20% women of childbearing age you know that is affecting. During this period they get these problems. Ok? And The National Institute of Child Health and Human Development noted

that only 20 cases reported in medical literature prior to 1921. It is not a common, this I've given the references.

So, this that is the reason why today the you know you are having several problems of producing babies right? You might have seen. In India there are several sophisticated method also being utilized for producing baby which was a natural one because of problems created by our food and then also using pesticides and fertilizers. So, there is another disease, which is Hypospadias and all of them you may not be aware because I was not aware, a condition in which this Hypospadias in which urethra is near the penis, this is for about the male right, that is for the female, not end as it should be has a double in the last 10 years, these are the data what they are saying. And similar things will be in our country also ok.

And Undescended testicles, right, which is linked with the rather risk testicular cancers, is increasing right, and researchers have reported a double in cases of 1962, 1982 in England and Wales. And these studies actually we are not very good at, we are just using we are not aware. Because our medical research you know are really couldn't co-op with this kind of pressure what we are having today. Doctors, I was talking with doctor, why you people are not keeping the data?

See, where is the time to breath and where to keep the data and there is also attitude problem. So, it is very important to keep the data to know right? But they are not keeping, I talked with several of my friends who are doctors and so, therefore we don't have have data I can't say I we don't have data, data will be there but it is not been talked about. Might be some Kannada some where somebody will be keeping.

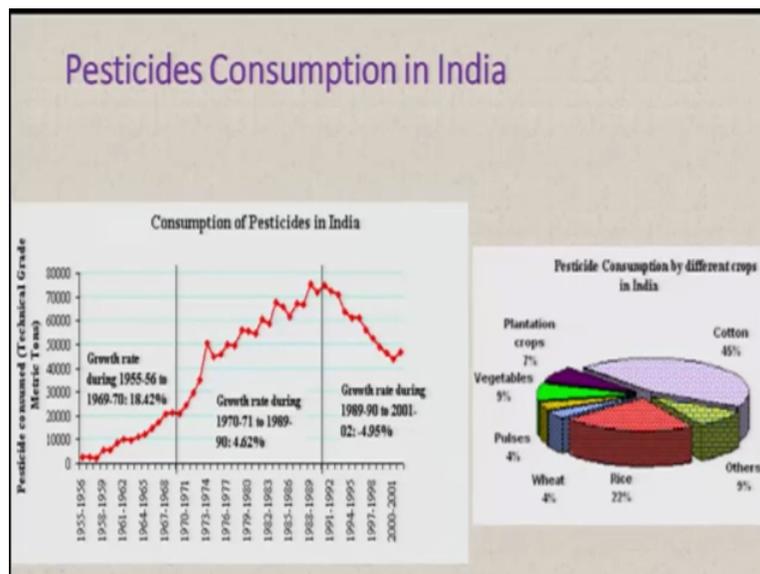
So, Precocious puberty in girls is now common. You might be observed particularly your own girls you know puberty period is being prematurely being done now-a-days and it is a very and even my I remember that you know we have in our family and other relatives we are having discussion on that and I am sure this is happening because of food and they have identified this you know and they conducted study of 17,077 girls in USA found that onset of puberty for white girls is 6-12 months earlier than expected ok, and which is not the right one, and African – American experienced puberty, 12-28 months earlier than the whites. Of course this is a study of

1997 almost 20 years back but still you know it is an alarm because of that they link to the using of pesticides and also the fertilizers.

And Reduced Sperm counts in was also documented between 1938-1990, sperm counts dropped by 1.5% each year for American men and 3.1% per year for European men. I think this thing will be you know use of the pesticide will be one of the cause, there might be several other causes according to me. Of course I have taken the data from some paper they say that but I feel personally there will be several other causes for this. For example-sedentary lifestyle, for example they will be sitting down for a quite some time particularly you know when you talk about male either male this discussion we are talking about males, the male will be, that might be food habits. So, lot of things will be during that and this is one of the thing.

So, fertility problems are becoming more common and now affect more than two million couples in US. And in India also you will find lot of people are not having actually, in particularly those who are not doing you know physical walk, those who are going to doing the stressful jobs that is the thing what I have talked with some of my friends and they are also saying that way, those are involved. So, these are you know problems what is there.

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Pesticide consumption in India if you look at it is basically it is increasing from 1956 onwards and at a very higher rate, of course it you know during particularly 1968 to this but after this

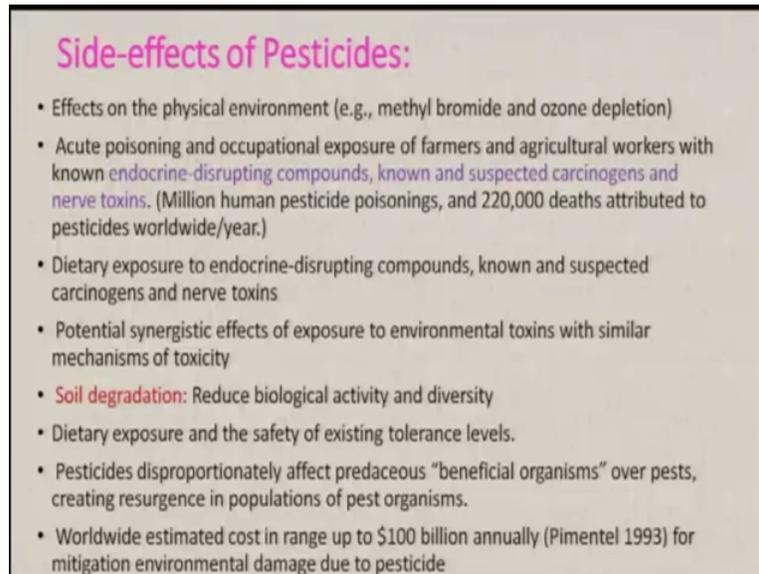
1992 this kind of things is decreasing again there is a little bit increase I don't have data beyond 2001. And that might be two reasons for this, one is that people start of realizing the you know pesticide ill effects of pesticides. Other thing is that one data is showing to me that we are using started this cotton genetically modified cotton and then that is the reason why you know you might be getting a drop in that. Of course I am not advocating for the genetically modified seed because I am having deservation so also people are having.

Practice that that we need not to temper the nature right, and if will nature if will temper that then the greedy people market sources will be misusing it and we do not know its ramification in the long run. So, therefore I am not suggesting to go for that might one of the reason why I am saying that you look at the data cotton pesticide congestion by different crop, if you look at cotton is 45% so, if they are using the genetically modified cotton B.M.C. or what they call, B.M. Cotton right?

So, natural it will be drop down, ok? Are you getting my point? This my argument I am trying to give why it is so? And rest of the things if you look at rice is measured and then wheat and then pulses are the things pesticide has been used. These are the percentages I have given 45% cotton, rice 22%, and then wheat is very less, 4% pulses kind of things. So, therefore that might be but we need to you know eliminate you know or we can use some pesticide which is natural, I will be may be talking about what our some of our people have developed by looking at the scriptures.

Our ancient technology has been revived for the agriculture in recent time. So, I will be talking later on how you can avoid because you have balance, you have lost the balance the nature, now you will have to live with it like this. You cannot say look I go back to the older time when there is no balance everything nature is working properly, no you cannot. So, therefore you will have to do something to overcome that problem and getting learning the natural way of doing it.

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**Side-effects of Pesticides:**

- Effects on the physical environment (e.g., methyl bromide and ozone depletion)
- Acute poisoning and occupational exposure of farmers and agricultural workers with known endocrine-disrupting compounds, known and suspected carcinogens and nerve toxins. (Million human pesticide poisonings, and 220,000 deaths attributed to pesticides worldwide/year.)
- Dietary exposure to endocrine-disrupting compounds, known and suspected carcinogens and nerve toxins
- Potential synergistic effects of exposure to environmental toxins with similar mechanisms of toxicity
- **Soil degradation:** Reduce biological activity and diversity
- Dietary exposure and the safety of existing tolerance levels.
- Pesticides disproportionately affect predaceous “beneficial organisms” over pests, creating resurgence in populations of pest organisms.
- Worldwide estimated cost in range up to \$100 billion annually (Pimentel 1993) for mitigation environmental damage due to pesticide

So, side effects of pesticides if you look at – Effects on physical environment, for example this methyl bromide and ozone depletion all those things is a problem. Acute poisoning and occupational exposure of farmers and agricultural workers with you know, known endocrine-disrupting compounds, because this being used in the pesticides. And also suspected to be carcinogens and nerve toxins and what people have and what people have reported million human pesticides poisoning, like being reported and 220,000 deaths are attributed to pesticides worldwide per year right? This is the very alarming kind of things you know, it’s not only with India alone it’s across the (coun) the world.

So, Dietary exposure to the endocrine –disrupting compound, known or suspected carcinogens, somethings are known and somethings suspected you know, and these are nerve toxins, not only carcinogen, but also nerve toxins kind of things. So, Potential synergistic effects of exposure to environmental toxins with with similar mechanism of toxicity, you know like because not only this from the pesticide from the other fronts also they are being you know mixed so, that is a one effect one has to look. Got it?

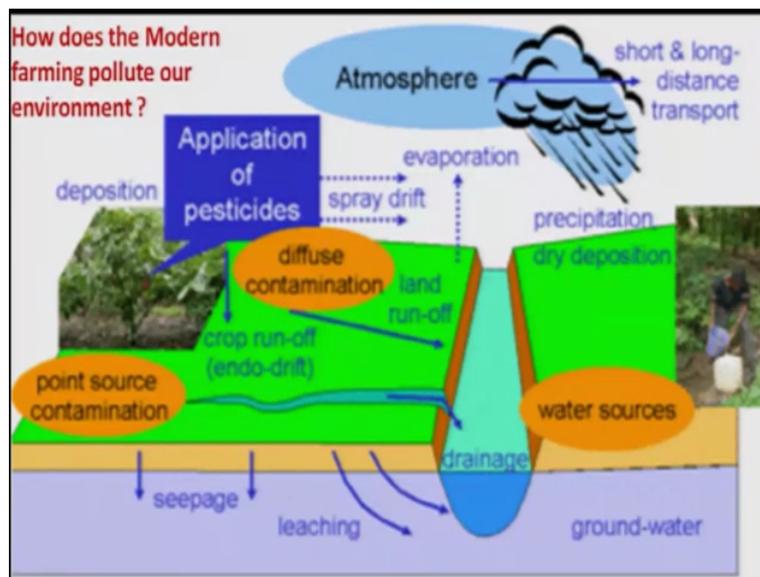
And we know the Soil Degradation. I will be talking about soil after this. They reduce biological activity and diversity. Because we are using monoculture, diversity is very important to maintain the soil quality and soil not getting degraded. And as I told Dietary exposure and safety of the existing tolerance levels and tolerance level of the persons are also taken because immunization

system is at stake. So, therefore the tolerating the things also is decreasing day by day of the people.

And as I told earlier the pesticide affect the predaceous-beneficial organisms over the pest right, because you want to target one but there is a non-target pests are there so those also will be and creating the resurgence in the population of pest organisms, that over there you want to kill somebody and it has been you know, increasing it alarming their products and rate are there, fertility rate being higher. This another problem what we face kind of thing due to the use of it.

And worldwide estimate of this cost in range of something 100 billion annually, this data have taken 1993 little old, I mean like 20 years back for mitigation of environmental damage due to the pesticide. Now this number could have been 10 fold you know, at least. So, I mean that I want to say that what are the side effects of that.

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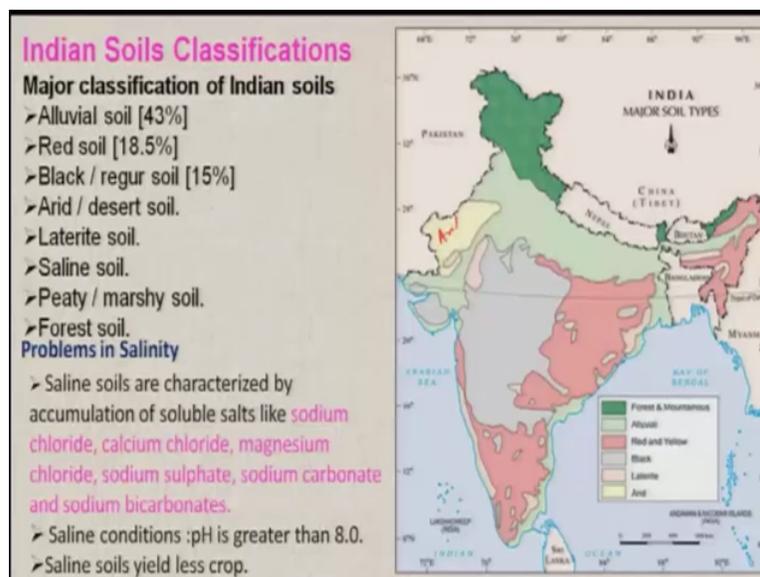
How does modern farming pollute our environment? What is the really it is going on? If you look at, let us look at the whole pictures and there will be what you call application of pesticides right? You are using this plants there might be deposition there on the surface of the leaves, the root and the soil and then it will get into you know, crops will be run of into it, endo drift kind of things it can go to diffuse and contaminate land run of right? It can go to the points, source if

contamination like somewhere there and it will go to the water, it will go to the drainage and some of the spray when you were doing it will be evaporated because you do fumigative spray.

It may evaporate and go to that atmosphere right? And there is also water resources it will go and it can go to the seepage it can reach is not the ground water you know, are you getting? So, then again it will be when you use this water it is having those pesticides components, chemicals and there is a of course it can evaporate with the water. See, it can go by spraying and it can water can evaporate when you are irrigating it. And then it will come back and then short or long distance it will go.

So, if you look at this is the whole chain which is being talked about, how it is going on, so it is very difficult to overcome now, you know because it is going everywhere, where to search? Where to go now? Even if you stop using pesticides and the chemical fertilizer you will have live with for another may be 20, 30 years to overcome that, when you make it zero now. Now, where to go? That is the biggest challenge we have created because due to the use of modern science and technology.

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And Indian soil I am like as I told, the soil is very important, therefore we call it in our ancient scripture `Matha Bhoomi putram prathibhyam'. Now land is very important, that we can't because it is having a life as I told in the last lecture the soil is the soul of infinite life. So,

therefore it is important that's what our scripture has talked about. If you look at the soil how you can classify? Any idea? Any idea? Because...

Student: Clay soil, Laterite soil, blunt soil, black soil, red soil

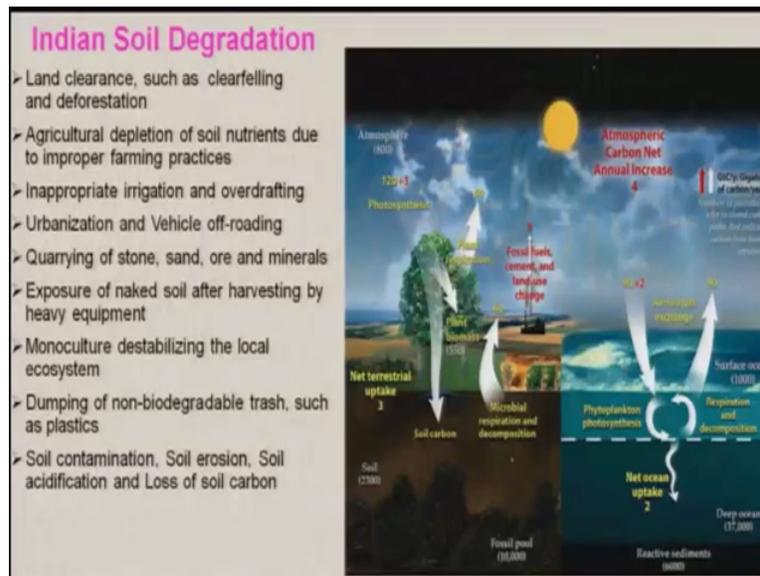
Professor: Ok. Any other things? For example:- We are having Alluvial soil, India is having a load with that because we are having gangetic plains, rivers you know, lot of rivers are there and you will get around 43% which are very good for agriculture. We are having Red soil, as you told rightly 18.5%. We are having Black or regur soil around 15% of course desert, we are having, this country is having also desert you know in the western side right? The Gujarat right? Sorry Rajasthan ok. Arid and then Laterite soil and this Saline soil we are having also because and also because of bad practice of agriculture, our soil becoming Saline and there is a Marshy soil and Forest soil.

If look at, of course this is little old this thing I've shown in the Himalayan regions and this Uttarakhand these are all basically forest and mountainous which are very different. Today we are spoiling this you know this Uttarakhand area there is lot of industry, lot of these things we are spoiling those place which are very good. And this reason Alluvial soil, if we look at Gangetic plains and then this portion of the Gujarat and these are of course the desert you know like in the Rajasthan, this portion is the desert soil, Arid soil, this is Arid you know soil and this portion is basically the Black kind of soils and this is the Red and Yellow soils and this portion so if look at these are the distribution various kinds.

So, depending on your soil, you will have to cultivate you know, you cannot really say that what I'll do. So, this is very important what we are using with modern technology, mechanical will doing the similar thing everywhere, that is should not be done. We will have to have a understanding and do that.

So, if look at problem of Salinity in the soil, Saline soils are characterized by the accumulation of soluble salts like various things Sodium chloride, sodium Calcium chloride, Magnesium chloride and so on and so forth and generally we call it as a what you call Saline soil with the pH value is greater than 8.0 right? So, and that will be you know very bad for to cultivate anything. And Saline soil of course if it is less than it can yield less crops so therefore one has to avoid these kind of problems.

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So, Indian Soil Degradation if you look at what are the reason? And you know that land clearance such as clear-felling and deforestation if you go and ask to your father or grandfather, he will say like when they were there lot of forest were there because of modern technology they are just felling the trees at a faster rate that what human being can do with their hand. So, it's a very fast very powerful tool they are having. You might in now-a-days in you know your media, social media right? Some machines have have been developed which will just clean the forest in may be a few hours big forest you know large forest so, deforestation.

So, agricultural depletion of soil nutrients due to improper farming practices, that what we are saying modern agriculture practices, farming practices not right, not sustainable not you know conducive for the Mother Nature. So, therefore that is the problem. Inappropriate irrigation and over drafting - Because we are using too much of water and also you are taking a lot of water from the ground.

And Urbanization and vehicle off-roading – Lot of urbanization is urban areas are increasing; we are taking the land you people may be knowing that in rural areas the land were divided. Some land will be for grazing, some land will be for cultivation, some land will be for making this ponds and some land will be for what do you call temples. So, these are all being classified and year marked. But today all land people have grabbing you know, so, therefore is a balance was

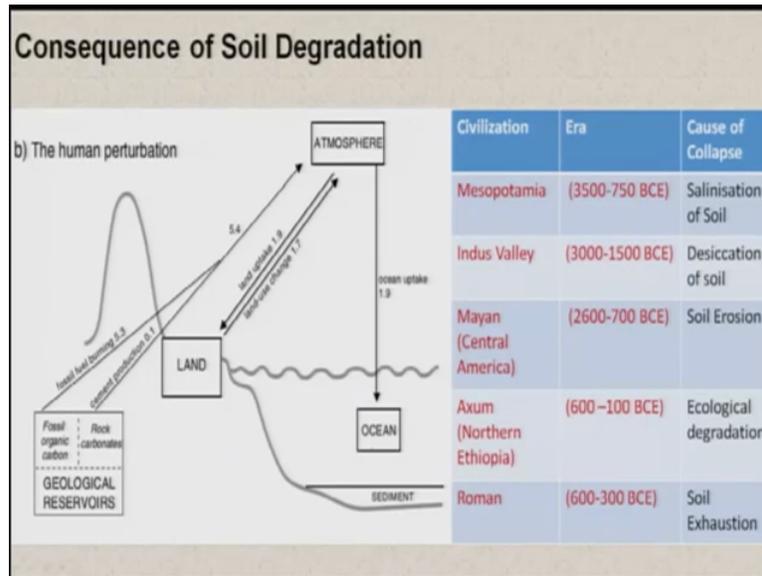
made, it's a very nice thing with we should. And then quarrying of stones, sand, ore and minerals all those things also spoiling the land.

Exposure to naked soil after harvesting by heavy equipment's – Like because equipment's you know if you look at I'll be talking about it later on that what is the depth one has to go for during ploughing when you do? But these modern machines are doing very longer level then then it will all dried up. So, there is a big problem therefore more water and there is a little problem with more problem about that. So, Monoculture destabilizing the local ecosystems. Dumping of non-biodegradable trash, such as plastics and some other you know chemicals and some other material even cotton with a lot of polyesters right? Poly ethylene and other things we are spoiling it. You might have seen like all land are now been spoil by them.

And Soil Contamination – is a big problem so also soil erosion, soil acidification, loss of soil carbon, if you look at carbon is a life, you know life we know from the science, carbon. And the soil is you know, various kinds of carbon will be there and this carbon balance is very important. If look at that you know during photosynthesis this will be having plant biomass and the red one if you look at it something gaga tons of carbon per year you know is being during this what you call white is coming for during this photosynthesis and atmosphere you are having also carbon right?

And then you will get capture it with a sunlight and then soil carbon and then it will go microbial respiration, decomposition it will go back and then fossil fuel you know this cement, land use other things will be like something around 9 gaga tons kind of thing, so also in the sea it is captured the carbon and it goes to the net oceans and deep oceans and all these cycle has to be maintained. That cycle is being disrupted, because nature makes that and we are disrupting. So, soil contents means greater than 12-18% organic carbon there will be in organic carbon also are generally classified as a organic soil which is very much essential for agriculture, farming right.

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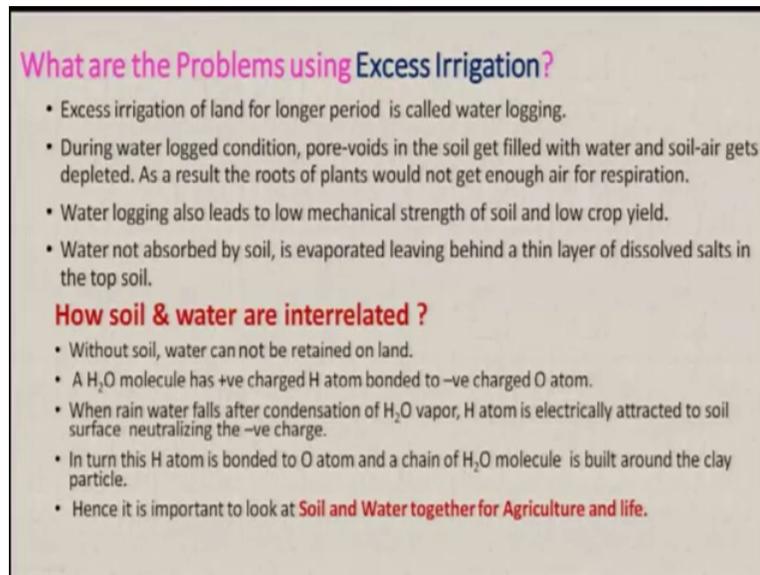
And if you look at in modern time, what we have done because of this fossil fuel, we are using organic carbons and rock carbonates for cement production other things right, we are increasing 5.4. And from the atmosphere we are giving in the carbon dioxide other things you know gases and carbon monoxide, so then you can land can take you know 1.9 kind of this giga tons and land use because of land use again it will go back to atmosphere, it may be coming back from atmosphere to ocean so that is the imbalance, because human being you know have creating this cycle imbalance. Nature works on cycle, nature works on in a making maintaining a balance.

So, as a result if you look at if you look at why it is soil is important? If you look at our history and people have found out we are having civilization, we discussed earlier that Mesopotamia civilization which was collapsed you know some due to salination, salinization of the soil because of salt content increasing you know, and Indus Valley civilization, desiccation of the soil and again this coming the soil. So, therefore you know those are the reasons what people have attributed and of course there might be some other reason as well but this is one of the major reason, so also the Mayan Mayan civilization which is Central America so it has gone due to the soil erosion.

And Axum the northern Ethiopia which I had not discussed earlier but this also civilization 600-100 BCE before this common era, ecological degradation even today also they are having problem, they are still doing Ethiopia. And Roman you know soil exhaustion because they were

having a large army for the food production they you know used the soil too much. So, that you know it become a problem for them and the civilization. So therefore today if we will not take care of soil and then we may extinct and the civilization may be going out. So, one has to be careful about that.

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**What are the Problems using Excess Irrigation?**

- Excess irrigation of land for longer period is called water logging.
- During water logged condition, pore-voids in the soil get filled with water and soil-air gets depleted. As a result the roots of plants would not get enough air for respiration.
- Water logging also leads to low mechanical strength of soil and low crop yield.
- Water not absorbed by soil, is evaporated leaving behind a thin layer of dissolved salts in the top soil.

**How soil & water are interrelated ?**

- Without soil, water can not be retained on land.
- A  $H_2O$  molecule has +ve charged H atom bonded to -ve charged O atom.
- When rain water falls after condensation of  $H_2O$  vapor, H atom is electrically attracted to soil surface neutralizing the -ve charge.
- In turn this H atom is bonded to O atom and a chain of  $H_2O$  molecule is built around the clay particle.
- Hence it is important to look at **Soil and Water together for Agriculture and life.**

And what are the problems using excess irrigation? Excess Irrigation of land for a longer period is called the water logging. You know people will be putting this water because you are having pump and they are careless also as well right? And now-a-days government is giving them free, so free means they will put the water and they are spoiling their soil and spoiling and also using more what you call fertilizers because fertilizer will be going leaching out, going out so also nutrients. They do not know what they are doing and then they will.

So, during water logging condition like pore-voids in the soil get filled water and the soil-air gets depleted. As a result root of the plant would not get enough air for respiration, because you need some respiration, I'll be talking about it how it does later on when I'll talk about natural farming. And why you don't need to give a lot of water, what is being given now-a-days.

Water logging also leads to a low mechanical strength of the soil and low-crop yield. We are giving more water, pouring more water, because now-a-days farmers are not that intelligent. They are being pampered, they are being not educated, and they are being told what has to be

done, they have become laborers according to me, I have visited whatever the interaction I am having with the local area around Kanpur, they are just laborers they listen to radio, television and then do that.

So, therefore they don't have their own knowledge. What to do? They are being as if like a raw but is doing so, that is the big problem with the society is facing today. Because people are trying to control them and they think they are the right one. So, so also our students they are also not learning now-a-days because professors are you know like all the lectures they are giving and there, what you call indoctrinating them not developing their mind. Similar things are happening.

So, Water not absorbed by the soil, and is evaporated leaving the behind thin layer of dissolved salt in the top soil and the salinity you know being increasing. So, the land becomes useless. So, how soil and water interrelated? Because if you look at in our system people will say ok soil has consumed at the so and so water management system soil management but this is the combined one has to look at it. Unfortunately in this country people have not looked at it till now. So, this is to be looked at.

And without soil can water be retained on the land? Certainly no, right? So, therefore soil is very important to retain the water in this country. If look at a water molecule positive charge atom bonded to a negative charge atom that is the chemical we know. When rain water falls after condensation water vapor because the vapor and then will condense and then the it will drip down as a rain droplets. Hydrogen atom is electrically attracted to soil surface neutralizing to the negative charge right. As a result what will happen it will try to you know this hydrogen atom is bonded to the oxygen atom and a chain of water molecule is built around the clay particle you know there is say in the soil, in the soil itself.

So, that is to be looked at it and hence it is important to look at soil and water management together how to retain, what are the things for the agriculture and also the human life. Because we depend on the agriculture, farming you know for our own life. So, and it is also ecology and other things one has to look at it. So, as I told the food qualities, I've discuss a little but let me bring to your attention that if you use the natural way what our ancestors are doing now-a-days people are talking about as organic of course it's a more business and other things little distracted

form of traditional method of farming and the conventional is the (indus) what you call chemical way of doing modern agriculture practice.

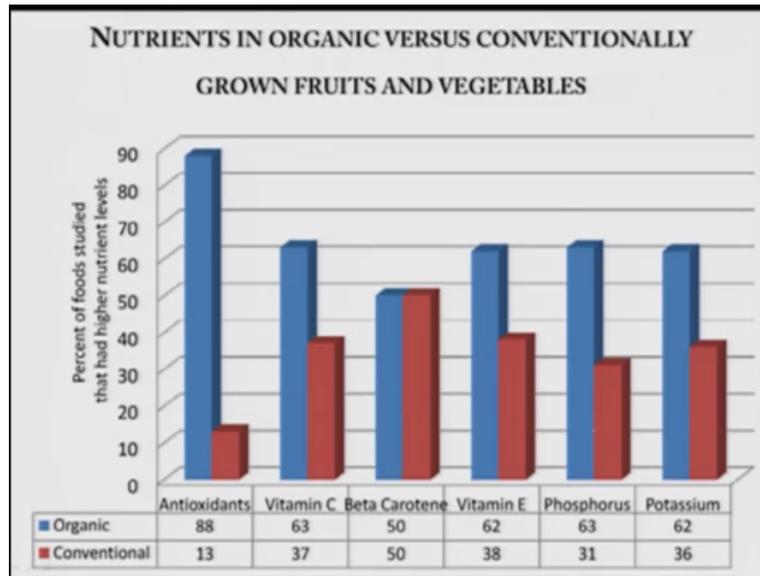
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**Food Quality : Organic (Natural) Vs Conventional (Industrial Agriculture)**

Vegetables Type of Soil Management	Minerals (in milliequivalents)						
	Calcium	Magnesium	Potassium	Sodium	Manganese	Iron	Copper
<b>Snap Beans</b>							
Organic	40.5	60.0	99.7	8.6	60.0	227.0	69.0
Conventional	15.5	14.8	29.1	0.0	2.0	10.0	3.0
<b>Cabbage</b>							
Organic	60.0	43.6	148.3	20.4	13.0	94.0	48.0
Conventional	17.5	15.6	53.7	0.8	2.0	29.0	0.4
<b>Lettuce</b>							
Organic	71.0	49.3	176.5	12.2	169.0	516.0	60.0
Conventional	16.0	13.1	53.7	0.0	1.0	1.0	3.0
<b>Tomatoes</b>							
Organic	23.0	59.2	148.3	6.5	68.0	1938.0	53.0
Conventional	4.5	4.5	58.6	0.0	1.0	1.0	0.0
<b>Spinach</b>							
Organic	96.0	293.9	257.0	69.5	117.0	1584.0	0.0
Conventional	47.5	46.9	84.0	0.8	1.0	19.0	0.5

And if you look at I had also showed you earlier that anything you take let's say for tomato we will take potassium right? Or kind of thing it is higher here. And whereas the in the natural farming and then conventional it is 58.6, there is a lot of difference. And so also if you take iron, you know like if you consider spinach is 1584 and where as in the conventional which is the modern agriculture practice it is 19 very very less and that is of course in mili equivalent I told it is a mili grams of that kind of things.

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So, and if you look at the nutrients in the organic versus the conventional, this is what you call conventional one means chemical agriculture or using chemical way and organic means they are natural right? You will get Antioxidants 88; you need not to take a tablet for that you know? It is higher than this. So also Vitamin C – 63 and Beta Carotene, Vitamin E, Phosphorus all this Potassium are higher compared to the chemical way for you know like modern agriculture system. Therefore we are unnecessarily taking lot of medicine for our own just to supplement this. It is hopelessly bad. So, therefore one has to look at it.

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**Problems with Modern Agriculture:**

- Artificial fertilizers and herbicides washed from the soil and pollute rivers, lakes and water resources.
- It results in soils with a low organic matter content.
- Dependency on fertilizers.
- **Greater amounts** of fertilizers needed every year to produce the same yields of crops.
- Artificial pesticides can stay in the soil for a long time and **enter the food chain**.
- Artificial chemicals destroy soil micro-organisms resulting in poor soil structure and aeration and decreasing nutrient availability.
- Pests and diseases become more difficult to control as they become resistant to artificial pesticides.
- Habitat losses.
- **Junk food:** Industrial agriculture mostly produces commercial crops like potato, tea, coffee, corn, coca, and soybeans, etc which are used to make the processed foods that have serious and costly health impacts.

And problems with the modern agriculture if you look at it is we have already discussed I will not look at it but only I will tell you the junk food we are being using like potato, tea, coffee, corn, coca, soya beans because these are a commercial foods and it is being used and then you are being fed with advertisements and lot of money being taken away and for kids are being you know live to use that and get you know diseases and then from that we will have to pay money and also health as that.

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**What is Current Situation?**

- Increase in Food prices by more than 300 % in last 10 years.
- Decrease of soil quality with lower organic matter in last 40 years
- Decrease in cultivation land in last 20 years.
- Decrease in cattle population last 20 years.
- Reduction in grazing land for fodders of domestic animals?
- Encroachment of green covers (**333 acres per day**).
- Depletion of water bodies and **Lowering of water table**.
- 130 Million hectares of degraded land in India till 2000.
- Migration of villagers to urban areas.
- Imbalance of nature causing dreadful diseases.
- Between 1995-2014, farmers committed suicides are **2,94,066**. (NCRB, India)

So, therefore we will have to look at what are current situations? Increase in food prices by more than 300% in last ten years in country India right? Earlier day's food was cheap. Decrease of soil quality with lower organic matter in last 40 years. Decrease in cultivation land in last 20 years, of course there are several other reasons also, it's not only the bad, wrong practice of a farming. Urbanization again lot people is all interlinked one cannot say that. Decrease cattle population last 20 years, people are not using them and those are very important, I'll be talking about why we need to rear cattle? Why you need to rear animal? You please think about why we need to do?

And reducing reduction grazing land for fodder and domestic animals? Because animals are not there, people have taken their land we had located land earlier. Encroachment of green covers 333 acres per day, you know being taken by the various people ok by various groups, this booming, this billing, this construction sectors. They are just grabbing the land. And depletion of water bodies and lowering of water table – in almost all parts of our country. And 130 Million hectares of degraded land in India till 2000 – there might be much more than that today.

And Migration of villagers to urban areas – Because you know we are using mechanization therefore they are jobless. What they will do there? So, they will have to come for the job to the city. Because we are using tractor, we are using all trailer all those things and using fossil fuel and then paying money and then as a result you know there is a uh... problem also I'll talk about the suicide of farmers. And imbalance of nature causing the dreadful diseases.

And between 1995-2004, you know something 2,94,066 farmers committed suicide because of cost of farming is increasing much and due to debt. This number let me tell you is a government number I've taken from NCRB, India but this number at least will be twice than what is being reported in this report according to my judgement, I may be wrong in my judgement.

So, now we know what are the things, what are the problems I'll stop over it plus please understand that the modern practice of agriculture is not good for us. And we need to relook back our traditional method of farming and also reinvent and rejuvenate and also find out ways how to tackle the imbalances in the nature, so that we can survive. And it is a question of surviving, it is a question of living a life which is important.

Therefore we need to look at traditional agriculture or traditional farming system more seriously not only copy and paste the old thing rather relook at it with a new outlook and do research for

finding out better ways to manage our self within this problem which being created by this modern science and technology and there misutilization by the greedy market sources. Thank you very much.