Nanotechnology in Agriculture
Prof. Mainak Das
Biological Sciences and Bioengineering and Design Programme
Indian Institute of Technology-Kanpur

Lecture-03
An outline

So, what will be doing out in this course is.

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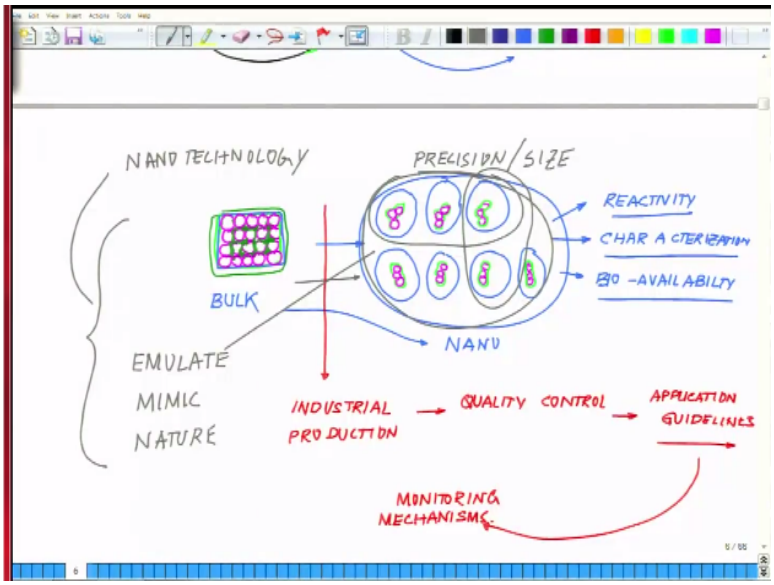

We will be travelling in 3 different parts into this course, so rather 4 different parts to start of with.

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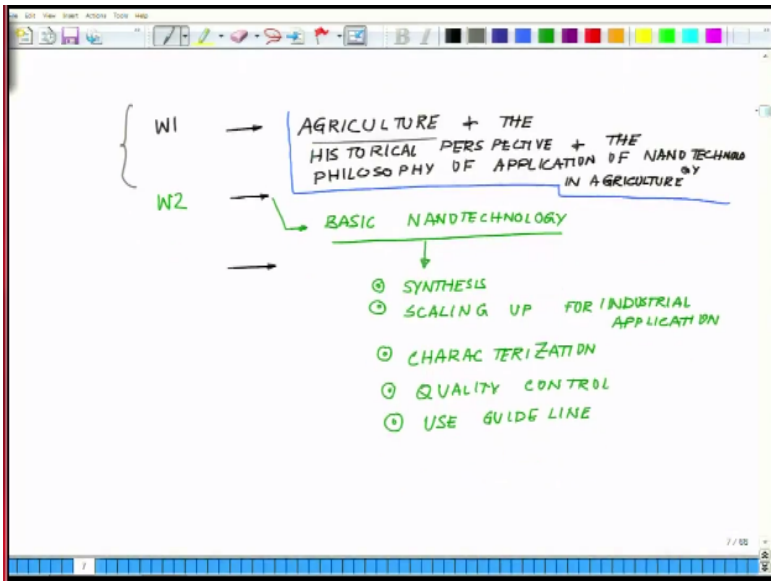

So, our as we are into the first week, our next goal will be to let me break the course in 3 different segments. The segment 1 will be as I am doing it now itself and last 2 classes agriculture and the historical perspective and the philosophy of application of nanotechnology in agriculture. This is our week 1 what we are currently doing, this is the part what we have been discussing.

Now next from here we will move on to the week 2 will be essentially our basic nanotechnology, in this segment what will be dealing is synthesis of nanoparticle, scaling up for industrial application. Then will talk about the characterization, then we talk about quality control and then use guidelines, this use guidelines will continue in every application will be talking about.

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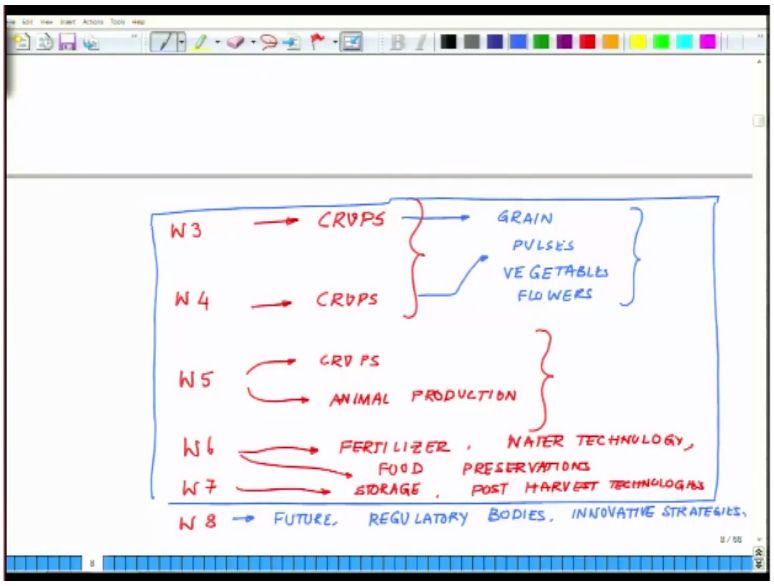

Then from there we move on to week 3, week 4 and week 5 and week 6. So this will be we will talk about the application of different nanomaterials till this date will have a comprehensive review of different crops where nanomaterial had been used in different ways. So this will be different crops will be dealing week 4 will again we will continue with the different crops out here and maybe some of it will spill over here, part of it will be in the annual production sector, then week 6, so week 6, week 7 and week 8.

So this is basically a 8 week course, we will talk little bit about nano fertilizers or maybe we may go little up and back and forth fertilizer, water technology and the use of nanomaterial in water purification, water technology. Then we will talk about little bit about food preservations and that will spill over into week 8 where we talk about storage and other post-harvest technologies.

So this is what is going to consume our week 3 to week 7 the journey where we will talk about all the different updates of the application of nanoparticles or nanomaterials precisely I should not use the word particle contains because is basically the whole family of nanomaterials. We will talk about their applications in different crops, which will includes our grain, pulses, vegetables, flowers, so and so forth.

Then on the week 8 which we is the concluding week we will talk about the future, the regulatory bodies who are directly concern with it and innovative strategies. So since we are into

the first week at this time where we are talking about agriculture, the historical perspective and the philosophy of application of nanotechnology in agriculture. So coming back, so this is the kind of the layout what we have talked about.

So will have 8 weeks, so the first week we will consume what we are doing now giving you a feel of the subject in terms of the 2 diverge domain nanotechnology in agriculture. So one has to really understand what really how these things are going to in a merge together in future, from there we will move onto the basic of nanotechnology where will talk about different synthesis techniques how we synthesize different kind of mostly used ones like carbon particles or zinc, iron, sulfur, different gels prepared for delivering nitrogen, phosphorus, potash.

And all these things, how to apply silicon for a specific crops, Borons or micronutrients, how they are being synthesized could be skeeled up, could needed to be characterized. The week 3, 4, 5, 6, 7 so essentially 5 weeks will be dealing with all the applications of agriculture and nanotechnology or nanomaterials in agriculture sector. And in the concluding week we will move from the role played by the regulatory bodies.

And what are the next generation of innovative technologies which someday in a near future or maybe in a distance future will change the way we look at the development in agriculture. So as I said earlier there is no looking back, we have already into this area, so skepticism or critiquing is not going to really take us forward, 1 critical point one has to realize that global population is increasing and we have to find out the strategies to feed this billions.

Yet we have to ensure that sustainability of the system is restored that brings us to a very tricky crossroad, what next several generations are going to face is how we balance between technology and sustainability. It is fairly easy during industrial revolution because we are all into the technology we never in a bother that you know many of these technological innovation will come back, will hurt us with the waste part of it.

Now we are suffering, but this time as a race if we think wisely, decently, systematically without allowing the skepticism to come into the play. Because that negative aspect is not going to help

us because we have to move forward for the few people. If we strategize it right, if we do the groundwork right because we have several tools. If we do the simulations right, if we do the experiments right, I do not see much reason that why we are again gonna fault.

But of course nature has it is own ways to play the game. But as wise race human race we can think, we can philosophize this subject which is quantifiable with its nanotechnology or with it is crop production or annual production or preservations and whatever. These are all quantifiable, this is not something you cannot give numbers to it. If we know within that domain that it is quantifiable.

And we can simulate what possibly will happen over a period of time then nanotechnology could change it has the potential to change the spectrum of agricultural production, it can take us to a level which is as of now I believe it unimaginable by mankind. That is just beyond comprehension but having saved this. I will again come back putting the words very clearly that it has to be done in a very very sincere manner.

Because of course research happens all over the world and you cannot control it people does several things. But then we have to always kind of look through it and then take a step forward we may have there maybe time when many to take a step backward. But eventually we have to move on and this will be a journey. So at the time when I am offering this course just at it is very in fancy.

May be when you guys will be teaching the course or they listening because there is way to many development which will occur in next 2 to 3 decades by the time all retire you know. But that is the way to go, there is where future lies and if you been I have talked out thinking over it, just remember this picture, this is what we are talking about, so this is what we talked about precision. If I say a plant needs this much and should be able to precisely quantify it.

If we say that of the total crop needs this much and we should only apply this much, we should not add more. Of course with the margin of errors, this is where we talk about the size and as the same size matters, it really matters. So nature is already doing all these kind of things is we have

to now go in hand with nature and the realize strategies nature has followed to nature is even using these kind of a stuff to purify water, to clear up things, are we in a position to emulate natures.

So what we are saying that we are not against nature, we are trying to emulate, we are trying to mimic nature with a powerful tool of nanotechnology. This is why and this is what I am trying to highlight that if we play it wise, if we do it right we can make a difference, thank you.