Education for Sustainable Development
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Lecture - 28
ESD for Food Security (Contd.)

Hello viewers, welcome back to the class ESD class on Food Security. We are discussing about the food you know how to reduce the food wastage, food security and different mechanism for that.

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So, to continue with that now we will continue with, like this is the kind of you know this is the kind of global SDGs challenges that we are facing challenges and probably solutions. The challenges of zero hunger and no poverty, these are the challenges that we are facing and how to get the solution for this? So, increase a agricultural productivity ensure the ensure equitable access and diversifying the diversity and diversify the plant varieties food crops etcetera.

And, how to invest in small holder farmers with especially, with women in engaging them in increasing the food security and improve the nutrition not only in the family, but in the community.

And by you know starting the home garden, kitchen garden, terrace garden and you know again by executing by implementing the rules, legal actions not to waste the food, penalties for the

not wasting the foods. Food preservation techniques and women should be educated regarding the different kinds of you know nutritional value of the foods food products and how to manage the kitchen garden.

And again how to you know, again how to introduce also how to help their family in you know in producing different kind varieties of the food. Seasonal food starting from the greenly vegetables to the stuffy food to the other kinds of the crops in from the from time to time in that in the different seasons throughout the year.

And again then yes of course, we have discussed about the technology that can assist us in reducing the food wastage. But moreover in the developing countries the more and more rural people a rural people rural women should be educated.

And similarly in the urban set up also more and more youth and adults should be educated. Educated to not only to start their own business in agriculture and food engineering, but also to facilitate to facilitate the small time entrepreneur start up business those who are, those who are working exclusively working in the food a food processing and agricultural products.

Nowadays this organic farming is coming up so, how to enhance these things. So, these are some of the solutions to reduce the impact of climate change on our crops to enhance the food security to again to retain the soil quality conserve our soil quality and the resources. And how to again by restoring the quality of the soil how can we diversify our food productions.

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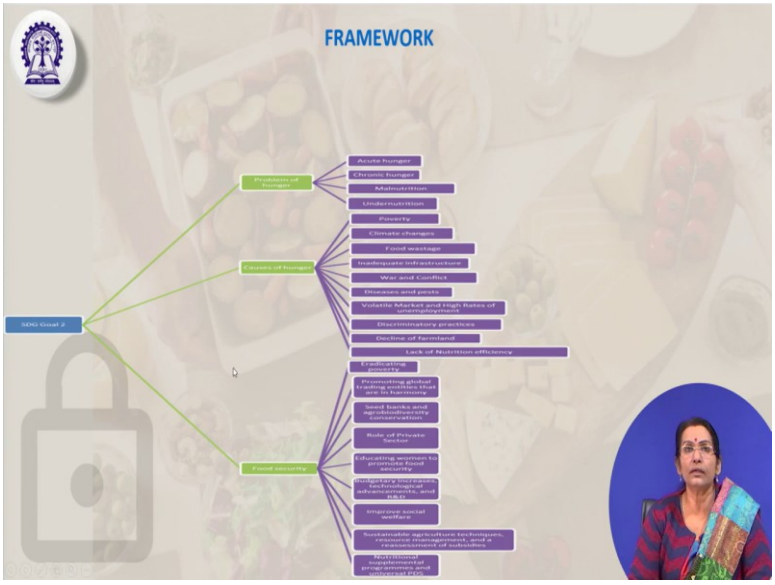

So, this is a framework, we have already discussed about MDPI framework. So, this is also a framework like focusing primarily on sustainable development goal two that is the zero hunger. So, this is that is how the problem of hunger should be addressed. Like differ how to categorise the hunger first of all how to categorise the hunger that is different kinds of acute hunger, chronic hunger, malnutrition provided poverty etcetera.

Then the cause we have to identify the causes of the hunger, causes of the hunger maybe due to lack of you know lack of water or you know lack of water facilities or the food wastage or inadequate if infrastructure or because of the disease in the plants and because of the lack of knowledge among the farmers. So, because of the discriminatory practices, what are the causes of this hunger in the different areas?

Then the food security like how to remove this poverty how to address this issues starting from the role of the private sectors, to seed bank to agricultural sub providing agricultural subsidies and the updating the information and education about the food production techniques. They improve the social welfare sustainable agriculture techniques practices and nutritional supplements all these things are the food security facility.

So, SDG goal 2 that is know zero hunger it focuses first thing is that problem of hunger identifying the different types of hunger, reason of hunger then causes of this hunger identifying diagnosing the different causes of the hunger then how to mitigate it through different solutions. So, this is the framework that everybody all of us we can adopt.

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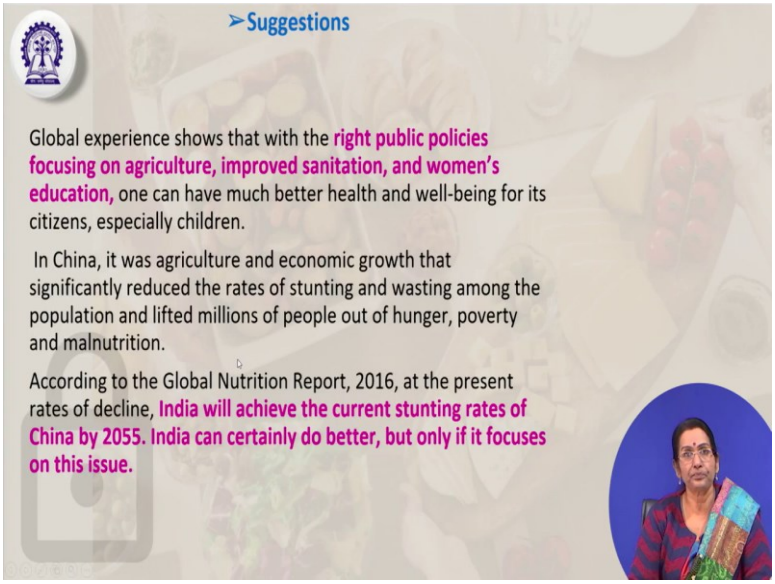

So, there are some suggestions also there are some suggestions like yes we have already discussed about the right public policies would be there. Focusing more on agriculture, focusing more on agricultural, improved sanitation, water security, along with the food security water security is also very important. Women's education empowerment and health consciousness like take especially taking care of the children children's etcetera.

So, therefore, so, these are some of the suggestion that should come from time to time not only from the ministry from the experts also from the private sector also from the you know from the experience farmers also. And are the companies or the organisation who are who are the food product based companies and the organisations or either they are working in the fertiliser sector or in the food preservation sector etcetera.

So, and the data says that the India will achieve the current stunning rate of full security global; that means, full security food food preservation or zero hunger by 2055. Because China has is and moved ahead in terms of their agriculture and economic growth and the growth and they have been able to bring out lift lifted millions of people out of hunger and poverty and malnutritions.

And that is and as the global nutrition data says report says that India will be able to achieve those status these status by 2055; provided it does better in policy sector in investment into investment and focuses on these issues identified by us. Like for example, the food wastage are sustainable; that means, sustainable use of sustainable use of the soil for the multiple diversified food production different seasons.

And all kinds of the; if you go by this kind of framework with the scientific analysis, with the logistic and with the proper feedback and evaluation then India probably would achieve this by 2055.

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So, these are some of the research findings that these research findings I have collected from the latest research literatures for this is research literature. So, that is ah. So, that is I have added it you can go through it later on. So, the world population continues to grows.

So, there is the more demand for the more food production. So, food production need to rise by 50 percent at least by the year 2030. If you want to focus on as achieving the SDG 2 that is zero hunger then by 2030 we at least need to increase the food production by 50 percent.

Similarly, the today's agricultural trade practices are failing to feed the poor and have the detrimental effects on the environment. So, again equal access, equal distribution again food. You know we have already discussed about crop production, food production, food management, food distribution and food restoration food. So, the preservation all these things are the very important dimensions.

So, how to ensure equal access to all people especially the poor and the rural disadvantaged people. Similarly, how to again restore the quality? How to reduce the negative impact, detrimental effect on the environment? How to stop how to reduce the food wastage or the crop wastage?

So, how to be alert you know alert and very alert about the seasonal changes certain seasonal changes. Or the you can said some kind of the climate change or the all natural disasters how

to be alert and how to protect our crops and the food crops and the post harbiting also harvesting also.

So, these are some of the important things. So, latest research and latest things are coming up and we must praise our farmers and agriculture agricultural you know experts and the agricultural companies. Companies are working on this agricultural and food production units from time to time. So, these are some of the latest research findings that you can go through.

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And similarly again say along with agriculture we should also focus on fisheries and fisheries and poultries, animal husbandry. All kinds of things we must also divert our attention and the focus and effort towards other things. So, we should not only we should not be over dependent on the food import ok for the foreign countries, we should procure we should cultivate, we should invest our time in producing our own food items depending; because India is primarily an agriculture based economic country.

So, why not to use, why not to use our talent, our skills, our land, our research for the food preservation food production by 2030. So, that all the learners would acquire the knowledge and skills and more and more people will go for this agriculture sector and food processing sector.

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So, similarly how to promote again how to promote the sustainable development campus like the green going for green; that means, the green company, green products, green edible space green. Going green in terms of not only consumption, but also in the production also. So, similarly, so like for example, in university of Hong Kong. So, they have also they have they have; that means, they had rooftop farming since 2012.

So, similarly in our urban cities also, urban cities also that we can have this roof rooftop garden gardens also (Refer Time: 10:32). So, the school and school of architecture they yeah they have given the design. So, this kind of things kind of can be done in our cities also rooftop gardening. So, and from time to time weekly workshop on urban farming, rooftop cultivation, these things can also be carried out. So, these are the again the research findings.

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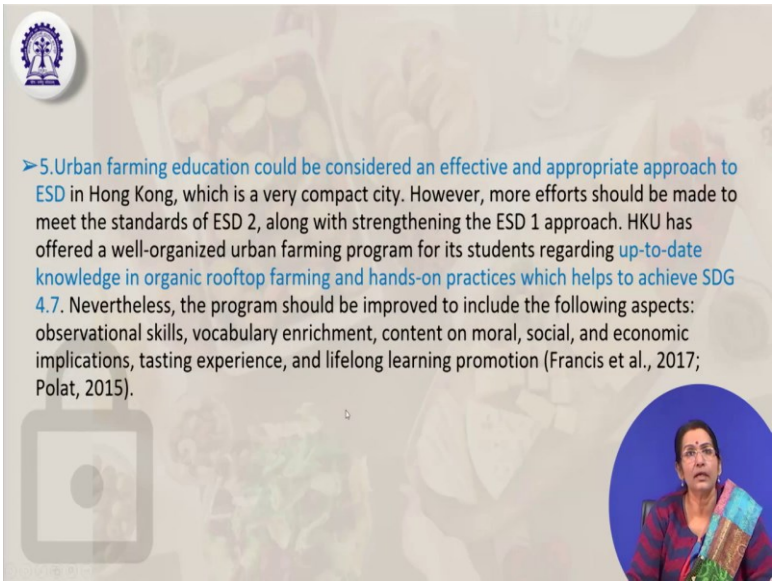

So, then similarly urban farming education should be considered as an effective and appropriate approach to ESD. So, from time to time it should be the youth and the it should be implemented this in terms of ESD it should be implemented in the core curriculum. So, up to date knowledge and the organic rooftop farming and some practices etcetera it should to achieve.

All these thing it should be educated it should be in incorporated in our regular curriculum in does not matter even though we are studying scientific studies or the engineering or medical etcetera.

But ESD through ESD course this can be this can be incorporated implemented in the course curricular. So, similarly through you know through observational skills through vocabulary in enrichment through moral and economic implications through lifelong learning promotion. These things can also be incorporated in the ESD syllabus or in the different disciplines.

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So, another thing is the attention should also again attention is needed to link this education to the food security. So, I think that is a ESD should be a should be made a very compulsory subject mandatory subject for everybody starting from the school level primary school level to the professional education etcetera. And moreover it should also be a part of the continuing education.

So, that is a today's agriculture and trade practices also they are also failing to feed the poor because of the detrimental effect of the environment policy fallacies etcetera that has to be rectified that has to be addressed properly.

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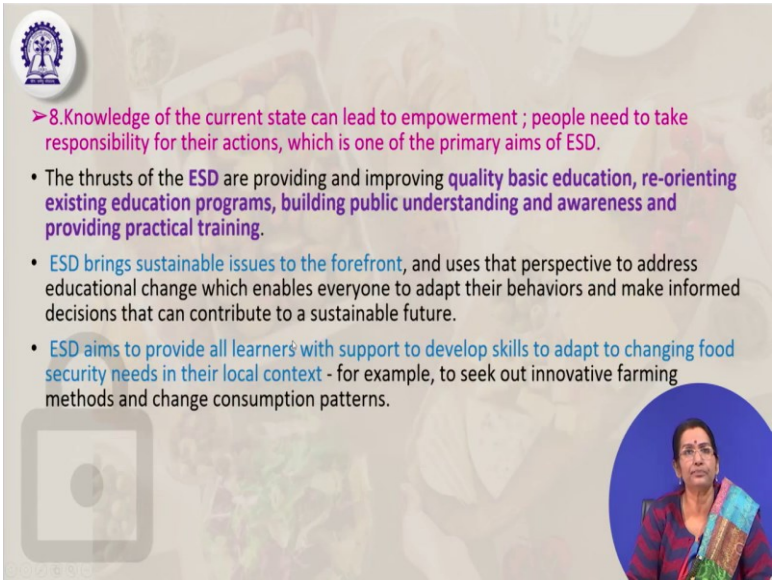

Knowledge of the current state can also lead to the empowerment people need to take responsibility for their actions like how can we enhance our sustainable consumption habit sustainable habits sustainable competences. So, which is; which are the primary aims of ESD.

So, ESD we can say can be provided through quality basic education reorienting our existing education programme. So, building public understanding awareness providing practical training everywhere now the ESD role is very widened because ESD brings the sustainable issues to the forefront all these things are there in an implicit manner. But ESDs job is to identifies focus it is to highlight it and to bring to the limelight and to take action.

So, therefore, ESD aims to provide all learners with support to develop the different skills to adapt to the changing food security and to the local context etcetera. So, now, we will go for ESD framework ESD for framework or how ESD can help us in distributing sharing the information and disseminating the information among our public.

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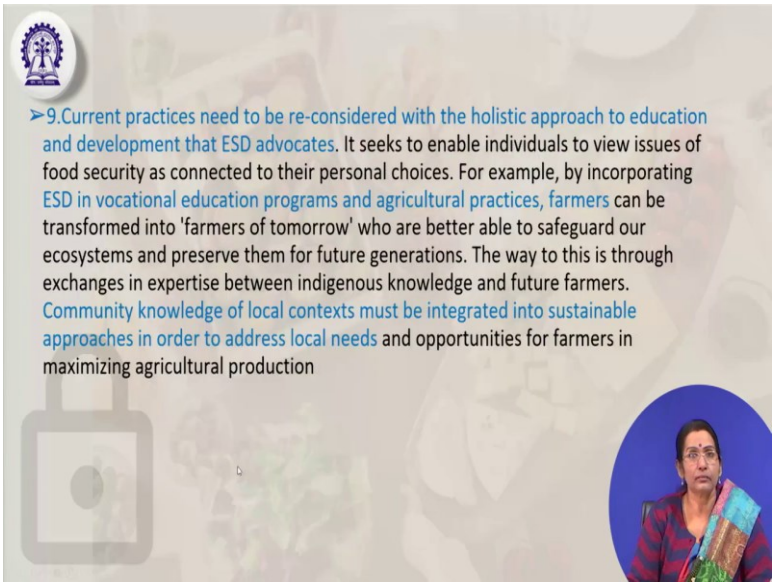

So, similarly the current practices also they also advocate for. The ESD advocates and then ESD should be in their vocational education programs and the cultural and agricultural practices of farmers. For the community knowledge also in the local context how ES; ESD should be ESD approach should be adopted for the to address the local needs everywhere that can be ES sustainability approach.

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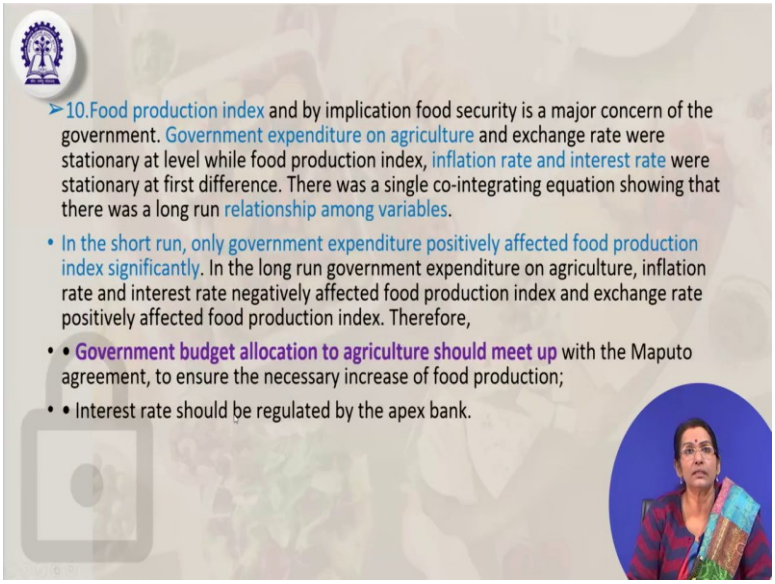

So, food production index also government expenditure on the agriculture, inflation rate, interest rate, loan all kinds of and what bank loans and subsidies all kinds of the knowledge information should also be provided from time to time.

Then also we can say government budget allocation to agriculture should also meet of should also be enhanced. And all kinds of the bank facilities and bank interest that should that kind of a information should be circulated among the farmers among the agriculture based entrepreneurs from time to time.

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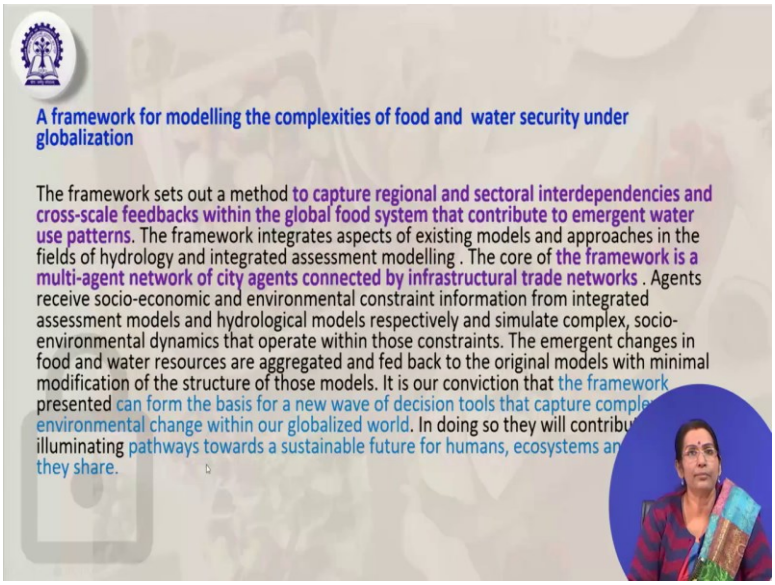

So, now hear a framework of modelling of the a framework of modelling the complexities of food and water security under globalization. A framework from the research literature only I have procure procured it that is how to develop a framework global framework for the food and water security to address the food complexities of the food as well as the water security how can we develop.

So, this kind of how this to capture the regional and sectoral interdependence multi and the cross scale feedbacks all kinds of you know multi agent network my city agents. So, so a framework can be they can form the basis of the new wave decision tools to capture the complete environmental change within the globalized world. Let us go for that pathways for that sustainable future and let us see what the framework looks like.

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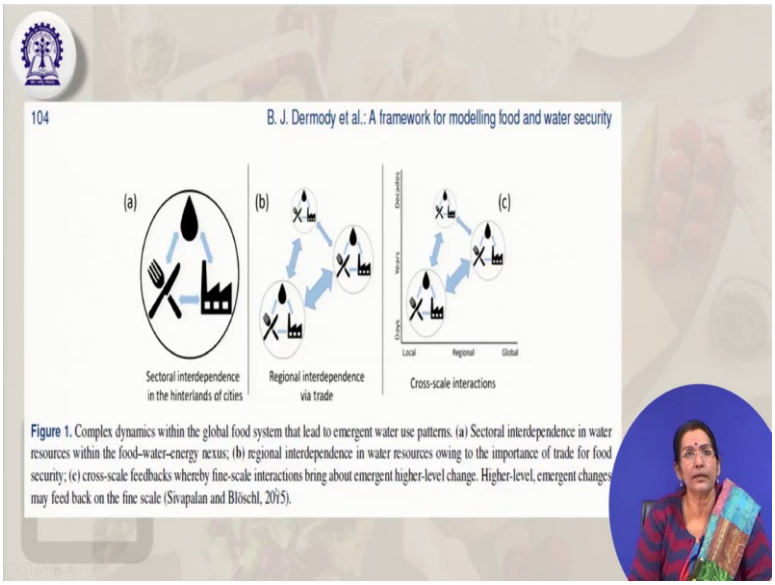

So, these are the latest research frameworks. So, this framework has been given by Dermody et al a framework for modelling the food and water security the latest research its going on. How the multi sectoral interdependence is there and different kinds of cities then again regional interdependence via trade then the cross scale interactions.

So, at every level first is the sectoral independence then regional in interdependence, sectoral interdependence, regional interdependence and the cross scale inter interactions within the same field. So, these are some of the models which are being given by Dermody et al a framework then you can also get the more literature on this I have also captured it from the net only with the research literature from the research literature.

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And, at what different level, how the integrated assessment model? Again they have also introduced integrated assessment model that is heterogeneous socio economic constraints per region. So, then multi agent network of cities nodes and trade links so; that means, it is a kind of you know agricultural food grid. Like we have discussed about the health grid it is similarly it is kind like kind of agricultural grid, it is a grid based dynamics of vegetation model hydrological model.

Again nowadays more and more solar energy and hydro energy are being also are being utilised are being research is also being tried on how to get the maximum solar energy being used for the agricultural purpose solar energy and hydro energy. So, how this framework can help us in enhancing that food security and food and water security?

Because food and water these are very very integrated without food there is no water no and water how water plays a very important role in food production and food creation and for food enhancing the food security. So, that is a food and water security these both for both the components how this framework can be followed.

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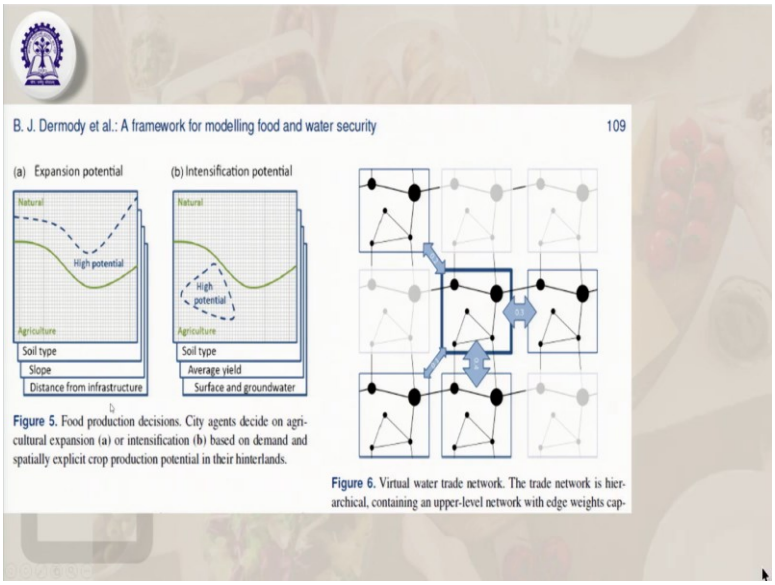

See these are all the networks the framework models these are the models that has been given. So, soil type depending on the soil quality slope distance from the infrastructure all this is kind of the you know architecture is a kind of architecture is a blueprint system design. We can say there is a kind of virtual trade water trade network they have developed with this for the production decisions to take the decision by the agriculture production units and the farmers etcetera.

So, this is the intensification potential this is the expansion potential by you know by graphical representation by calculation this can be; this can be done. I think the agricultural exports can better understand it and implement it and they are subject domain in their education.

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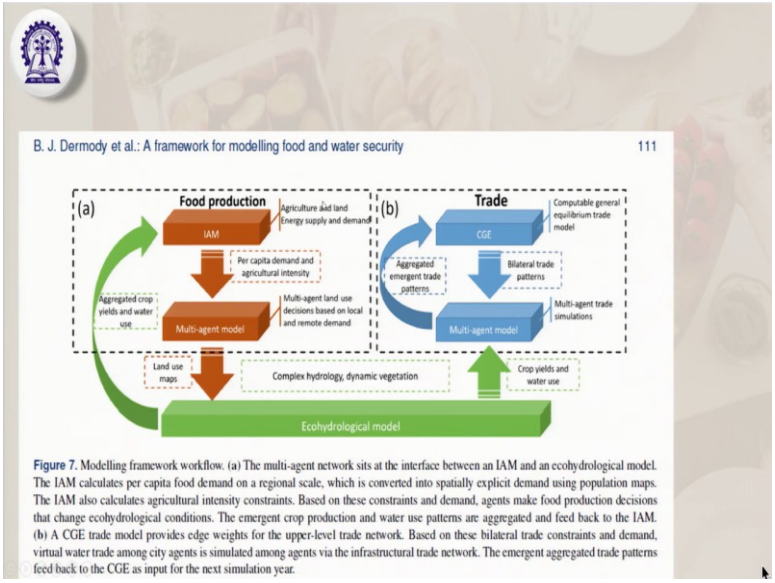

So, and again this is also the framework the same framework like food production and trade how these two domains are interrelated. So, like food production that is for agriculture from the agricultural land energy supply and demand. So, these are interrelated then again.

Per capita demand and agricultural intensity again how multi agent model can be implemented multi agent model land if or using the land use based on the local and the remote demand land use maps etcetera; then again complex hydrology and then dynamics of the vegetation again trade.

So, the food being produced then again how the trade, trading in terms of trading in terms of computation general and the equilibrium trade model bilateral trade patterns and aggregated emergent trade patterns, multi agent trade patterns, simulations etcetera then the crop yield and water use.

So, they have developed this ecohydrological model it is called as the ecohydrological model how this food production and trade both working together, can help us in the in enhancing the food production and the food distribution.

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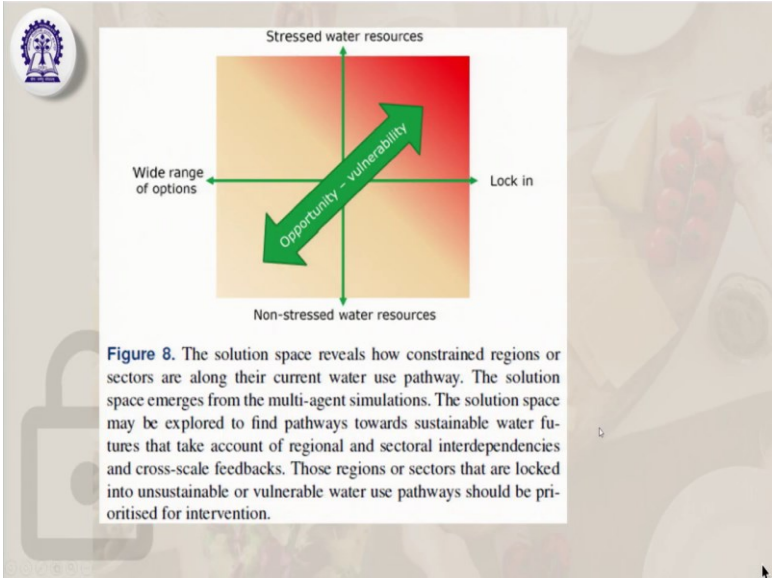

Figure 8. The solution space reveals how constrained regions or sectors are along their current water use pathway. The solution space emerges from the multi-agent simulations. The solution space may be explored to find pathways towards sustainable water futures that take account of regional and sectoral interdependencies and cross-scale feedbacks. Those regions or sectors that are locked into unsustainable or vulnerable water use pathways should be prioritised for intervention.

So, again the same thing that is trace that is the is the paradigm of you know opportunity opportunities, how this can be the scale the graph can be from the opportunity to vulnerability how the range from the you know risk zone to the, risk zone to the opportunity zone.

How this how to monitor this quadrant how to this monitor this quadrant and get the solution. This is also a clippings from the research literature research latest research literature.

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So, now we are coming to the ESD component ESD that is sustainable sustainability and health concern. So, that is the traditional it is a colonial that is from how we are coming from the history from colonialism to the present context this is the health concerns family and the local food productions food you know. Now, now we are focusing more on this quality food quality in terms of this SDGs focus.

Earlier it was more like a more like of early onset of diabetes these are the symptoms now we are facing obesity, heart disease, anaemia, then bacteria kind of infections and the food hunger and early onset of diabetes. These are some of the you know some of the outcome some of the side effects that we are suffering because of the insufficient or poor quality of the food and how to restore the quality.

With more and more green leaf vegetables more and more you know fresh you know fresh foods fruits and vegetables and fresh without and minimum use of fertilisers and the manures in the field and the cultured milk that especially curds and the organic foods. So, that these are the some of the things.

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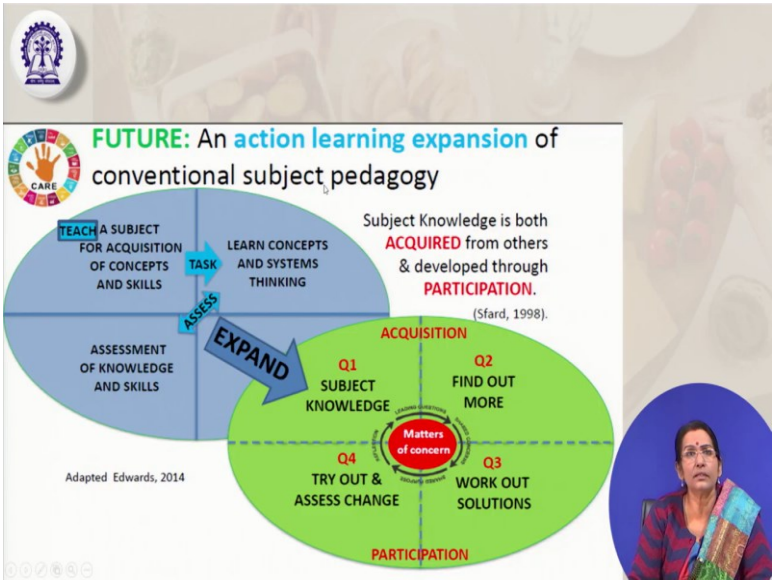

Now, again now this is the action plan future an action learning expansion of the conventional subject pedagogy. So, what should be the pedagogical framework, that has been given here. Like for example, the teach the subject teach the subject of acquisition of concepts and the skills required for the food security starting from the production to the consumption. Then assessment of knowledge and the skills from time to time again learn the concept and systems of thinking ok.

So, this model was adopted by Edwards in 2014 and again subject knowledge is both it can be both acquired from others by observing by attending the awareness camps workshops and also can be developed through participation ok. So, now, how to expand it this model that through acquisition of subject knowledge, to explore more thing on this thing then work out the solutions that are the problems we are facing right now and try out and access the change how can we bring.

So, for this acquisition and participation starting from the acquisition to participation and the practice participation and a practice then coming to the solutions of the emerging new techniques this is learning cycle this would go on. So, this is this should go on and these are the current matters of the concern in the food and a food security and health domain.

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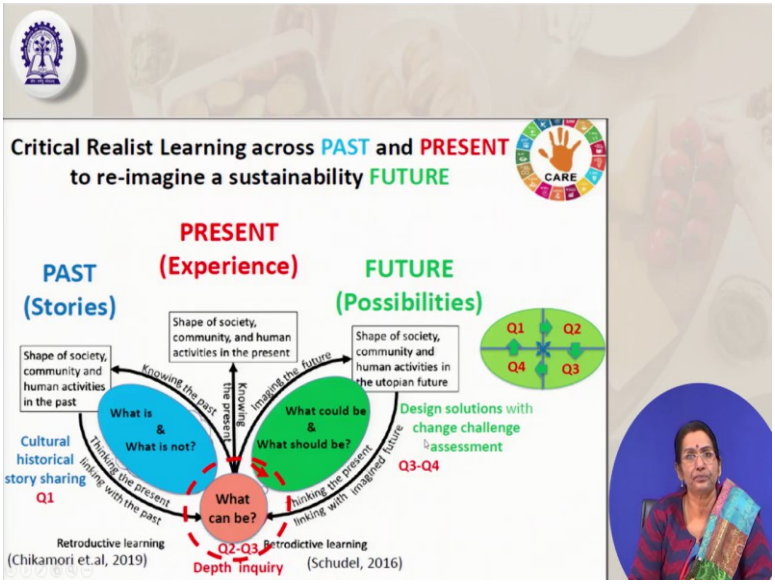

So, this is the again how to move from the past to present to future. So, critical realist learning process across the past, present and reimagining a sustainable future ok. This is the past stories past stories like the what was the shape of the society community human activities cultural historical background all kinds of things.

What it is now? So, in the ESD framework ESD curriculum we can include these things what it is now what it is not now and thinking about the past stories past and like our what our previous generations they were doing.

So, it is a more kind of reproductive learning, but linking the past with the present that is the required. Asking the questions about the past, but linking the past with the present. And present again how the shape of the society has changes and community and human activities also changes how knowing and the representing what can be done at present what are the these the like in depth enquiry about.

What are the question asking questions about what are the challenges we are facing in depth enquiry about this what can be done that what can be done that like these are the recent challenges that we are facing experiencing and how it can be addressed. So, what could be done and what should be done. So, that in future they are thinking about the present and linking it for the future.

So, for the future possibilities we have to explore the future possibilities not only mitigating the present challenges, but for enhancing the sustainability and future availability of this kind of resources and activities and all kinds of a resources for the future generations.

So, here again design the solutions to the change challenge assessment. So, here again whatever; that means, with the innovation, with the creative thoughts, ideas, developing new competences.

So, then again so, many questions can be put question number 3 4; that means, this kind of questions like how these things future can be made more sustainable can be made more secured more and how food security food production and what security can be enhanced health can be, health can be total overall health standard can be improved. So, this kind of framework we can implement through ESD.

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So, again these are some of the food items products like for example, as how to enhance the quality of homemade foods. Like you know nowadays in even in the refrigerators also that for preparing the curd there is also another unit by regulating the temperature how can we prepare the home products like home made curds etcetera. Similarly all kinds of item items food products that how it can be healthy for us in and if we prepare it at home.

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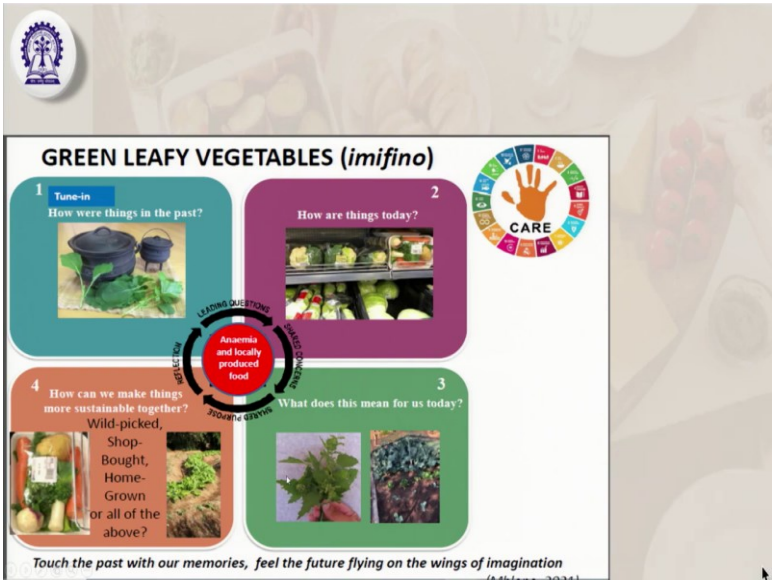

Similarly, so, green leaf vegetables like how can we promote the green leaf vegetables with minimum you know fertiliser a manure etcetera chemical things etcetera. So, how which kind of like herbal knowledge like the which kind of plants and the greens can enhance are in haemoglobin can enhance our you know immunity. Like the Ayurvedic products like the herbal medicines herbal medicines like neem tulsi all kinds of things.

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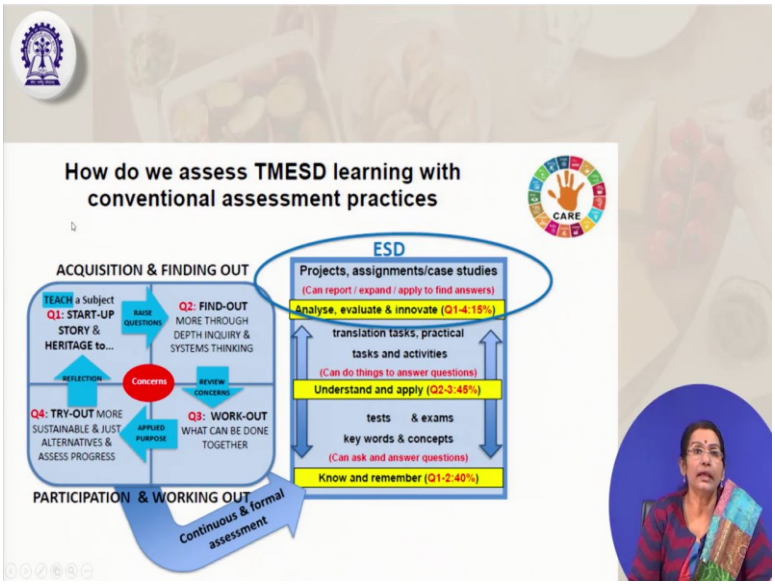

So, this green leaf vegetables can how can it enhance our immunity. Then again how to assess, how to assess the ESD competences from the conventional method to the most practical method

like a ESD assessment in terms of projects assignments analysis assessment case studies that is to analyze evaluate and innovate.

Here also we should use its revised blooms taxonomy to you know to and to measure their higher order thinking process, skills and competences in terms of creative thinking innovative practices all kinds of things different kinds of tests on the exams.

Primarily group based project based experienced on learning projects can be given to them. But again continuous formal assessments should be more productive instead of formal assessment formative assessment in terms instead of summative assessment from time to time feedbacks should be given.

More and more in depth enquiry systems thinking should be their start up storey then case studies sustainable and just alternative access progress all kinds of the activity oriented practical.

That means, whatever they are studying they need to experience it learn it from the actual field that is from the reality. So, reality based learning. So, what can be done for learning together experiential learning project based learning?

Primarily they can be they can be motivated, students can be motivated to pick up any of the social problem related to either economy or food or health or water whatever this would pick up some kind of a social problem challenge. And then try to explore try to find out the solution and mitigate these problems.

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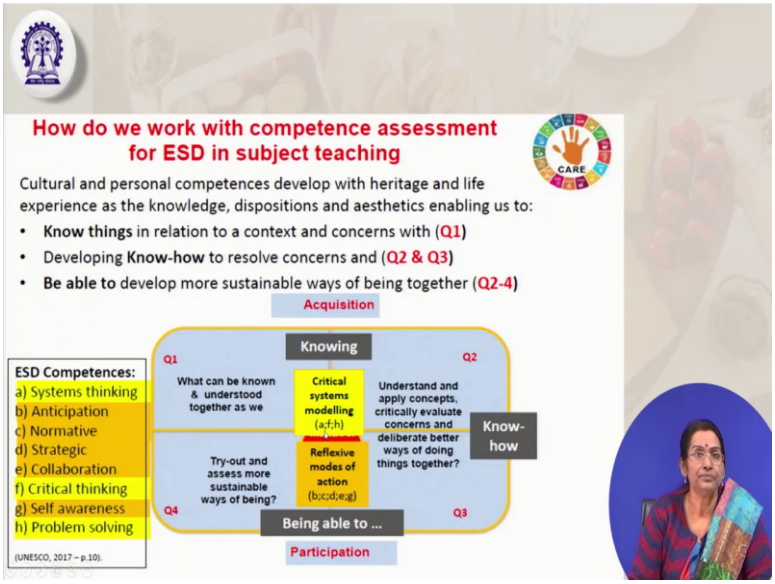

So, similarly how to do work with the competence again ESD also requires to develop certain competences like the you know the; that means, it is not just about the know what is, but it is know how is know why is. So, know things in relation to the context know how is to resolve the problems and to be able to or develop more sustainable ways for being together.

So, that is why all our students they need to develop ESD competence like systems thinking like holistic thinking holistic approach harmonious development. So, anticipation that is presumption being proactive normative collaborative strategy critical thinking self awareness problem solving. These kind of competency these are the 21st century that is a sustainable competences that ESD competences need to be developed.

So, in this manner we can say from acquisition to participation to the ESD competence to know how is in this we can divide this into quadrant. And according to this quadrant we can base our education model you can start our education model with knowing to know how is to being able to participate explore experience act upon and then to make it more sustainable. So, through this framework we can teach this ESD subject, so through with competency assessment and development of sustainable competences.

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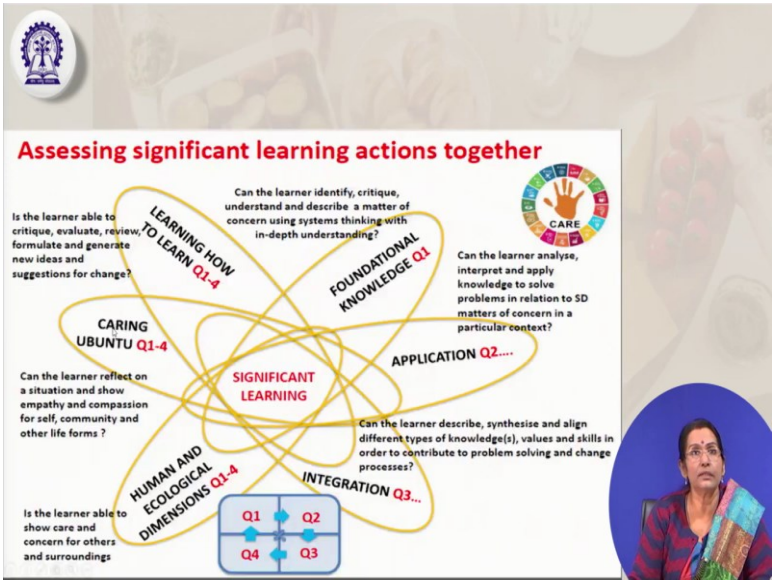

So, these are some of the thing assessment techniques learning know how is how to learn, fundamental knowledge and applications, integration, human and ecological dimensions, caring. And all kinds of thing holistic thing significance of learning this kind of framework that we can apply we can imply in our ESD subject.

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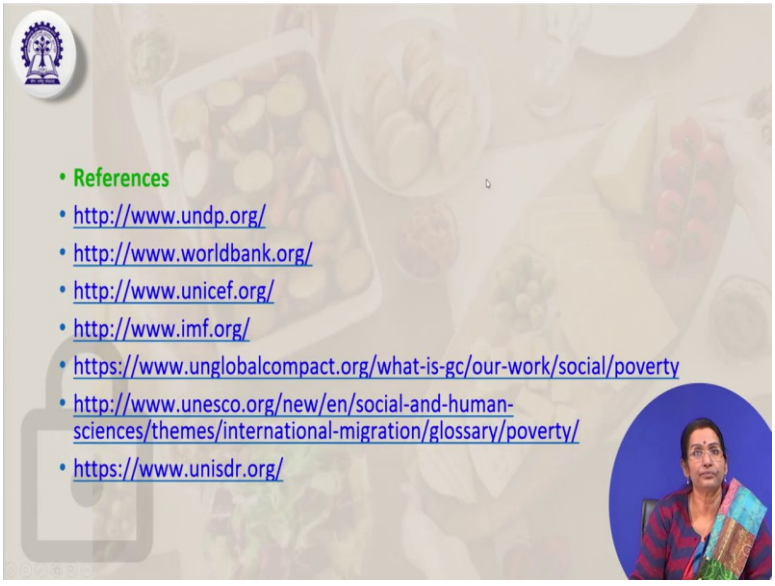

So, this is all about think these are some of the references you can go through it. So, these are some of the frameworks that I have captured from the literatures literature that we can try out

in our own subjects. And we can design our subject whatever domain we teach does not matter, we can adopt, we can apply this ESD framework given in our own discipline.

Thank you very much.