Organic Farming for Sustainable Agricultural Production

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Lecture - 01
Organic Farming: Introduction and Status

Good morning. I welcome you all to NPTEL online course Organic Farming for Sustainable Agricultural Production. So, regarding agricultural productions, so, the issues of origins last few decades looking at the adverse effect of conventional farming. The conventional farming has posed a serious threat on food quality, environments and water quality too.

In this view, organic farming is gaining momentum throughout the world to provide a better environments, better food quality to the consumers.

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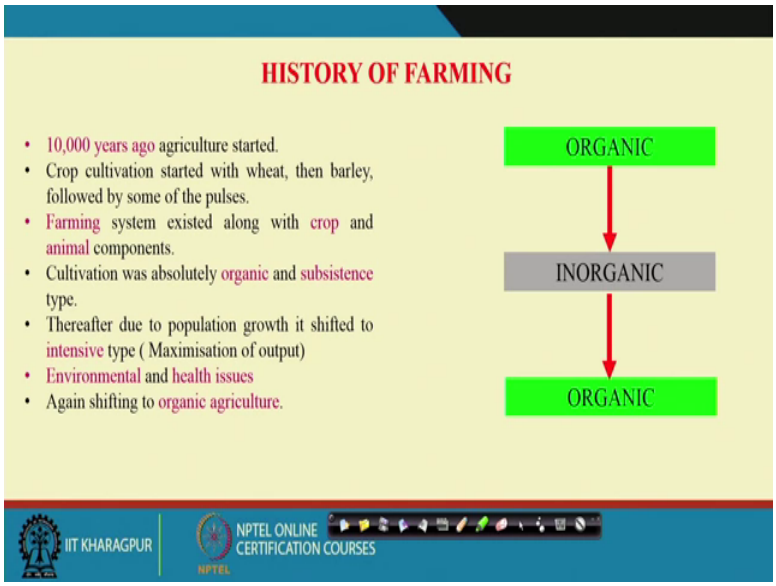

So, in these figures see the history of organic farming as you see the agricultural has started 10000 years ago, where, the crop cultivation started with the arraival crops like wheat, barley followed by some pulse rice crops also. During that periods there are no chemical fertilizers, only farming system that existed along with crops and animal husbandry.

So, this was a integrated concepts where the crop has grown through organic use of the cow dung. Slowly, the cultivation was only of organic and that was a subsistence farming, but with the increasing population growth if there is a rapid demand of increasing food productions, so that it encourage the use of high yielding varieties of the hybrid cultivars for increasing production to meet the growing demand of the population.

So, to exploit the yield potential from the high yielding cultivars there was need for the use of chemical fertilizer. So, after organic so, we converted to inorganic to meet the demand of the growing populations with the increasing food and production.

So, that happened during the late 60's. So, time reached when the production became plateau with the use of the inorganic fertilizer; at the same time it created many adverse effect like the deterioration of soil quality and the environmental quality; ultimately the food quality.

In 90's then there was a need of good air for breathing, good quality of water drink on early 2000; so, there was need of the good quality food for better human health. Hence, so to have a better environment, better food quality and better drinking water quality we are now again converting to organic farming. But issues comes how the population is growing and we need to meet the demand of the growing populations through the increasing food and productions, whether the organic way of managing crop productions can meet the demand of the food and production that is one issue.

So, in this course we will be delivering the management practices in organic farming. So, to challenge this is the increasing demand of food and productions by doing the scientific managements in organic farming, how we can meet the food demand of the growing population.

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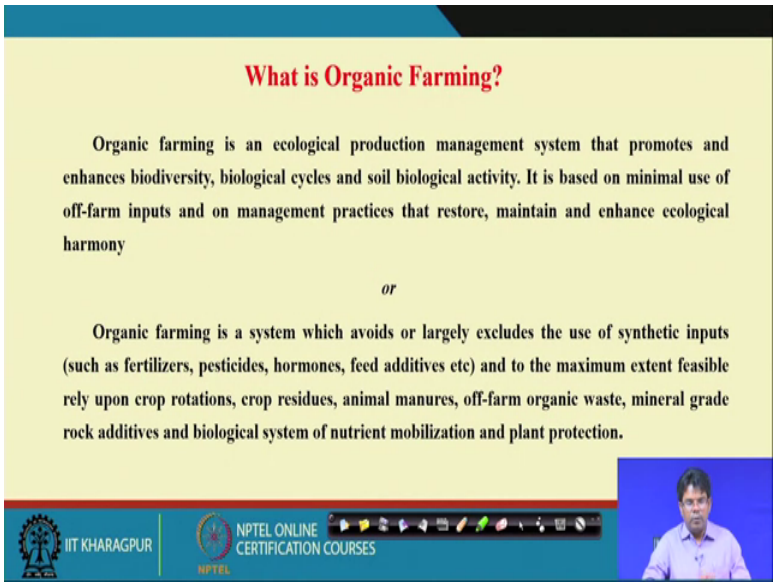

So, if you come to organic farming what is organic forming? See, organic farming this is an ecological production management system that promotes and enhances biodiversity, biological cycles and soil biological activity. So, why use a biodiversity; means, we need to include many crafts at a time, so that it can minimize the insect, pest and this is pressure. Biological cycle means you have to grow different crops in rotation. So, by doing so, this also, this can enhance your soil fertility, at the same time it can reduce the dresser of the insect pest and disease.

And soil biological activity; soil biological activity we mean to say soil is a living body, this has many microbial populations. So, this is so the microbial population they do live they do help in nutrient release part in the soil and nutrient availability for the crop plants.

So, by doing organic farming we maintain the microbial populations make the soil such a living body as active and with or the management practices like your crop rotations and the crop diversification and it is based on minimal use of off farm inputs and on management practices that restore maintain and enhance ecological harmony. So, as you say inorganic farming, so, we try to minimize use of the off farm inputs try to use the on farm inputs to the maximum extent.

Organic farming, is a other way say is a system which avoids or largely excludes the use of synthetic inputs; such as fertilizers, pesticides, growth hormones and the feed

additives and to the maximum extent feasible rely on crop rotation as you are discussing, crop residue, in corporations, animal manures, off-farm organic waste, mineral rock phosphates rock minerals and biological system of nutrient mobilizations and plant protections. So, through biological nutrient fixations or green manuring so, that can help in organic farming.

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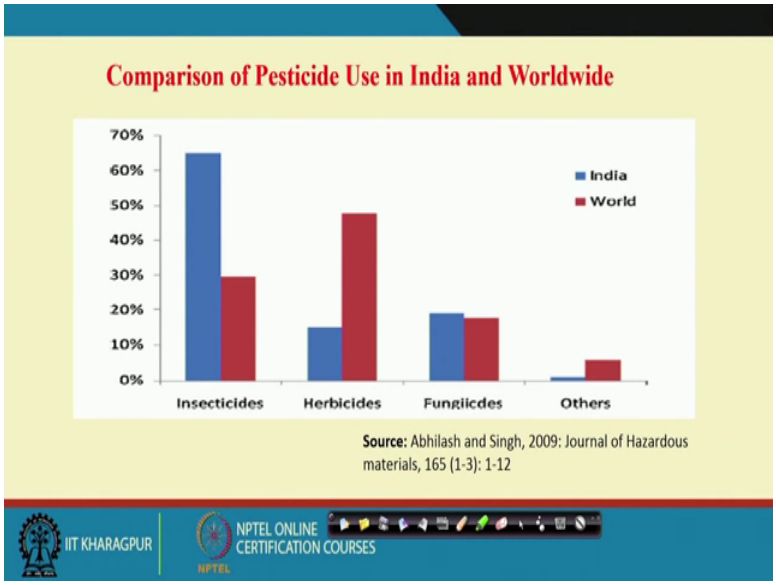

I want to; so, some lights throw some lights on the pesticide use in India and world. So, the quality of the food deuteration is due to the indiscriminate and unscented use of insecticides, herbicides and fungicides in crop productions. If you see compare the insecticide, the pesticide use in India and worldwide, see the India uses the maximum protrusions of the insecticides, it is more than 60 percents followed by fungicides and herbicides. Whereas, if you see the world level as maximum use of herbicides followed by insecticides and fungicides. As India being a tropical and sub tropical continents and that weather condition is highly favorable for the growth and multiplication of the insects, probably, this is the reasons why use more of the insecticides and if see the effect of the insecticides or pesticides on human health.

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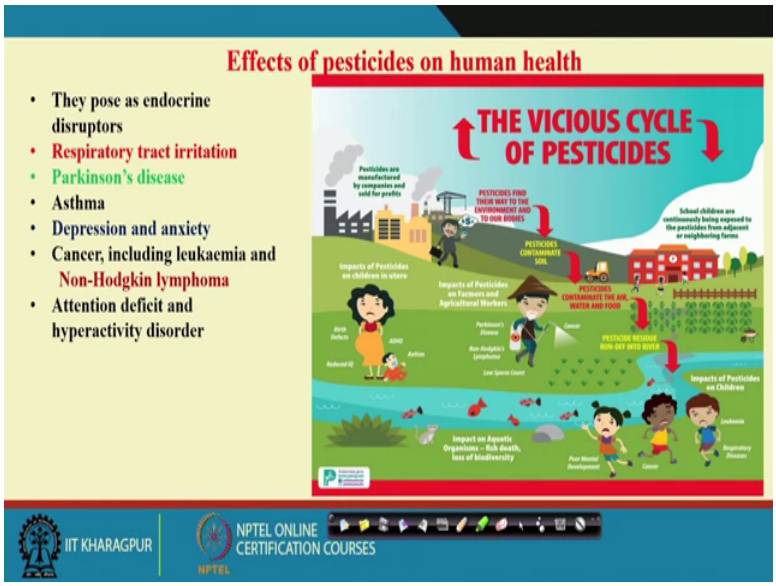

So, this pesticides that has effect on the air that we breathe, so that also the that contaminate the air quality, the soil, the soil gets contaminated to pesticides. The water, so that influence the aquatic bodies and ultimately the human health as through your conjunction of the foods or breathing airs are getting exposure to the spray of the insecticides or pesticides.

These pesticides that pose a serious threat in human health and see they pose a endocrine disruptor; that means, there is a harmonal imbalance takes place in human body, especially the research report we are found that DDT is a chlorinated hydrocarbon pesticides and this is found many of the omens and the lactating omens.

So, that goes the babies through milk to the DDT that also enters to the infants and this is a endocrine disruptors that say hormonal imbalances that causes many disease including cancer and the neuro disorder. Then respiratory tract in irritations, Parkinson's disease that is also because of the in the nervous systems disorders due to the insecticides or the pesticides, asthma, then the depression and anxiety, cancer that is say including leukemia or the lymphoma that is say blood cancer. The attention deficity and hyperactivity disorders those have the diseases that happens due to exposure to insecticides or the pesticides.

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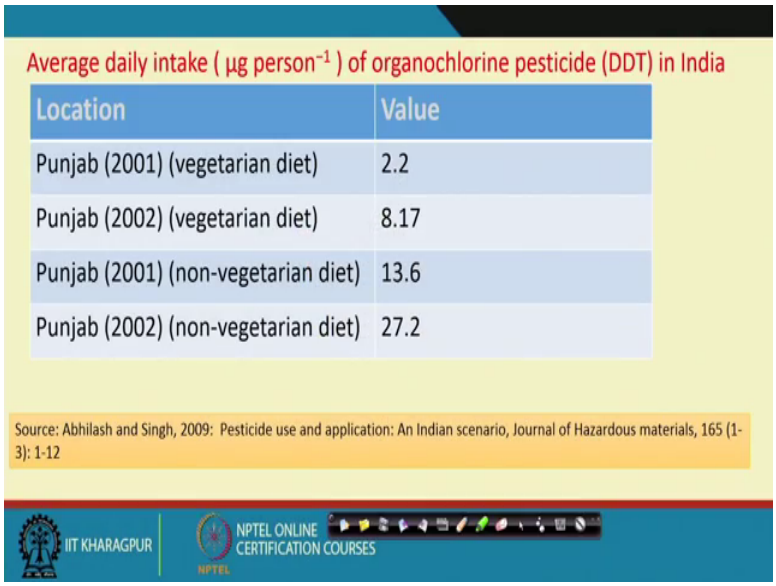

If I say the pesticides the as a DDT dichlorodiphenyltrichloroethane for examples the average daily intake of organochlorine pesticide DDT in India; so, this is a research reports from the pesticide use and applications on Indian scenario published in journal of hazardous materials elsewhere publication. If you see the location Punjab, I have taken into account and the microgram DDT per person in Delhi food.

In 2001, the vegetarian diet it was 2.2 microgram per person per day and if you interestingly if you see 2002, this increased to 8.17 from 2.2 to 8.17 and you see the 2001, non-vegetarian diet, around 13.6 microgram per person per day DDT and 2002, this increased to 27.2 microgram per person per day.

So, this figure shows is highly alarming and if you see because of this see intensive use of the chemical fertilizers and pesticides in Punjab and over exploitation of groundwater also the groundwater is also contaminated with pesticides. So, the cancer patient populations is growing in Punjab and you might have known that when the cancer train moves Delhi from Punjab to Rajasthan. So, this is a serious consequence of the indiscriminate use of fertilizers, pesticides and over exploitation of groundwater and Punjab is facing serious threats of the water availability for agricultural productions.

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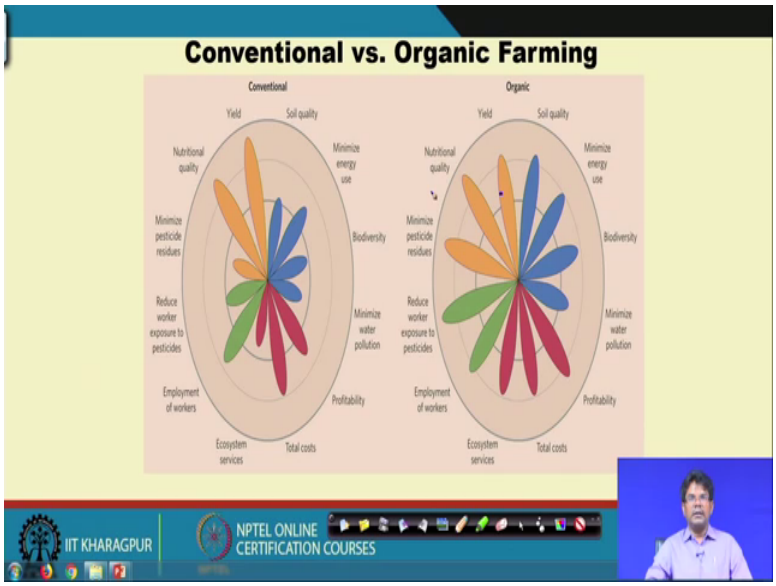

So, in view of these if you compare the conventional farming versus organic farming, so different components if you see parameters. So, in many of the parameters the organic farming has superiority over conventional farming excepting few. The parameters you have taken suppose the yield, nutritional quality minimize pesticide residue, reduce worker exposure to pesticides, then an employment of workers, ecosystem service, total cost, profitability, minimize water pollution, biodiversity, minimize energy use, soil quality.

If you see here as you point out the factors you can see if you see the green yield, in case of yield, in case organic and the conventional, yield of conventional farming is higher as compared to or organic farming.

If you see the nutritional quality, in case of nutritional quality, the organic shows the better nutritional quality as compared to chemical farming. The pesticide residue, minimizing pesticide residue in this case the organic farming has a significant role as compared to chemical or the conventional farming and reduced worker exposure to pesticides in that case the organic farming is superiors over the chemical farming.

An organic farming also gives more employment of workers over the chemical farming. Ecosystem service organic farming seems to be better than the chemical farming. If you come to total costs of the productions, so, there is no much difference between organic

and the conventional farming. So, they appears to have the same level of the cost of production.

However, see the profitability, organic farming gives the higher profitable as compared to chemical farming. You see the water pollutions say reducing the water pollutions organic farming has the better role as compared to chemical farming. Biodiversity organic permit has the edge over chemical farming and in terms of energy use organic farming minimize the energy use as compared to chemical farming because chemical farming you are using the fertilizers urea single super phosphate.

So, that causes the huge amount energy used, but it is a less in case of the organic farming. And thus you see the soil quality as we discussed earlier the soil quality is better in terms of the soil productivity microbial populations in organic farming as compared to chemical forming. Because see soil is the that provides the existence to the plants that provides nutrients to the crops for its growth and development. So, it is very essential to maintain the soil quality in long term and that is only possible through organic farming, so that we can make the soil life and we can may utilize the nutrient you can have the better neutralizing pattern from the soil for the better growth and development of the crop.

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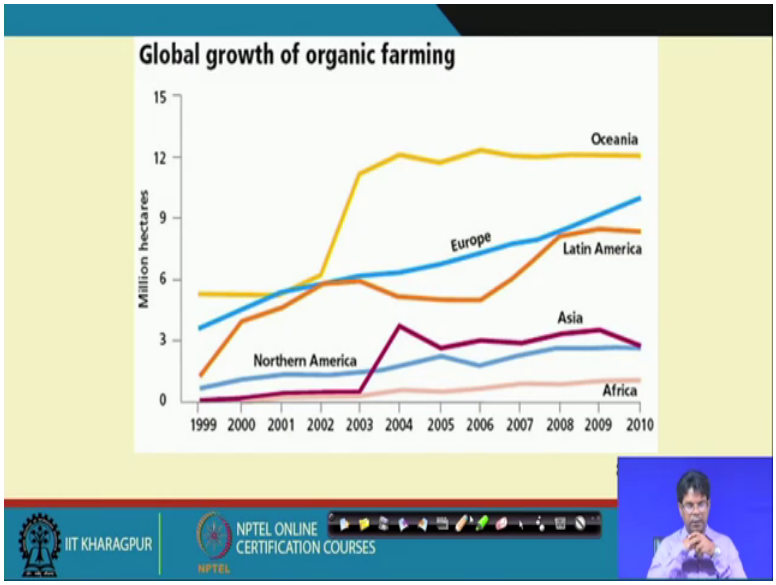

We give the example of global growth of organic farming, you can see from this figure the Oceania that the highest growth of organic farming that started from the very

beginning which is 1999 to 2010 followed by Europe, Latin America, Asia, North America and Africa.

If you see the growth, the land wise see the there is a growth is rapid in case of the Australia or New Zealand, Oceania regions and Europe there is a constant rising the area under organic farming, Latin America there is a some type of the decreasing in between and also again its picking up after 2006. Asia the growth seems to be a constant after 2005, there is a constant growth of our organic farming and land area under organic and a North America at who and Africa there is also a rise in the land area under organic farming.

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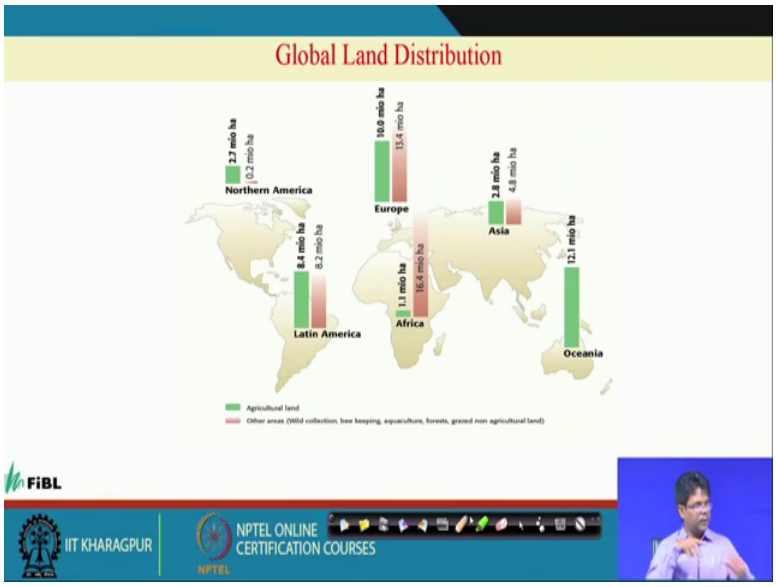

If you see the distribution of the lands under organic farming, if you see the distribution of the land area under organic farming in different continents, see Oceania it is 12.1 million hectare that is a maximum followed by Europe 10 million hectare this is for the agricultural land and they are the other areas of the beekeeping aquaculture forest followed by Latin America that is 8.4 million hectare, North America and the Asia that is be 2.8 and 2.7 million hectares.

So, the growth of the land area under organic farming is maximum in Oceania region followed by the Europe, then Latin America, North America, Asia and Africa being the lowest, where we have the 1.1 million hectares in the agricultural land, but they have the

other lands like the aquaculture, forest area, dredged non agricultural lands in organic farming.

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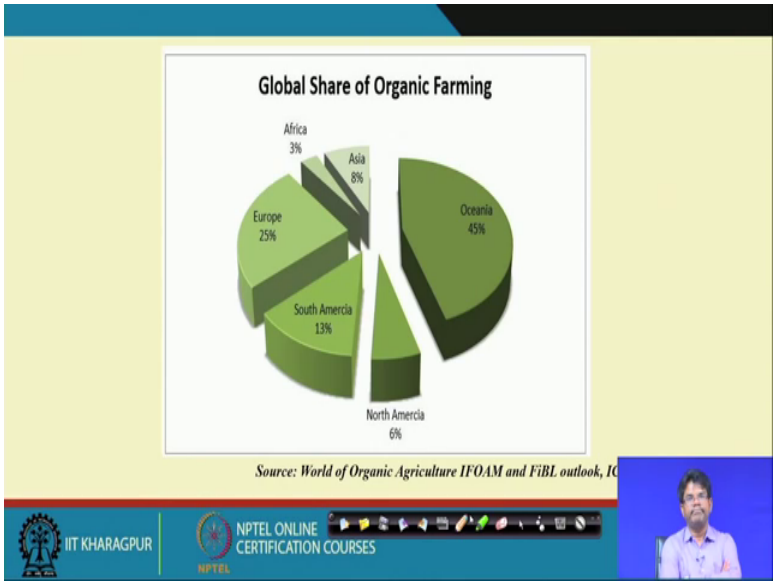

If you see the global share of organic farming, Oceania 45 percent, Europe 25 percent, South America 13 percent, Asia 8 percent, North America 6 percent, Africa 3 percent.

So, if you bring the Indian scenario, so, we are making a progress in organic farming. As you see the world scenario and number of organic farmers in India, say growing and the market of organic food market also has a growing over the last few years.

So, if you see the history and the distribution of the organic agriculture, it appears that because the demand is there to have a better food, better air and the good quality of water to drink. So, there is a need to bring more and more area under organic farming.

So in this aspects as you see as we discussed that issue is how to maintain the productions. So, that is a more important, because we do not want to sacrifice the production level, in view of the better quality, the view of the better quality. We want a good production at the same time the better quality because this if you go to specially Indian farming scenario, now the farmers are using huge amount of insecticide pesticide in fruits and vegetables and there is no regulation on the dose and the frequency of application of the pesticides and also those the materials they are plucked on the early morning or the previous to evening and sent to the market for the human consumption.

So, this regulation, so, we need the Indian market we need to regulates in the farmer sites because you have interaction with the farmers right. So, this is that the crops they are growing for their own productions is you can say close to organics we may not be fully organic, but they to apply any insecticides or pesticides for the crops where which crops they will be consuming, but the vegetables or the fruits they are sending to market in for those there is they are applying huge amount of insecticides and pesticides.

But now to stop this, so, there needs a increasing awareness among the farming community, among the consumers too and initiative from the governments also requires how to minimize the use of insecticide and pesticides in the farmlands.

So, as you see the status the organic farming is growing this is a positive directions because we go for the organics because you can see many of our health issues that comes from food; if a better quality of food you can remain healthy. So, to have a better food we need have a the healthy production systems, green production systems, organic production systems where we can maintain our ecosystems. If you have you have a good food organic systems we can have a better quality of the water to drink because you see the underground is getting polluted due to intensive use of chemical fertilizer and pesticides they do list and it contaminate the underground waters which we are you are using for the drinking purpose too.

So, making agricultures as a holistic organic systems we can have a good productions and we can have a better quality of the foods or you can happen say a good quality of water drink and the good quality air to breath.

So, we are progressing in the positive directions, but we need to progress furthers increasing rate, so, that the we can maintain the productions with a better quality of the foods. With this I conclude the first lecture then we will move to the second lecture looking at the status of the organic foods in India and the world.

Thank you.