Indian Institute of Science
Bangalore

NPTEL

National Programme on
Technology Enhanced Learning

Global Supply Chain Management

Lecture- 33
Food supply chain ecosystem – Grip frame work

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So this is what we are going to look at what we call the grip framework.

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In other words what we did so far is to map the ecosystem and for the four parts of the ecosystem we have studied what are all the what are all the possible factors that are affecting the supply chain and why is the supply chain inefficient so let us look at the four factors the first one is grip stands for governance risk innovation and performance so but as I said although this is a good economy we are going to study in the reverse order ways we start with the performance.

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So SES framework help us to study the following are the food supply chain governance and so on and the food supply chain design avoiding social political is using innovations in regulations and logistics.

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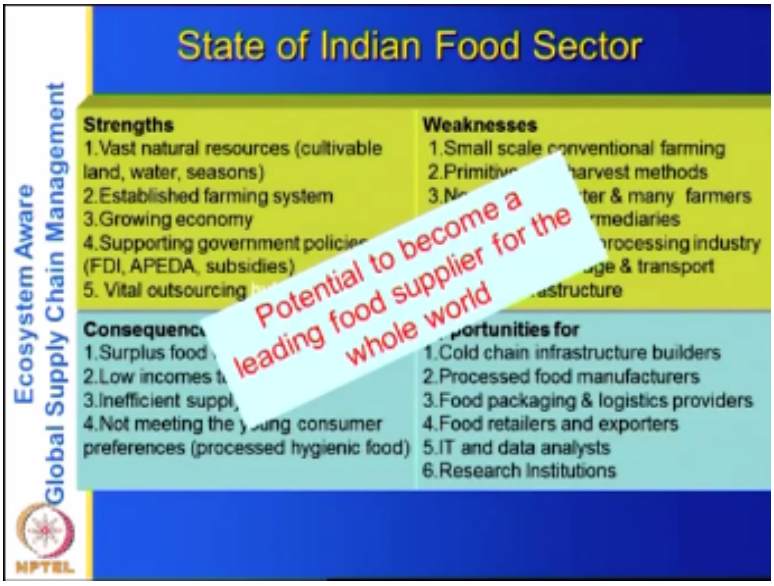

So let us look at the performance what is the state of Indian food sector let us do the SWOT analysis so if you look at what are the strengths of Indian food sector last Natural Resources we

have seen that 52 percent of lay in Kanto bow water there are 16 seasons and all that there is an established farming system yes you need not try to start it afresh and so on it is a growing economy because of services growth and so on and supporting government policies regarding is doing it has the agriculture SC Jets it provides a lot of subsidy fertilizer subsidy and so on.

It allows foreign direct investment and it is a vital outsourcing hub it and outsourcing hub for other than agriculture products in other words it there a lot of manufacturing and in what there is lot of services which are which come to in India and so on so then it become an also so hard for the other products manufacturing products and services can it become a resource a helper providing food to others I mean of course we have lots of experts that happen in the agriculture products and so on.

So let us look at what are the weaknesses small scale conventional form primitive post harvest methods no channel master and many farmers to consumers intermediaries hardly any food processing industry inadequate storage and therefore so basically we are we have summarized earlier and we are looking at in the performance the weaknesses of this so here small scale primitive post harvest methods and so on so basically some of them need to be taken out by researchers by companies and by educational institutions.

And some of these weaknesses are to be business oriented in other words are no way in which anybody can help you have to allow contracts for me but contract forming people are afraid that the small farmers maybe because of their weakness they can be commoditized by the people what are the consequences what are the consequences of the strength weakness of these weaknesses surplus food is wasted away in other words here there is an article by me can India be the food basket for the world the answer is yes.

Can India supply the food for all this experience even other what the answer is yes but there are ways together they 30% of the food for my cats only 20% of 25% of the final price in efficient supply chain know not beating the end consumer professes preferences you know if you look at India it is 50% of the population is below 25 years 50% of the population is below 25 years so

the angles are aspirations or they want to pretend eat food they do not want they do not want to eat the grains.

So are you meeting the aspirations are they sang people the answer is no so what are the opportunities the opportunity is higher for culture and management infrastructure builders processed food manufacturers should packaging and logistics providers with retailers and exporters IT and death illness and research institutions there is huge opportunity that provides Indian food sector and so on.

So finally potential to become needing food supplier for the whole world not only for India so this is where I was coming that India has a comparative advantage to become a leading food supplier for the entire world but we are not and it is very important that that this should be taken seriously.

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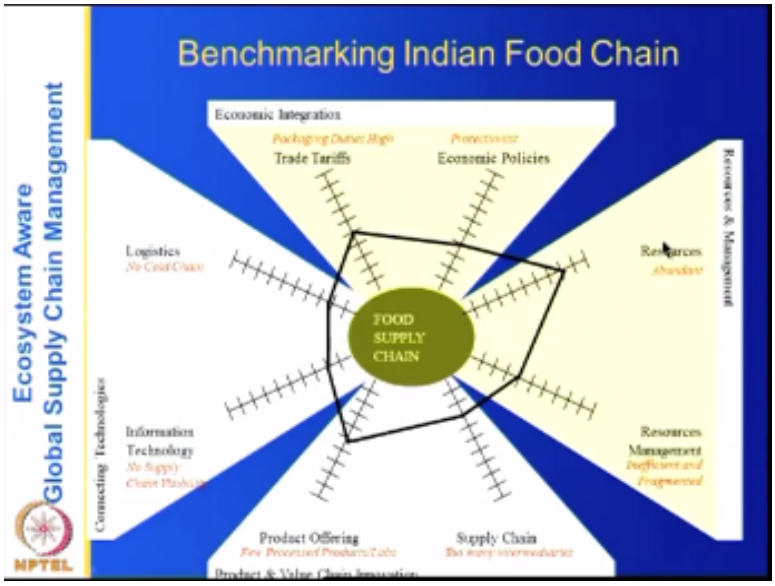

So you look at the benchmarking of the Indian food supply chain so as I said one of the things that you can use the SES framework is for benchmarking so if you want a benchmark what about the resources their high resources and what about how much of them we are using your management your management is very low inefficient and fragmented resources or abandoned

but so if you look at the resources god is great he has been very kind to India but the man is basically does not know.

How to manage and if you look at the supply chain there are too many intermediaries and it could be lot better than what it is today we have seen that from our analysis what about product offering in terms of product few product process for its and so on so this products offering or for very less in India in other words you do not have as many products as you could you could get from the processed industry.

Then what about information technology using information internet and in the supply chain there is hardly any information transfer it is all only and either the phone calls are face to face communication that happens what about the logistics in terms of we are talking of the connecting technologies or delivery technologies both information technology and logistics technology or as they the low as far as this is concerned and what about economic integration or trainings there are lots of protectionist economic policies a PMC act and so on at all this minimum price act and so on this acts are acting Ignacus this also.

What about packaged the duties and high in other words as head of the trade is concerned it's not very friendly so what happens is if you look at the benchmarking Indian this one that shows the performance of the Indian supply chain this diagram is shows you the performance of the Indian supply chain.

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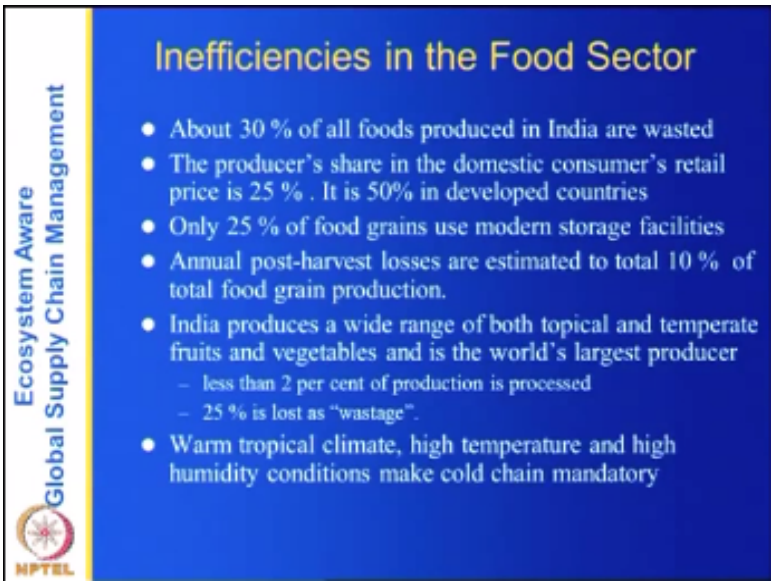

So there innovation sees in the about 30% of all foods produced in India Weston the producer share is in the domestic consumers retail is 25% it is about 50% in the domestic market in other words out of 20 75% of what the culture will pay you and I pay these goes to the intermediaries so the two others to la logistics and retailers and so on only 25% of who trains use modern storage facilities 75% of mustard on the road and yellow has to post harvest losses are estimated to be 10 percent of total food grain production.

India produces a wide range of cloth the tropical and temperature fruits and vegetables and is the world's largest producer that less than 2% of production is processed 25% is solid as wastage in other words if you supposing you take something like tomatoes or you take bananas, bananas can use drying technologies and they can be mixed in breakfast cereals and so on and that is those technologies are known by other companies.

You need I have to invent any new technologies they are known to the world only thing is you have to basically use those technologies in the Indian context and so only less than 2% of the production is processed and 25% is lost in the wastage what tropical climate high temperature and high humidity conditions make low and chain mandatory so if you think you can manage without the cold chain it becomes extremely otherwise it will be extremely unwise so the rain efficiencies in the food sector you know they come from this so if you are looking at the performance of this.

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That is what the performance tells us in other words if you are looking at the perform of the food sector then we had we had used the SES framework to map the one day and therefore this one and that particular diagram is useful if you want to most of the times most of the times.

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You want to know you know if a supply chain is inefficient so what how do I rectify this so this diagram gives you where you should be able to rectify it in other words if you are in the

governmentation maker then we should look at these if you are and they want to have the delivery service infrastructure you should look at this we are looking at the manufacturing and the supply chain you should look at the supply chain inefficiencies or lots of foot manufacturing sector and so on.

So one of the advantages that you have what the SES framework the supply chain ecosystem framework is once you know where the efficiencies are you know who the decision makers are and who should address this problem the resources are there and then the resource management is an issue who should address this the government need to train the people in terms of a skill and so on the education institutions should also do this they skill best training and somebody has to develop the material for this train who should be trained and in what direction they should be trained and what should they get trained and so on so.

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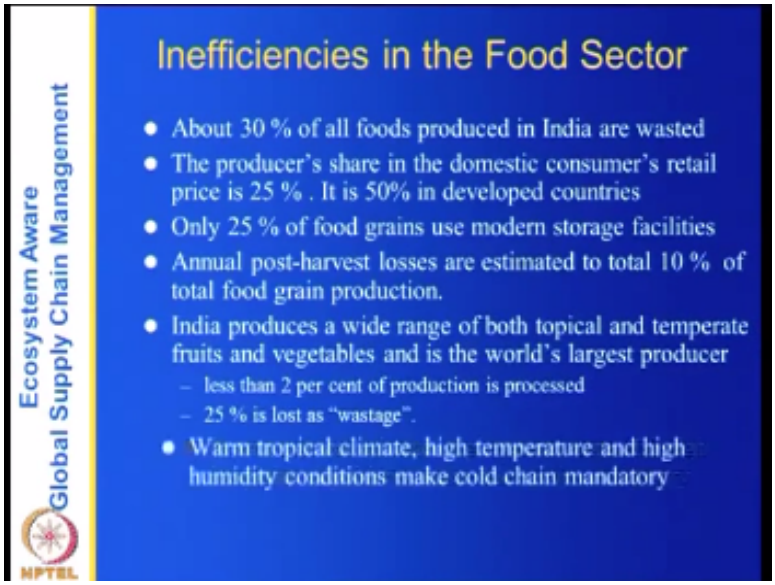

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Basically the issue is once you have this performance in this usually you know the we have Edition dress and who should take the initiative and so on so we will look at the innovation and what are the innovations that are possible.

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I mean one thing that happens here since our analysis as earlier shown that the Indian supply chain food supply chain is this week so it is possible to make the Indian food supply and competitive the border in several concepts from other supply chains as well as food supply

chains in other countries so this is where we are going I am saying that the supply chain can benefit from due to the market kind of initiatives and so on.

You need not have to invent very much in terms of those so innovations along four dimensions need to converge for Indian food retail to turn into highly competitive article basically it is supply chain innovations institutions resources logistics and IT and so on so we call this SCS framework for excellence in innovation so.

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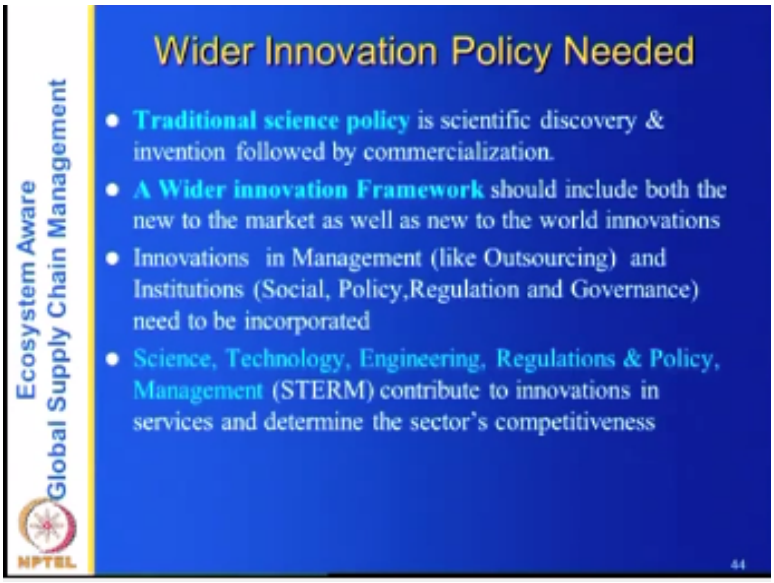

Why that innovation policies theory as I said the traditional science policy is scientific discovery and invention followed by commercialization that is the linear logic where you had to first find out they discover the product and then in order to file a patent and afterwards commercialize it and so on but what we need here is to include that they do to the market as soon as new to the world of innovation so we required that kind of innovations besides the new traditional innovations but what we actually need for India is the other wider innovations.

So innovations and management like outsourcing and innovations in institutions like social policy deregulation and governance need to be incorporated and science technology engineering regulations and policy and management contribute to innovations in services and determine the sectors competitiveness for example in the food supply chain we saw that there

is no governance at all this other thing is left to the individual and if he does not does not know what to serve and where to sell then he is lost.

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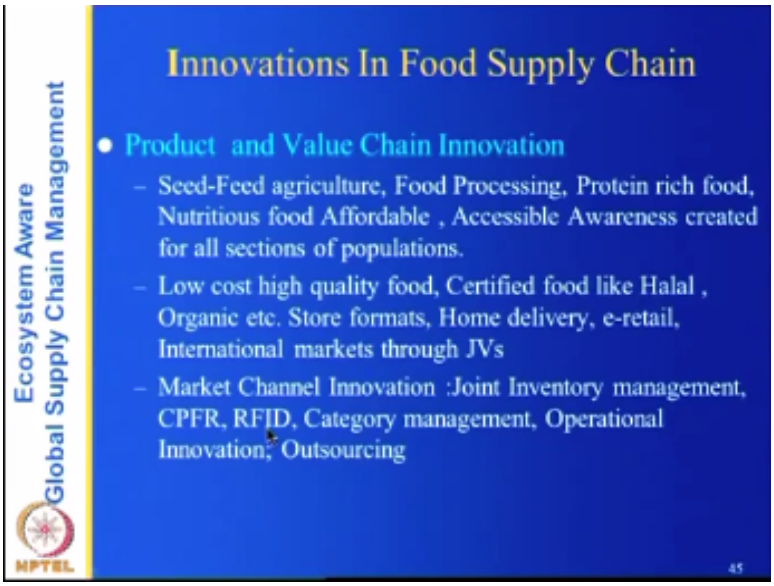

So let us look at what are the innovations in food supply chain actually I will give you a big list and afterwards go into the particulars of them for example I was talk of seed to feed agriculture in other word depending on the particular product you are looking at can you see it that for that for supposing you are using corn supposing your end product is cotton oil then can you use a seed which will give you high oil.

This one purpose from the feet suppressor your final end product is for food use it and I as a as a vegetable then in such a case you want a high nutrition so can you make it see use a seed which will make it highly nutritious so in other words depending on the field you can you use the seed so that is called c2 field agriculture and the answer in case of carbon is yes that can you and can you extend this to other this one .

So put I mean they are trying to do something of a sweet potatoes and all that they want to increase the vitamin E a content and this they have the seeds for that particular thing and about food processing protein enriched for nutritious food at affordable accessible and awareness created for all sections or the pasture population so you have to have nutritious food, nutritious

food is different from food you have to have you know India has this malnutrition states on and pregnant mothers and so on.

So for them if we were to provide nutritious food their Triple A qualities that you need to provide one is it should be affordable well people are poor so even though it is nutritious if you if you provide at a very high cost then you may not be able to this one you should be accessible in other words if they are in a village they cannot come to this aisle to the town and then buy it so it should be available in the village and awareness it can be good but it should taste well and then people should be aware that if they eat this they are getting vitamins and so on.

It is good for their health and low cost high quality food certified food like Halal organic store formats home delivery you retail international market through JBs and so on and market channel innovations joint inventory management CPF or RFID category management operation and innovation and outsourcing so if you are a supplier and carry these are all the things that are done usually for all the supply chains in foreign countries.

In other words you do joint inventory management but in the retail but with jointly with your wholesaler or jointly with your manufacturer and you have to have this category management and operational innovation outsourcing and so on.

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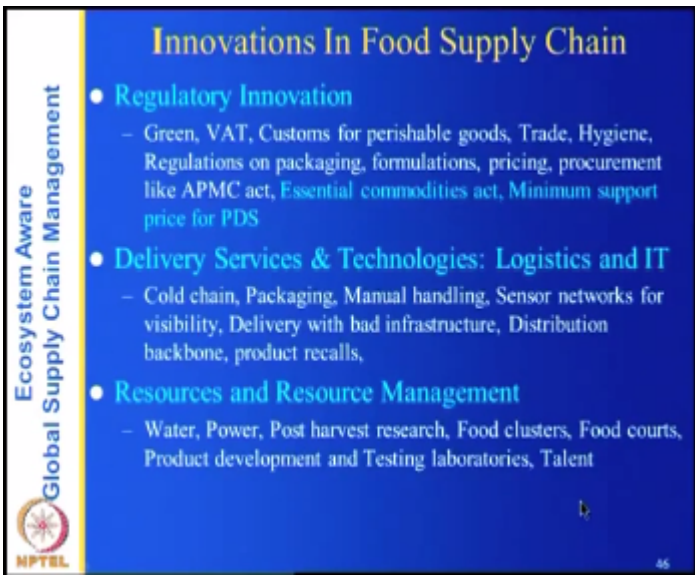

And regulatory relations like green customs for vegetable goods trade hygiene regulations on packaging formulations pricing procurements like a PMC Act essential commodities act minimum support for PDS and then there are all this one supposing there is delay at all this that is going to affect a food supply chain particularly these regulatory innovations for example Matt is value added tax for example the government is trying to remove the restrictions for interstate transfer so the interest rate as transfer is going to affect the logistics a lot.

Now warehouse location becomes lot more friendly and also it will reduce lot of logistics costs if this VAT is comes into force delivery service technologies cold chain packaging manual less manual handling sensor networks for visibility delivery with bad infrastructure this is if you can innovate how to deliver on time then the even if the infrastructure is bad what is bad infrastructure you do not have good roads you do not have very timely transport and so on.

So how do you what are the innovations that are possible Mr. Bhushan backbone and product recalls and all that now particularly when you are dealing with food if their food gives for example the food poisoning and so on then it may be necessary to advise the customers not to use that food well it may not be we need to have product recall here we could be ask them to dump it so but even then you should be able to reach the customers who have bought that particular food so you should be able to have a communicate with the with your customers.

And resources and resource management water power post harvest research food clusters food course product development and testing labs and tell it you see one of the big innovations that can come in food supply chain yes do you want to supply the grades do you want to supply the grains like rice wheat and fresh vegetables and so on or do you want to supply the food which is nutritious which is cooked which is fresh at affordable prices.

So this is like do you want to supply the product or do you want to supply the solution now all of us know well in various varieties of manufacturing industries people look at the solution as well as the products in food supply chain it makes a lot of sense to look at the solutions that is supplying the food rather than the grains that is where the food clusters food courts and so on

their basically be drawn here if you develop food courts and at those food courts if you give ration for people who are buying for the ration card holders food courts give food at discount.

And the food here is hygiene food and it is basically standardized and it is nutritious then you are solving for the problems so the people you need are to then do you have food court everywhere they are hawkers are small food courts and so on so the research here is it could be you could manage and innovate something.

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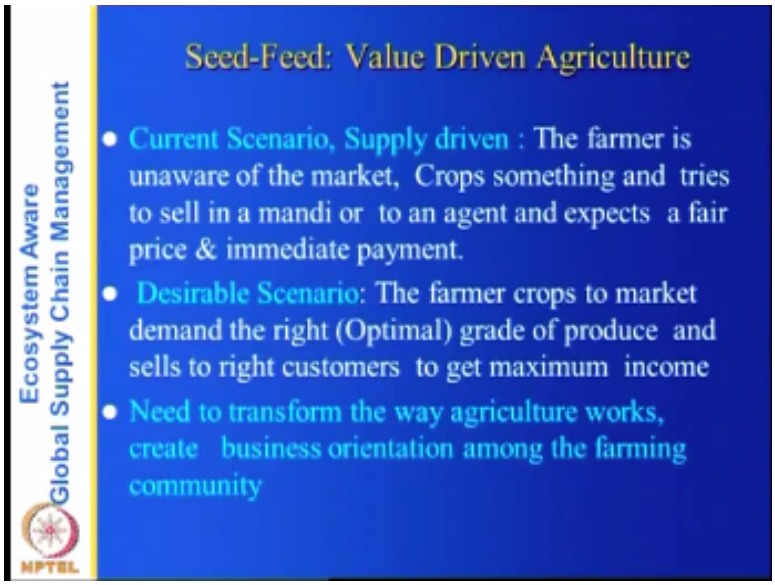

So that is the seed if you value driven agriculture that is the farmer is unaware of the market crops something and tries to sell the mandi and to an agent and expects a fair price and so on we have seen this before but you cannot scenario is supply driven so desirable scenario is basically you who sells to the right customer still but the maximum in much in other words finer the farmer crops to the market now this is possible for example a farmer which who crops cotton.

And he has to sell it to the fact is that of the garment factories and the garment factories could be somewhere in the West and the farmer could be somewhere in the East so how do you communicate between them so basically all you are you producing a butter for a particular

factory for this and so on so if the farmer is able to connect then you need not have to have problems later need to transform the way agriculture works.

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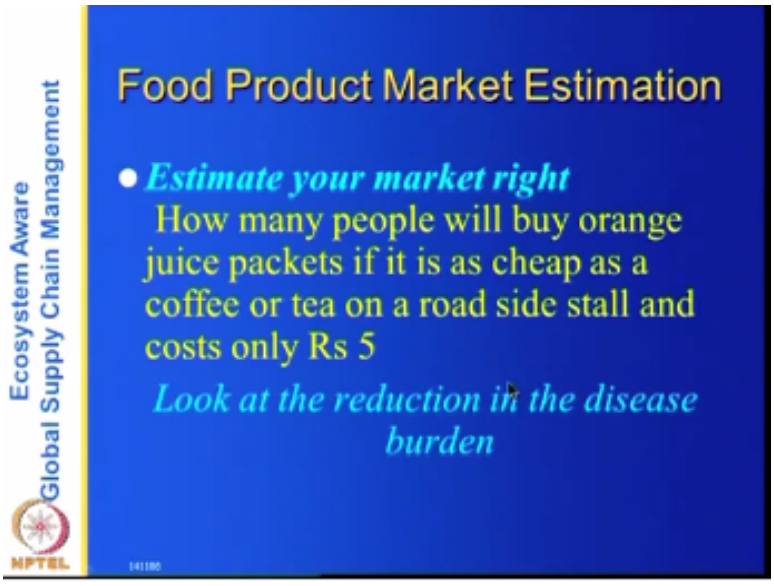

And food product market estimation so one of the problems with the processed food as we have seen earlier is the duties in other words Packaging is very expensive the duties on packaged food is very expensive that is where orange juice cost so much and so on the other hand if we if the government as well as the people they are the industry they come together and estimate the market wrecked how many people will buy orange juice packets if it is cheap as coffee or tea on the roadside stall and costs only five rupees of this because five rupees it can be ten rupees because coffee now cost ten rupees .

So basically if you can estimate your market instead of the orange juice being priced at the fifty rupees if it is priced at ten rupees and then if it is applied on the road in a good condition hygienic then do you buy coffee or do you buy orange juice orange juice can be you can be bought and it is useful if it is nutritious and the pregnant women are children they will get into a malnutrition problems well will disappear so if you estimate your market you have basically 1.2 billion people .

And orange juice can be trained it can really can be used by from small kids to the old people so you have a market of 1.2 billion every day or every week but because of this what happens there is a reduction in the disease but in other words there are more people will not get sick will not get will be more healthy the children will not be a burden on this society because of malnutrition and so on so now the government can subsidize part of it as I as a part of its this one instead of giving hospitals later when they get the disease.

So the food market estimation is it becomes an important thing and we have seen this kind of market estimation is now is an innovation and by the industry in terms of this one this has been done with a lot of success in the telephone industry in India.

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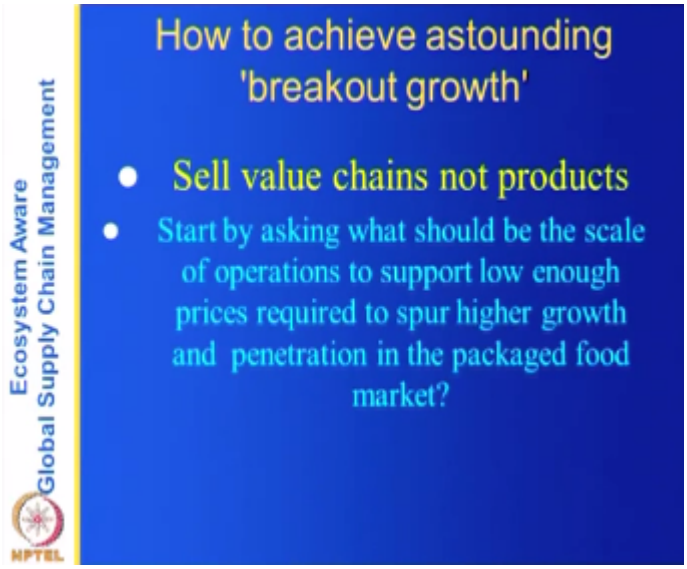

So the other one is how to achieve Astana break growth so do not ever start thinking that the only way to sell food sadly since the grains sell value chains not products in other words you sell the final solutions also the whole process start by asking what should be the scale of operation to support low enough prices requite despite a higher growth and penetration of packaged food market.

As of now packaged food market in India is very expensive very few people can afford it but can the package should be used by everybody the answer is big yes it is we are both poor as

well as there as well as the rich people can use the packaged food but then the market will increase enormously if you can bring down the prices if you can make it more nutritious more affordable so that is the kind of thing that industry break out growth that industry should think about.

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And what are the opportunities for example as I said before India can be a hub the food hub instead of trying to be a local hub a low cost hub our IT service half and so on since it has all the new shows natural resources and it can create huge employment if India follows the food manufacturing a huge opportunities Halal hub now for example the India has a Muslim population about 200 million and it is neither sorry export to Southeast Asia and Middle East and so on.

We have Indonesia we have Malaysia we have all the Middle East to continuation countries you can share there are the Halal hub if you taste Halal food is exported then it becomes an export hub vegetarian hub a lot of Indians are vegetarians so it can be vegetarian half organic food hub Europe and USA at seafood hub because there are lots of sea populations so if it is developed in an industrial scale and using resources and appropriate this one is done India has a huge opportunity to become a Halal hub vegetarian hub organic food hub and a seafood hub.

So quit processing SMEs in rural India if you create for example in the rural India how do you play food process processed food to the rural India you create food processing SMEs and rural India you know for making tomatoes to this one and so on and the distribution system need to be improved gold chain management post harvest technologists we went through this and potential for huge employment creation now for example.

The distribution system the logistics this is a skilled profit appropriate skill training people can be logistics employer similarly in cold chain similarly in post harvest this one similarly in food processing these are all do not require PHD is kind of thing all that it is skilled training so if they are done skilled trained appropriately then they can they can provide this one so the food manufacturing opportunities and with huge employment potential other than that it will also improve the efficiency of their fault.

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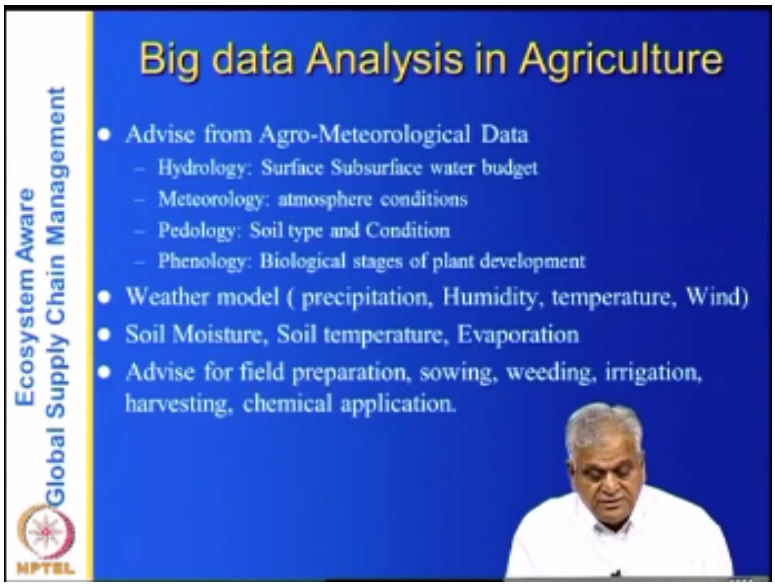

Then another thing that comes is this I mean there is the people are talking about what is called big data analytics or a big data analysis in agriculture what is big data big data is the data that is available to you when you want to make a decision in the agriculture you have to make decisions on depending on your soil fertility depending on the weather patterns that are going to come you to make what they the kind of seed what is the crop that you want to have when

do you want to see it and when do you want to harvest and what is the kind of post harvest research and so on .

So this depends on metrological data hydrology surface subsurface water budget and meteorology glossary conditions and hydrology soil type and condition and phrenology is biological stages of plant development so this basically you can do the advice and in at the appropriate moment based on all these sizes and in this order these are well developed science is the only thing is these people should be able to advise the farmers this and weather model precipitation humidity temperature wind and so on.

Depending on the crop you are in do the temperatures affect your crop the correct quality and so on and soil moisture soil temperature and evaporation why for field preparation soil building irrigation harvesting and control application so for basically the only way agricultural research is just seeds and watering and so on basically it is practice oriented now from practice oriented agriculture you have to convert it to scientific agriculture.

Now they cite recovery culture is nowadays there is basically database station making and this needs to come into India so this is called big data analysis which is used in retail markets for example in retaining.

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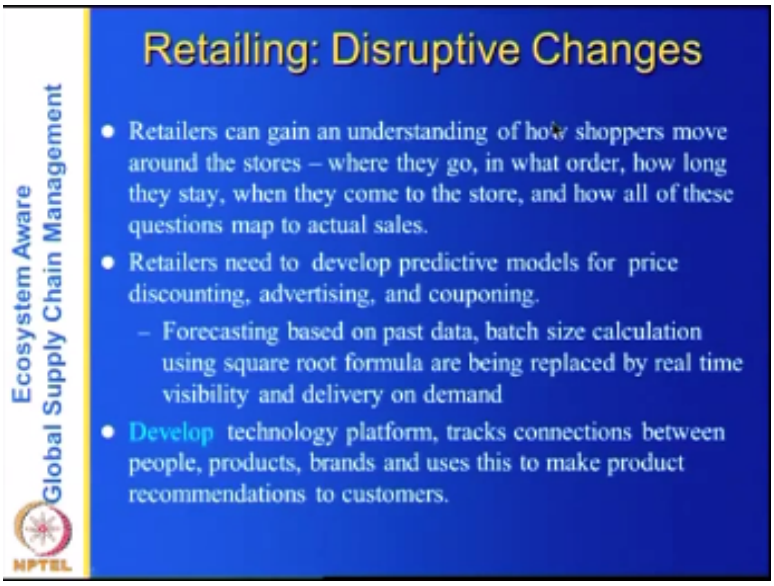

Lots of disruptive changes retailers linear data less you want to use any of this campaign and understanding how shoppers move around the store where they in what order how long they stay and when they come to the store and how all these questions map to actual sales so are people just coming to sightsee or they are going to buy what are the places they are visiting and that how they mean these are done by through CCTV cameras and so on.

And all these things and also the part of sale information using all this you can combine who are the good customers or what are they doing what are their behavior retailers need to develop predictive models for this price discounting advertising and coupon in other words if you want to get coupons and price discounts and so on depending on what who is by forecasting based on past data that size calculation using square roots formula and being replaced by real time visibility and delivery on demand.

In olden days in the supply chain even today some people do this they are basically look at how do you calculate what should be your demand in other words how do you fill your shelves how much do you order from your warehouse how much should you order from the manufacturer and so on all that used to be done by past sales it is a positive what you do today is your delivery on demand and it is real time visibility you look at what people are buying and make sure it can be online buying if you are doing online on time online retailing.

Your retailing as it is called then you know then it becomes even more this one that these this disruptive changes are going to affect this now for example there are technology platforms there do you who should develop technology platform track connections between people products brands and use this to make product recommendations to the customers you know one thing that happens in most advanced countries which our retailer should learn is that when you go to the web and try look for a camera look for a laptop look for a cell phone or something.

Then you immediately start getting emails from various people saying that look we have this available we have that available we can give this you give you this at a discount you go to this store then you know it is less priced this kind of stuff but when you of course in India 60% of sensors 4 even then you know do you get an email or do you do you have this one some returning invitation saying that here we are having this kind of food please come and buy and so on.

So the communication with customers become should be become a habit maybe they should start with the middle class and it can go down later.

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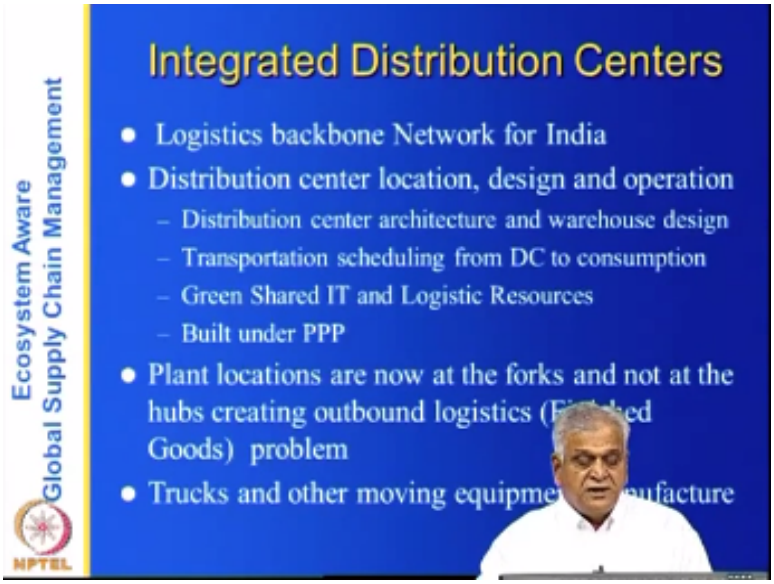

So another problem that we have with this one in the delivery this one is integrated distribution centers in other words do we have distribution centers in India we have 7,000 warehouses

logistics that that one for India is we do not have distribution center location design and operation architecture transportation scheduling dream shared IT and logistics sources please stop under PPP is private public partnership in other words it is very important for India to you to innovate distribute Center locations.

Well do you look at distribution centers what our distribution centers distribution centers with the places where you store your items and then they are sent to the retailers when as and when they are required and the distribution centers consists of warehouses trucks and so on and all that you know it has the it has transportation it can be green order so on but what happens is in India we have only layer houses not distribution centers so the warehouses are basically either for FMCG or from white goods and so on.

Depending on the product type you have five seven thousand warehouses and so on in India but what are needed or the distribution centers which are integrated into this plant locations are now at the forks are not at the hubs creating outbound logistics problem in other words where are you having where your auto factories they are in Delhi Chennai and Kolkata and Pune Bombay and so on.

So they are the forks they are not at the hubs what is the hub of India probably in out port probably Hyderabad probably anywhere in the middle of hand this one if you have production Saturdays you should go to the forks but we have it with forks and they there we have the reverse logistics in other words we had to transport finished goods rather than parts usually the transportation should happen you transport the parts to the places where there is the ED there is where there is demand. So trucks another moving equipment and manufacture these are parts of the integrated distribution this one need to do this.

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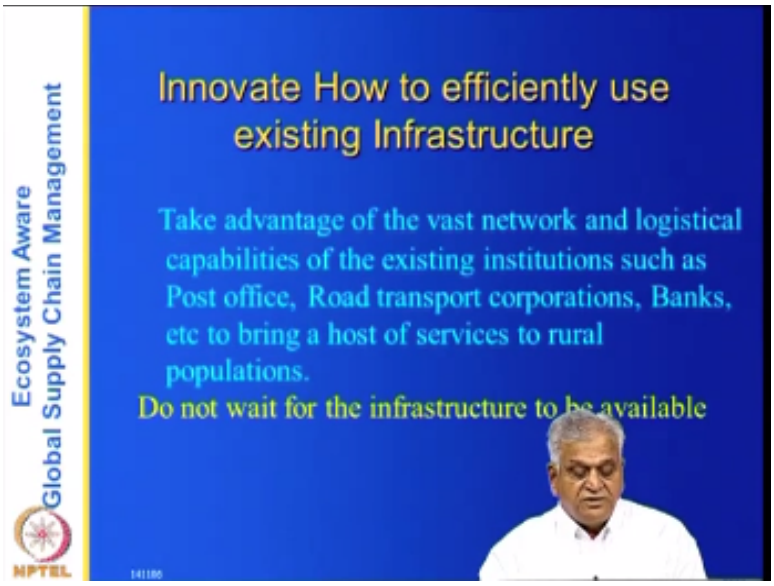

Innovate how efficiently use the existing infrastructure take advantage of the vast network logistics capabilities of the existing institutions such as post office Road Transport banks etcetera to bring host of services to the rural population do not wait the infrastructure and so on.

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The grip framework as I said for the in the ecosystem this one is the G stands for governance R stands for risk I stands for innovation and P stands for performance although grape is an economy that we are using we will consider these things in the reverse order as I said we have

already done look at the performance of the Indian food supply chain and then we looked at the innovations that are that are possible in the food supply chain.

And these are basically the new to the market kind of innovations rather than new to the world kind of innovations in other words these are not signed to a core product discoveries and pay attending and all that but these are discoveries which are present in other parts of the world and they have made blockbuster industries they have been very successful in terms of a customer usage and all that so the third one which is an important one is the risk in the supply chain in the Indian food supply chain.

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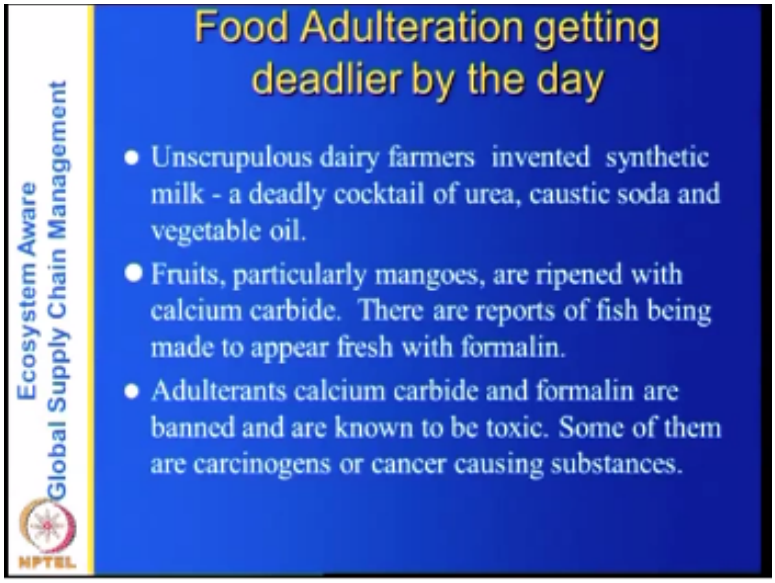

The first plan fundamental risk is the food and adulteration getting deadlier by the day now for example unscrupulous dairy farmers invented synthetic milk a deadly cocktail of urea, caustic soda and vegetable oil you know this will cause food poisoning to cancer any of this and causes lot of deaths now I do not know why they do it that it looks like a natural milk and I do not know who made this invention.

And second one is fruits particularly mangoes are ripe and using calcium carbide what they do is they take the raw fruits and then spray calcium carbide on them and try to ripen and that they this will look very nice but looking but there are reports of fish being a pure fresh is the formula and so on but then the calcium carbide or formalin with this they will cause food poisoning the adulterant calcium carbide and formalin are banned and are known to be toxic .

Some of them are carcinogens or cancer-causing substances and that is certainly cause food poisoning and now serves and all that but can also cause cancer so one thing with the food adulteration and contamination is very common it is throughout the world it is more prevalent in emerging markets like India but that is one of the highest arrests that the food supply chain faces .

How do you counter this and in how do you actually find out the trace their supply chain pack and how do you find out that you there is basically adulterated they are not fresh and genuine goods so these are all the issues let the supply chain faces and it is very important this issue is addressed.

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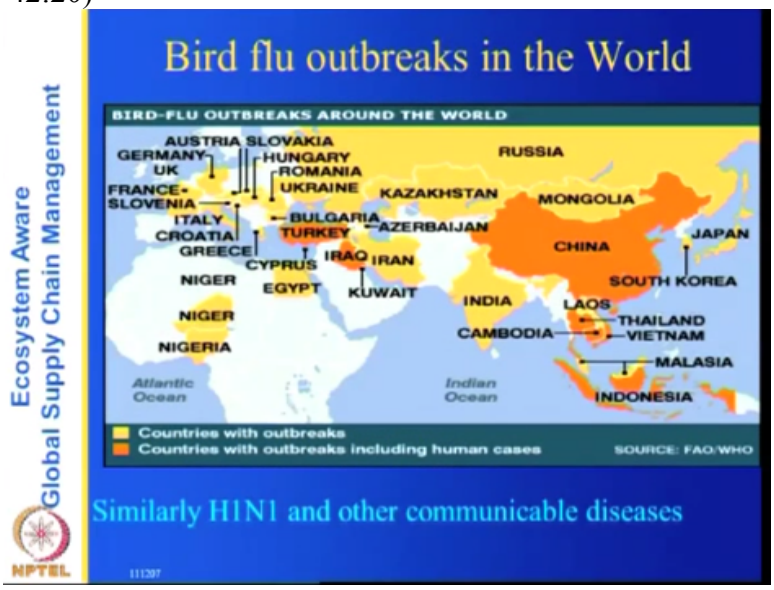

The other one is a bird flu you know for example bird flu outbreaks around the world China India and so on and then this shows all the countries with outbreaks including the human cases are the right ones China and so on and the countries with outbreaks without human or India Iran Egypt Nigeria and so on so I mean what happens with the bird flu outlets birds basically

are the ones you know they are used as meat in the food and once the virus are in the meat then it can go to the humans and thereby causing an outbreaks.

So this is where I think one has to be extremely careful and because the poultry managers who are basically make and keep the poultry and the animals they should be advised or trained to find out if their Birds are having bird flu most of the time people farmers or the poultry owners before they realize that there is a there is a bird flu with their contingent then it breaks out so there is a there is a need for educating the farmers on this.

Similar is H1N1 and other communicable diseases which go through the food channel for example the pet food here is another issue that this one I mean most of this meat that is with the bird flu and all that it enters the pet flu and enters the pets and threw them to the humans and all that so this becomes highly connected issue.

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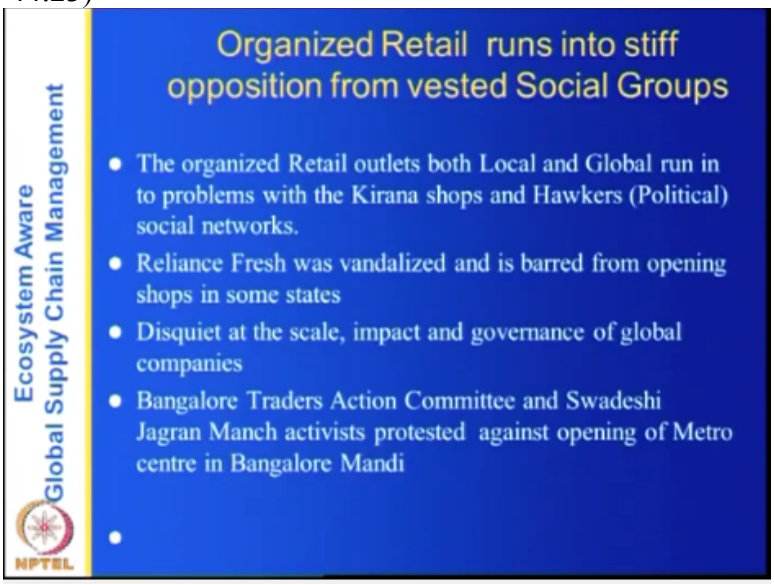

Then the other issue is the social issue now particularly the organized retail runs into stiff opposition from social groups what are these social groups now organized retail is a company this one I mean the retailers cash-rich and they have deep pockets and they can basically offer discounts they offer fresh goods and they offer the quality hygiene and all that so but they are competing and these people are competing with kirana shops kirana shops are small on the street shops who basically make their livelihood by selling the vegetables fruits and other items .

So that there are 12 million of them in India I think maybe it has increased these are this is an unorganized sector and they basically get there they are competing with the organized sector so since there are large numbers and both banks they are try to agitate and try to create problems for the organized retail so the organized retail outlets with local and global run into problems with kirana shops as well as hawkers now these are sometimes political sometimes social now in other words.

They are Hawkers networks and kirana shop networks and they basically have political connections so they try to create problems for the organizers retail and Reliance fresh was vandalized and is barred from opening shops in some states in other words there are some states in India where Reliance fresh cannot open their shops this is because they stay at once to protect the kirana shops.

So particularly this becomes important because the kirana shops are small and medium players and they are unorganized sector but on the positive side they are vote banks and they have a lot of political connections so they basically try to vandalize this and disquiet at the scale impact and governance of the global companies once the companies like Wal-Mart and others they try to enter into emerging markets.

They do it with their with deep pockets and they want to basically come into the market and offer all kinds of discounts at cheaper prices and other comfortable convenience so that the they can wipe out all the competition so it depicted there is a disquiet in the emerging markets at the scale impact and governance of global companies now you can also understand that the government's are also are very disquiet about the global companies getting in touch with the farmers .

Bangalore Traders Association traders action committee and Swadeshi Jagran Manch activists protested against Metro Center in Bangalore Mandi the Metro is a trader is a b2b interface it stands between the farmers and the kirana shops and when it opened the shops in Bangalore with the permission of the government then the Bangalore Traders Association and Swadeshi Jagran Manch activities they are basically protested across the opening of this so whether it is a retailer or whether it is a wholesaler .

They are people there is opposition for mister groups whether it is right or wrong this is not an issue the issue is here are social groups who claim that they are being affected by the entry of this organized retailers or wholesalers or something and that means to be taken into account when you are starting the office.

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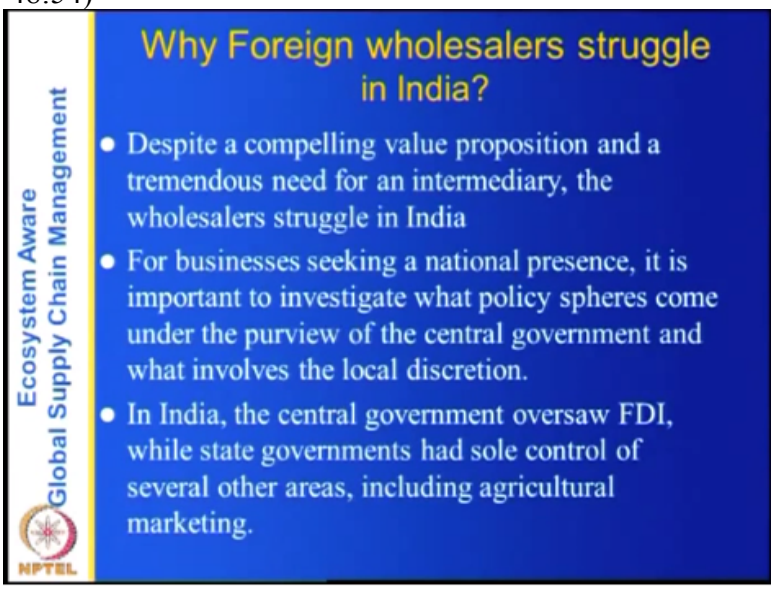

Why foreign wholesalers struggle in India the despite compelling value proposition and the tremendous need for an intermediary the wholesaler struggle in India so as we saw before there is a lot of wastage of food and there is a tremendous need for an intermediary between the farmers and the retailers and the retailers can be organized retailer or unorganized kirana shops whatever it is between the farmers somebody has to take the farm output and then clean them up and make it possible and then bring make it in terms of convenience package them and give it to the kirana shops.

And that is the kind of thing that Metro cash-and-carry and Wal-Mart and others are trying to do for business is seeking a national presence it is important to investigate what policies he has come under the purview of central government and what involves the local description in other words in India there are the I mean like everywhere else there are three or four layers of governance .

The first one is the Indian government which is the central government which is the policy making it has to basically make the policy regarding special economic zones regarding the FDI

and all that once they approve then the state government has to give all the facilities the land and the permissions protocol because agriculture is in the domain of the state and once the state government gives the permission this the corporations of the cities they need to get permissions because the hawkers and the kirana shops they are all basically controlled by the corporations.

So there is 3 or 4 layer control governance that manages this policy so they basically one should have connections with all this in India the central government oversaw FDI ,while the state government had sole control of several other areas including agricultural marketing so depending on which area which vertical you are entering one has to be extremely careful in calculating the risk.

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So that is what we have seen in terms of the risk that happens in Indian food supply chain it is very important one has to look at this for example what are risks that they are facing the risk one is adulteration the second one is use of these chemicals this one and third one is the social groups unorganized sector try to protest against the entry of the foreign players or even not even foreign it is a large organized sectors .

For example Reliance fresh is not foreign it is a company which is Indian so the permission granted to Reliance fresh has been vandalized so these are the social group this in addition to the risk that you get from your supply chain you get this from the government as well as the social groups or resources and so on but the your usual risk like delivery failure of trucks and

all the crops failure these are the kinds of things that are common that you should be able to deal with other kinds of risks like the social risk in the retail area .

So governance of food supply chain so as we saw the governance is basically the only ones here the supply chain somebody has to do the supply demand matching in other words what is it that is required in the market and what is it that is available from the farmers and how do you match the farmers to the retailers and if that is the fundamental problem of governments. Now as we saw the governance has 3 layers once you know what your market needs are then you want to do the partner selection you want to do once the coordination of who does what and when and finally we want to execute the entire supply chain but is it possible to visualize all these three steps for the food supply chain that we had described so far .Well the answer is a big No so let us look at that.

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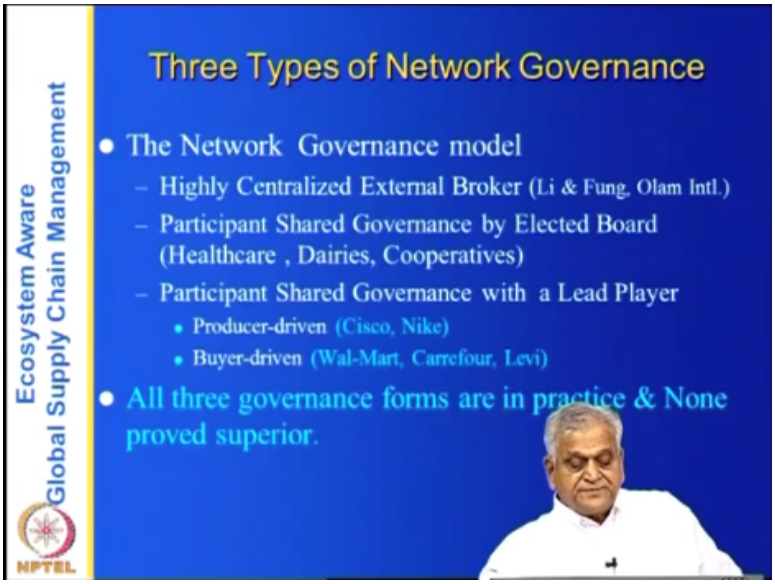

We have seen that three types of networks the network governance model highly centralized external broker like Li and Fung this is an orchestrated model like olam international or Li and Fung and so on where there is an external that means there is somebody who is outside of the farming area he does not do warehousing he does not do any retailing he does not do any farming but he does the broker so that is the kind of thing olam does in the food supply chain area and we will also look at the each opal which is a ITC owned initiative which does this kind of thing.

The second one is a participant governance model elected by elected board this is popular in health care Diaries and cooperatives these participants shared governance is common even in India for example Amul is a diary is this one it is station it is out of Gujarat state in India and basically it is governed by an elected board so there are small farmers literally millions of farmers who basically have 1 or 2 cows or buffaloes and they take the milk they deliver it to their villages and somebody in the village .

He basically collects this and it is they make ice cream and other things process the milk and sell it back. so this is a kind of thing in dairies there are several Diaries even an idea which using an elected board participant shared governance model with a lead player for example it can be producer driven or it can be buyer urban in case of the producer driven we will see shortly that there is somebody who is a big manufacturer or multinational who has lot of power in the value chain he becomes the lead player .

And he basically manages the entire thing and the others have to listen to them because he gives them the market share there are buyer driven things like this make basically the emergence of big retailers like Wal-Mart, Carrefour ,Levi and others has they have become the buyer driven and all the suppliers supply to them .

So they are directly although they do not have they may not have a brand of their own but they get all the other products and everything they basically control who does what and at what point in time and when do they supply and how much and so on so basically because the governance mechanism exists here is the buyer this one.

So all three governance forms is in practice and none of them proved superior but since we are dealing with the food supply chain buyer driven supply chains by retailers are very common in food supply chain you know for example Wal-Mart itself is an example of Tesco and others and so on producer driven supply chains in field markets or as we give an example is her coffee and other things where there are big players big market players in the area food.

Of course in terms of dairies and cooperatives were given it gave the example of Amul in India which is supposed to be a classic perfect example of an elected board which controls the diary and it makes a lot of profits and when all the customers as well as the participants in

the dairy are very happy and of course we have the centralized broker system there is there are several brokers or orchestrators in the food supply chain .

And they include loam International which is a foreign company which is the Singapore based company and they are basically and also each opal which is an ITC Initiative but if you if we analyze how the scale of a food supply chain that we have in India the kind of governance is very little in other words most of these this one is driven by.

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The driven by is made to make to market and it is like push and the farmers produce something and then try to sell it in the market. so there is no supply demand matching using any of this and it is a great test name we will see that producer driven chains introduced a lead firm often an a large multinational plays central role in coordinating a distributed network of suppliers so this is basically what we have seen now who does what in the chain and for what order and when and how much all this and what are the specifications of this what is the kind of equipment that should be used and he is also responsible for the labor and contamination and other kinds of issues hygiene and all these issues in this.

So the lead firm controls R&D product design and innovation and the type of chains are to change some characteristic of capital and technology intensive industries such as automobiles ICT and semiconductors so but food manufactures play a major role in organizing producer driven supply chains although challenged by large retailers in the food.

The retailers are very common to be the lead players their power lies in processing in supplying and processing key commodities such as high-value bean crops like coffee or cocoa or key ingredients for a wide variety of processed foods like processing Tomatoes now for example if you have purchasing tomatoes in large quantities then you know it is used in a chopper to use in tomato juice it is a variety of phase.

So if you can control then you can call the shots that had if you had a small tomato producer then you are trying to sell whatever you have produced then you know you have to listen to someone else so this is this is basically this type but producer driven chains not very common in the food area.

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The buyer driven chains large retailers and brands like Target ,Wal-Mart Carrefour they basically play a lead role in sourcing from decentralized networks of independent suppliers defining product and process specifications and standards so here we have set the standards and they tell who does what and so on defining a depending on what their customers want then they are sourcing of the customers then they try to find out what is to be done and so on.

So basically they dictate this one the buyer driven chain tends to be characteristic of labor-intensive consumer goods industries such as apparel footwear agro industry and consumer electronics so these are the because there is not much of a brand issue in all this so they

basically control they are controlled by the buyer driven in India big retailer such as More Reliance and Big Bazaar are still in their early stages and the regulations play as roadblocks.

So in India you have buyer driven chains not very much maybe in a pro but not in certainly in food so but there are very big retail shops coming up retail chains and they are still in early stages where maybe they are all 5 to 5,6,7 years old and the regulations play roadblocks for example can the retailer directly have car truck farming with the reformers the answer is yes in some states no in some states and can the retailer directly source is it possible to source from the farmer directly.

Then the answer is yes in some states no in some states and the overall the big retailers are comfortable sourcing from the mundi rather than going directly to the farmers .

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So what are the governance in Food SCN generally then big farmers have no place aiin governance except in cooperatives so if you have an Amul cooperative then you have a place in this because you have at least their right to elect one of the members of the co-operative board but the other guys if you are producing whatever you are producing you have to basically take it to the market and sell governments help the farmers through mandi procuring a comfortable price for the public distribution system.

So we talked about the Mandi and mandi is that a governance model yes it is it does to supply demand matching to some extent between the farmers and this one the farmer can get

his goods to the Mandi and then find somebody to buy it if he is lucky so but the Mandi procuring at a comfortable price and the PDS public distribution system whatever items that are needed they are procured at a government fixed price .

And Food Corporation of India for example is acts on behalf of the government and owns 5000 warehouses and employees and other accessories but it is rated poor other words the food corporation 5000 warehouses they are supposed to be go down they do not have the software like WMS or transportation this one and they have to hire vehicles and so on so there are lots of problems associated with the warehousing and also storage that gets spoiled and so on.

So basically the PDS procurement for the ration system it is in the hands of the government and Mandi is also a sort of a government controlled market place where the farmers need to bring their stuff to the mandi and then find somebody who can buy them so that is the supply demand matching issue amul e-chopal and other private players play a lead role in the procurement so basically if you look at the governance of food supply chain in India where a food product law also you can mention .

And that is there is the Mundi that is used procuring for a comfortable price for the farmers and there is a PDS system which the government uses to buy grains from the farmers for the public distribution system and Food Corporation of India helps them so they are like amul ,e-chopal and all that the players who do this so I mean given the size of 106 million farmers earn 400 million workers and 1.2 billion people who are to be this one and 28 states and for union six or four to six union territories it becomes thoroughly inadequate and the governance process need to be studied .They need attention and improvement .

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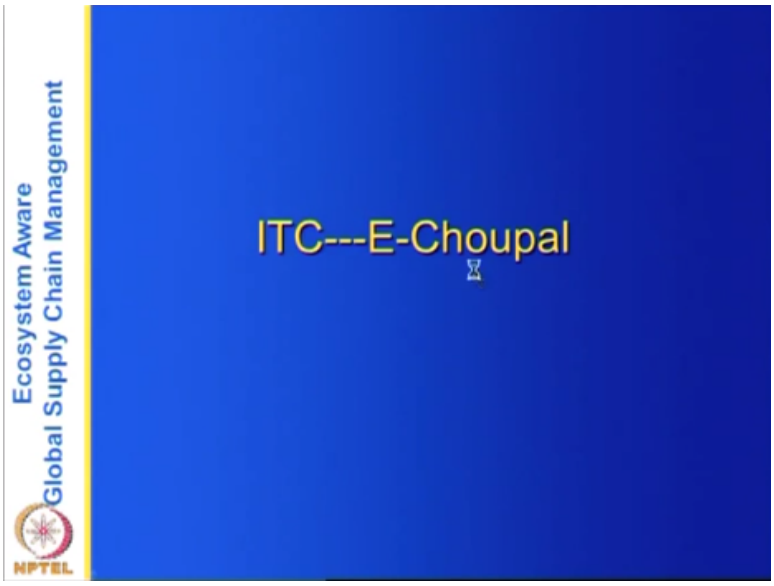

So let us look at one of the examples of an Orchestrator from India ITC is Imperial Tobacco Company but it is now called a ITC and e-choupal is a meeting place.

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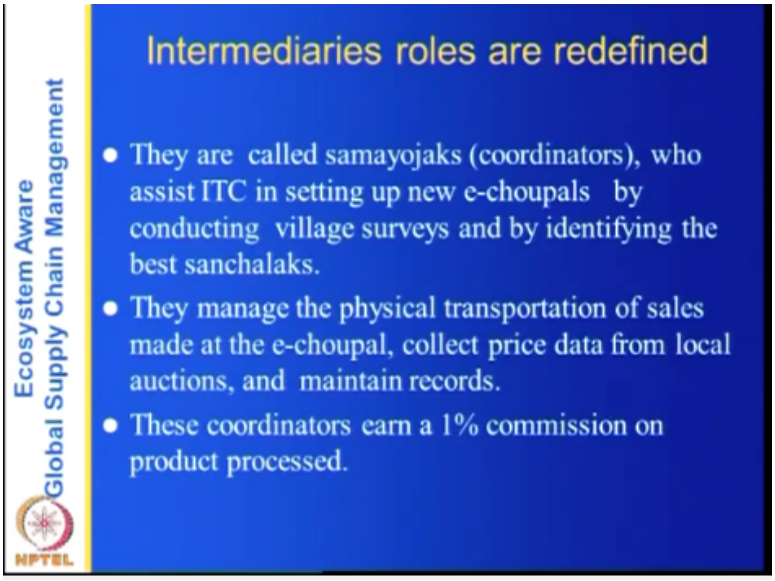

So e-choupal infrastructure and services what are they e-chopalis an initiative from ITC and they call it empowering the farmer they call it is a social initiative a firm in the farmers but they use this each opal basically to procure all the materials they need for their food apart from the tobacco or this one ITC also is into the food supply chain food arena they

manufacture a lot of food products and their process a lot of food this one it is a brand for FMCG and so on.

So basically what ITC does is to procure from soya beans to coffee beans to everything from the farmers directly now it has earned the name of you know direct cash transfer once the this they want to ensure that the quality is good and so on they supply seeds all that so let us look at what it is an internet kiosk in the house of a trained farmer called sanchalak within distance of targeted farmers so there is a fellow called sanchalak and he is a trained farmer and he is inside the house inside the village.

And he has a computer and other accessories that he has and through using the computer and the internet he can access the prices of all the commodities which are sold in the market and so on so far the within the working distance of the target farmers and warehousing hub is managed by the erstwhile middleman in food supply chain there are lots of middleman you know basically acting between the farmers and the mandi and the farmers and traders now ITC does not want to antagonize them.

So they said they usually they basically manage the warehousing hub and within a tractable distance you know tractors are used in agriculture here and tractors can be used to transport whatever the fresh produce the ones they buy it from the farmer they can be used for transporting their to the warehouse customized knowledge on farm and risk management so basically the ITC has knowledge about the firm and also about the risk they face.

The better supply chain for ITC lower transaction costs better value through price ability so they know where they are buying from and they have the quality issues are all sorted out and so since this is all done through in the villages then there is lower transaction costs and relevant real time information resolves in higher income commodity prices local weather news customized knowledge despite heterogeneity reduce transaction costs.

So basically the real-time information which is s needed to the farmers that they are doing what is the problem with an Indian farmer Indian farmer does not know what is the marketplace so if say somebody trader comes and tells him look this is the price I offer then he does not know whether to basically take it or leave it so direct marketing channel for farm produce in other words it offers a Direct Marketing channel we have to go through mandi.

So some states allow this ITC because it is an Indian company for certain commodities certain crops like soybeans and others direct marketing channel for farm produce screen quality demand aggregation for competitive prices and efficient logistics so basically once the farmer sells this to ITC take a control of the transportation because they do not want the enemies handling and he manual handling any spoilage contamination adulteration to happen once it is their own.

So that is what their very issue is see intermediaries roles are verified there is no called they are called Samayojaks coordinators who assist ITC in setting up new e-choupals by conducting village service and by identifying best sanchalaks so ITC has this it has something like 6500 e-choupals right currently and they want to work and seek 5 or 6 e-choupals every day so that comes to about 2,000 to 2,500 a year so they want to they want to do this and somebody has to work for them.

So these coordinators are going to work for ITC for this one and they also set up and train one of these sanchalaks then as the physical transportation of sales made by the e-choupals of all collect the price data from local auctions and maintain records so these coordinators and 1% commission on the product processed so this 1% may not look very high but on the other hand you know if the volume is high then what you get 1% is high so then that is where actually the coordinators have all the motivation to work hard to increase the transactions.

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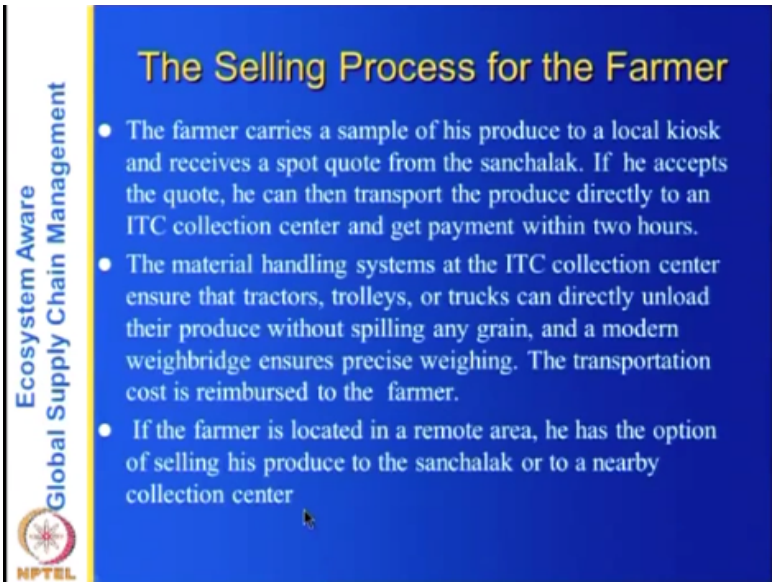

The selling price for the process for the farmer so what is the process supposing the farmer has some harvested crop he carries a sample of his produce to the local kiosk and receives a spot quote from the sanchalaks so it is what it is I mean the sanchalaks are empowered basically then the distribution of power they can give you quote and if you accept the quote you can then transport the produce directly to an ITC collection center and collect payment within two hours so he gets a payment the cash is transferred to his bank account immediately.

So the farmer has to take a sample not the goods to the kiosk and once the quality and other things are all assured then he will get a quote if he accepts he will get the money within two hours and the material handling systems at ITC collection center ensure that tractors, trolleys or trucks can directly unload their produce without spilling any grain and a modern weigh bridge ensures precise weighing .

The transportation cost is reimbursed to these farmer if the farmer brings it to the warehouse then it is reimbursed to him so in other words this is spot buying what ITC does is buying at the site of the farmer and if the farmer agrees then they can transport it to their place and also this weigh bridge is supposed to be precise and there are no hookups here because if it is a small farmer there could be all kinds of problems with the weight balance .

If the farmer is located in a remote area he has the option of selling his produced to a sanchalaks or to a nearby collection center then so basically they are trying to provide the transport they are trying to give him the money and so on .

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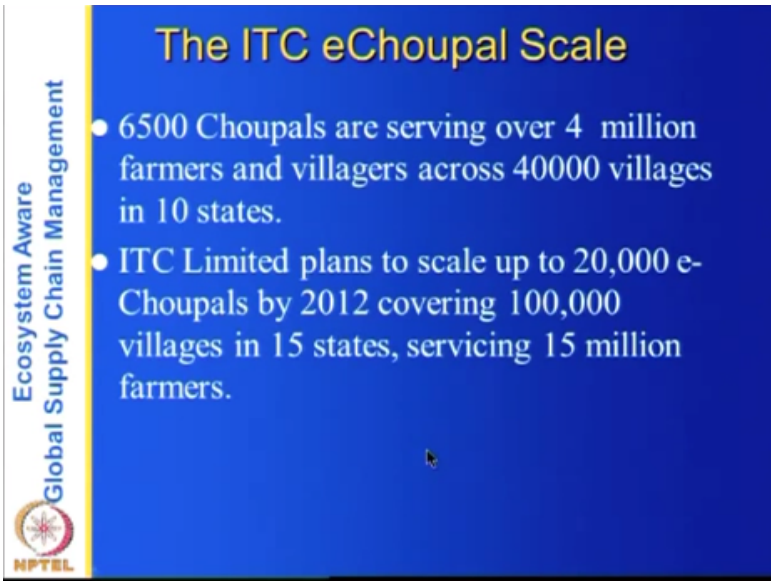

So 6500 choupals is serving over 4 million farmers and villages accept across 4000 villages 10 states ITC limited plans to scale up to 20,000 e-choupals by 2012 I mean this presentation was made in 2011 covering 1 lakh villages from 40,000 to 200,000 and in 15 States serving 15 million farmers .

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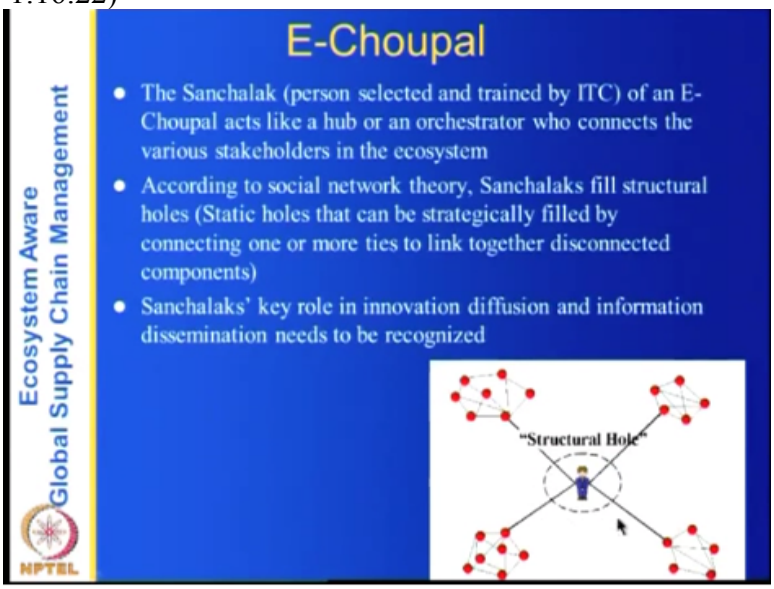

So in the sanchalak person selected and trained by ITC easily often each opal acts like a hub or an Orchestrator who can actually various stakeholders in the ecosystem so if these are all the farmers and traders and so on and it becomes a structural hole in the social networking according to social network theory sanchlalak are like structural holes static holes that can be

strategically filled by connecting one or more ties to link to other disconnected components. these are all the farmers these are all the retailers these are all the trade owners and so on.

So there is these are all could be dense networks they know each other very well but they don't know each other one group does not know the other group and the sanchalaks play a role of a structural hole in this a theory and sanchalaks key role in innovation diffusion and information dissemination needs to be recognized so both innovation diffusion and information dissemination are the goals of this structural hole .

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So let us look at that example that is about e-choupal which is an initiative by the ITC which is Imperial Tobacco Company which is those manufacturers not only cigarettes but other FS FMCG products let us look at a company called olam international which is an Orchestrator global agri-food networks so olam international evolved into global leader in agriculture commodities which have space in Singapore from a small Nigerian company so it was a very small Nigerian company now it move to Singapore .

And it has become it has become a global leader in agriculture commodities what does we do olam does not one forms but orchestrates a network of very small producers. Olam international limited supplies raw and processed agricultural commodities grown only by small and medium producers in developing and emerging countries to well establish regional

and international customers in other words if you are a retailer or you are a big customer then they will supply you all this from this one.

It is a global company I mean other words they source from Africa and they can supply to US and resource from India they can supply to UK and so on so basically it deals with small and medium enterprise producers and it deals with both raw and processed agriculture commodities they are raw commodities like cashews, peanuts and other things they are all supplied and also processed agriculture commodities are all supplied.

Olam directly engages in sourcing that means it has connections with the farmers across the world transport warehousing and distribution of a broad range of commodities including cocoa rice timber cashew nuts cotton coffee sugar sesame she nuts and spices so olam is supplier of many of the world's most prominent brands offering reliability consistency trust traceability and other value add services .

So it is basically an Orchestrator it has an intermediary and it is a wholesaler and global and it basically is between the farmers and the in some countries Africa India China and so on and the big retailers and the big customers anywhere in the world so we have seen here that under the government's this one .

So all the parts are the governance there is a food supply chain you have participant there is one you have producer driven the dominance you have buyer driven governance which is by urban governance is the most popular an orchestration like particularly in sourcing to olam and e-cchoupal and others so in agriculture supply chain if you consider on the global scene all the three-part kinds of governance patterns or popular.

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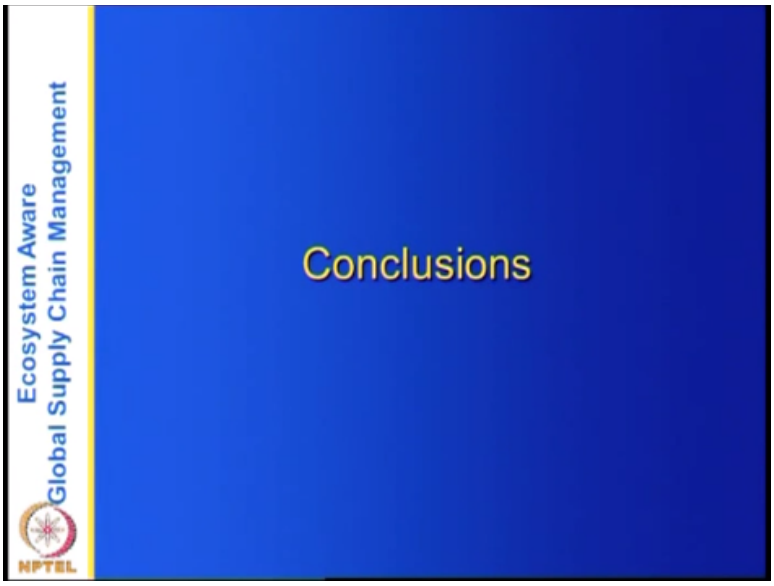

So a food supplies chain how do you want to conclude this.

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So I mean the point is idea any economy has three sectors the agriculture in manufacturing and the services sector now basically we have seen that the agriculture has comparative advantage in India because of its natural resources and we also mentioned gone through for the entire thing we found that the management of the resources and management of the supply chain need to be addressed so India need to move to a more sustainable growth model concurrently maintaining vast manufacturing base efficient driven agriculture and world-class

business services for the market and welfare of 1.2 billion consumers and provide world with high-value goods and services.

The reason for this statement is it has two simultaneously or concurrently address all the three sectors of the economy agriculture manufacturing and services see in olden days people think they any economy moves from agriculture to manufacturing to services . It is that though they were three distinct that they are not three distinct things.

For example agricultural require services agriculture requires manufacturing work requires agriculture and manufacturing require services and services require the inputs from both manufacturing and services so we are all basically intertwined and for that reason you need two more value chain concurrent you know all of them.

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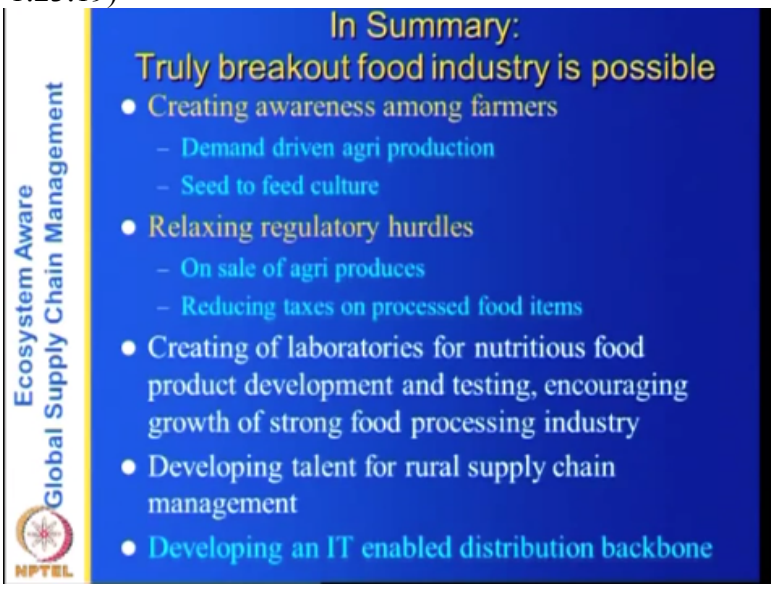

So how do you get a truly breakout food industry as possible creating awareness among the farmers where to create awareness among the farmers demand-driven agri production seed to feed culture they said you know you plant the seed depending on the feed you need and relaxing regulatory hurdles on sale of agriculture produces reducing taxes on processed food items and creating laboratories for nutritious food product development and testing an increase in growth of strong food processing industry.

Developing talent for rural supply chain management developing IT enable distribution backbone now if you look at the distribution backbone in India it is basic very basically very

weak that have warehouses and so on in transportation and unless they are basically not professional we will stop here.

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