Education for Sustainable Development
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Lecture - 33
Sustainable and Clean Energy (CONTD.)

Hello everyone, welcome back to this course on ESD. So, in the last class we are discussing about the different agreements Paris agreements and other agreements regarding the climate change and clean energy. So, to continue with this we will just discuss about what are the India's action plans; what is the India's action plan, ok.

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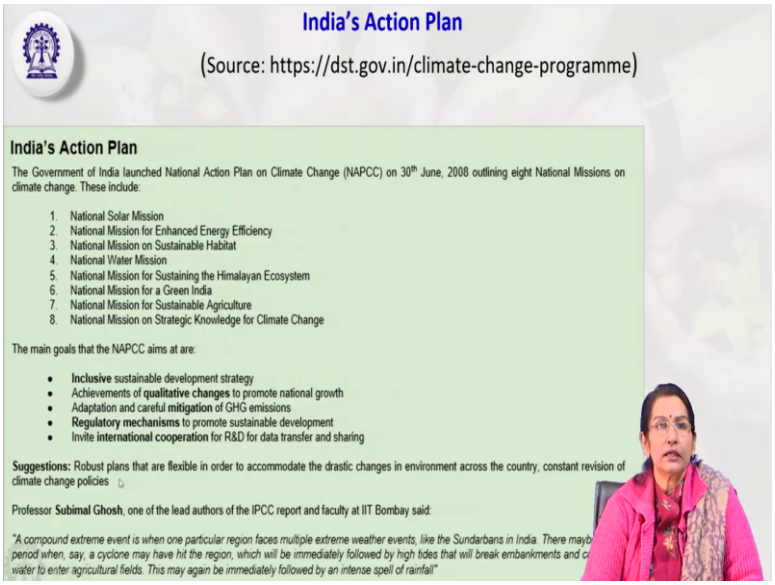

India's action plan as you can see from this website also. So, India's Action Plan primarily focuses on how to; that means, different schemes like national solar scheme, solar mission, mission for enhance enhancing the energy efficiency, mission national mission for sustainable habitat, water mission jal shakti ok ministry of jal shakti, then national mission for sustainable sustaining the Himalayan ecosystem, mission for green India, sustainable agriculture, strategic knowledge for climate change.

These are the national schemes the government has launched the National Action Plan on climate change on 30th June and the outlying national missions have been have been included in this national scheme. So, now, the main goals of this national scheme national action plan on the climate change are primarily that inclusive sustainable

development of energy, achievement of the qualitative changes to promote national growth, economic growth etcetera.

Then how to carefully adopt the careful mitigation of greenhouse gas emissions? Tegulatory mechanisms to promote the sustainable development and invite international cooperation for R and D for the data transfer and sharing. So, these are some of the goals strategic goals of national action plan on climate change.

So, now as such; that means, in order to achieve all others SDGs; SDGs these are also required like for example, health is as we have already discussed health is related to ecosystem, environment, life on earth, then sustainable health and wellbeing and climate change life on life on land all these things. So, energy is related to every all other SDGs also.

So, how to develop a you can say integrated action plan, so which can help us in achieving the sustainable development goals all the 17 goals. Of course, here at the end you can say the global partnership definitely the global partnership that is SDG 17 is a very much importance in achieving all other SDGs.

So, ESD as a tool and global partnership as a framework as a as a network that will help us enable us in achieving all the other all the other SDGs and exclusively also these energy resources clean affordable and clean energy.

So, the suggestion is that the robust plan that are flexible in order to accommodate the drastic changes in the environment across the country and with the constant revision of climate change policies with the updating upgradation of technology everything has to be taken care of and that has been; that has been mentioned in this action plan with its regulatory acts; regulatory committee.

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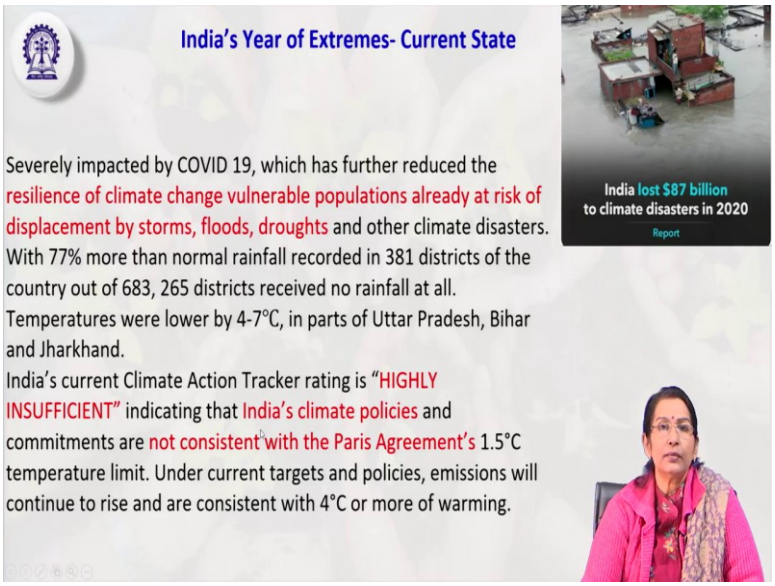

Now, so, India's year of extremes and the current state, what India has experienced since these years, like severe years COVID 19 has severely you know affected and it has reduced the resilience of climate change vulnerable population already at risk because majority of the people are at risk in the sense the displacement by floods, regular floods, droughts, tsunamis storm all kinds of things are there.

So, that is also. So, and because of other climatic disaster also 77 percent of more rainfall has recorded in 381 district because of the climate change, the 77 percent of the more rainfall has been recorded and moreover due to pandemic also. So, the; that means, the displacement of people; displacement of people has taken place also across the country. So, that has also created a kind of you know disturbance disruption in the economic aspects in the activities, economic activities and the normal life of the people.

So, similarly this temperatures are also lower by four point 4 to 7 degrees in the part some parts of the Uttar, Pradesh, Bihar and Jharkhand. So, India's current climate action tracker action tracker rating is highly insufficient indicating that India's climate policies are non consistent with the Paris Agreement; that means, it is not it is not complying the Paris agreements.

So, that then that is why it is not sufficient it is highly insufficient. So, 1.5 degree temperature limit under the currents targets and the policies, the emission emissions will

also continue to rise and constant consistent with the 4 degrees centigrade of that is of more of warming.

So, gradually because of the climate change the temperature global temperature and our countries temperature is also gradually increasing that has also created another problem and pandemic has also created the problems in the social sector like disruptions of the normal lifestyle of the people, displacement disruptions in the economic activity that has also created further problem. Hence to meet the Paris Agreement the climate policies of the Paris Agreement to act in consistence with Paris Agreement has become very difficult for India nowadays.

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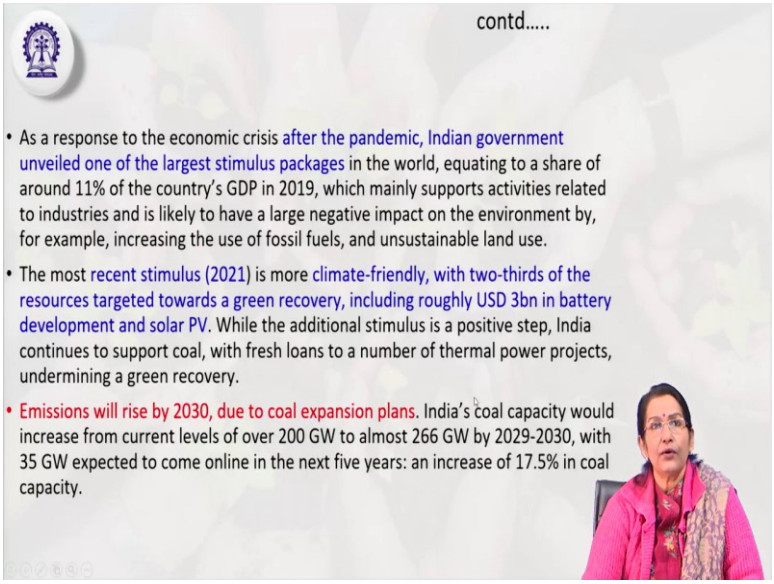

So, similarly after the pandemic Indian government also unveiled one of the largest stimulus package know besides the relief packages the other packages; that means, how to; that means, other you know relief packages in terms of you know that around eleven percent of the country's GDP is 19 2019, mainly supports activities related to industries also likely to have large negative impact on the environment by for example, increasing the use of fossil oil and unsustainable land use.

So, and this pandemic also involves because the Indian government has given the different schemes stimulus package and the relief funds for this for the for upgrading the you know living style, living status of the people because of the sudden disruptions in you know economic activity and joblessness and sudden shutdown.

So, that has also has given the extra burden to the Indian government, that is one aspect. And the most recent stimulus that is the more crime climate friendly with; climate friendly with two thirds of the resources targeted towards the green recovery including the highly in including roughly USD 3 billion in battery development and solar power.

So, Indian government has hugely invested in the solar power sector, energy sector then 3 billion USD dollar battery development for the auto mobile sector and the green recovery in the in our within the country in the both in the rural and urban areas that are in the in the country within the country. So, these are the major three stimulus package the recent you can say endeavours, recent efforts, recent schemes that is to bring the; that means, to bring to meet the climate change challenges and to be in agreement with the Paris documents Paris Agreements.

So, but; however, emission will also rise by 2020 due to the coal expansion plan even in spite of investing in the solar panel, solar energy system India is still using this coal thermal power from the coal and recently they have got the coal expansion plans.

So, that is; that means, from that expansion plan can also incur some carbon emissions in the by 2030, so that is also an disadvantage also. Because India's coal capacity would increase from current level over of 200 gigawatt to almost 266 by 29-30 with the 35 gigawatt you know expected to come online in the next five years.

So, therefore, an increase of the 17.5 percent in the coal capacity that has also that will also create the carbon emission by 29 30. So, that is also an added disadvantage we can say that is an added disadvantage. So, again through these schemes also then through these things again we have to manage it because this is another the pollution will be created, carbon emission will be created from the coal sector power energy thermal sector from produced by the coal.

So, that will also increase the not only increase the pollution, but also temperature overall temperature. So, that is a disadvantage setback that we have to also address it in the next five to ten years

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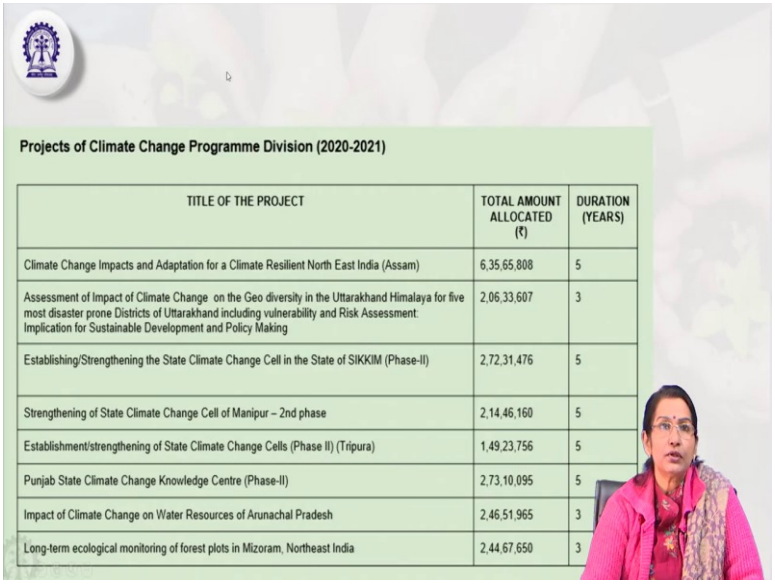

So, this is the projects of the climate change programme division, the existing projects that are these are the different projects and total amount allocated and duration of the years like this climate change impact on adaptation of climate resilient North East India Assam project, Himalayan, Uttarakhand, Himalayan region disaster prone districts also that project that is climate change to and the Geo diversity to handle it in the Uttarakhand and Himalayan region.

Establishing and strengthening state climate change cell in the Sikkim, then and strengthening the state climate change cell in Manipur, then again state climate change cell in Tripura almost all the northeastern states. Then climate change knowledge centre and climate change water resources centre in Arunachal Pradesh and the monitoring the forest plots in the Mizoram.

So, these North Eastern projects are going on and even the Himalayan range is present. So, these are the climate change related programme divisions and projects are running. So, with this kind of investment and this duration.

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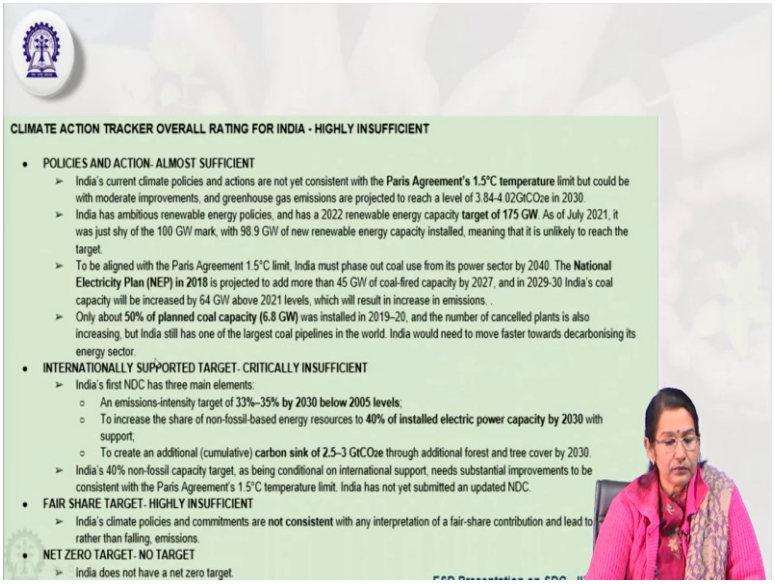

So, climate action tracker also overall rating for India is highly insufficient as it has been given that policies and action plan almost policy and policies and actions almost sufficient like India's current climate policies and actions are not yet consistent with Paris agreement ok.

So, these are the data that has been given the how much it is produced and the and as a 22 2022 renewable energy capacity target is 175 gigawatt. So, how to achieve? It was just and our India was just as of the July it is it was just shy of near of 100 gigawatt with 98.9 gigawatt of new renewable energy capacity installed; that means, it is yet to achieve 75 gigawatt extra through different sources.

Therefore the National Electricity Plan; National Electricity Plan in 2018 also is projected to add 45 giga gigawatt from the coal sector; from the coal sector. So, in 2029 30 India's coal capacity will be increased yes, but only about 50 percent of the planned coal capacities are installed.

So, these are the some of the policies and action plans for the energy for the energy sector expected is 175 gigawatt and presently the status still 21 is ninety 98.9 and moreover coal capacity is also going to increase. So, internationally supported targets critically insufficient.

So, international supported targets also critically insufficient. India's first NDC has three main elements ok. So, what is the what are the an emission intensity target? 32 33 to 35 percent by 2030 below the 2005 levels to increase the share of non fossil based oil oil energy resources by 40 percent and to create additional cumulative carbon sink 2.5 to three CO 2 through the additional forest and tree coverage by 2030.

So, the India's 40 percent non-fossil capacity target has been conditional to the international support needs substantial improvement. Of course, the with the supply with the you know this petroleum ministries gas supply to every household in the rural areas had curbed has meet has met some of the; some of the requirement limits.

Then fair share target that is highly insufficient India's climate policies and commitments are not consistent with any interpretation of a fair share contribution and leading towards the rising rather than falling. Net zero target no target India does not have a net zero target India does not have any net zero target or no target. So, that is; that means, that India that does not have this kind of net zero target zero carbon emission target India does not have that. So, these are the shortcomings in our action plan.

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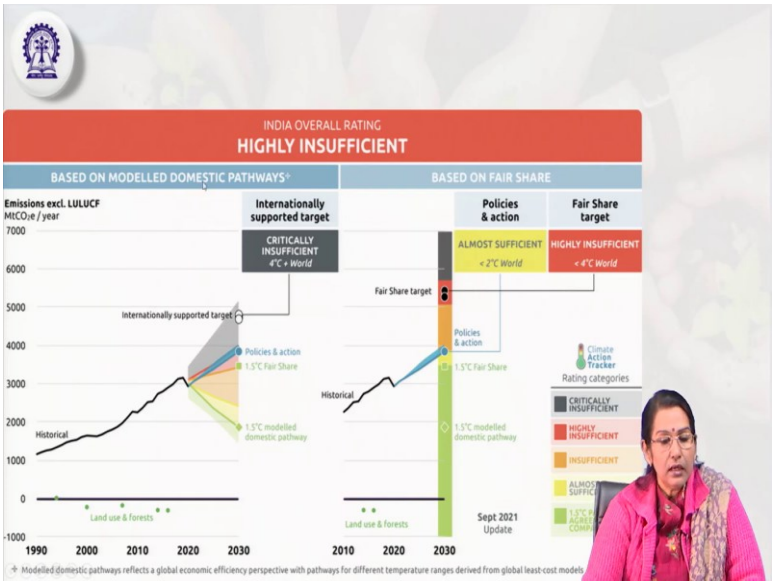

So, how the India's overall rating is highly insufficient? The climate change actions as per the Paris agreement is highly insufficient based on the modelling of the domestic pathways as you can see. The land use and the forests then the policies actions all kinds of this graphically international supported targets how it falls below this ok.

Similarly, almost insufficient in the policies and action implementation and highly insufficient then critically in critically insufficient and again insufficient then almost sufficient this point this range is almost sufficient as per the thing it meets the as per the agreement. But above this limit highly highly insufficient and critically insufficient as you can see from the you know from the graphs this graphical representation.

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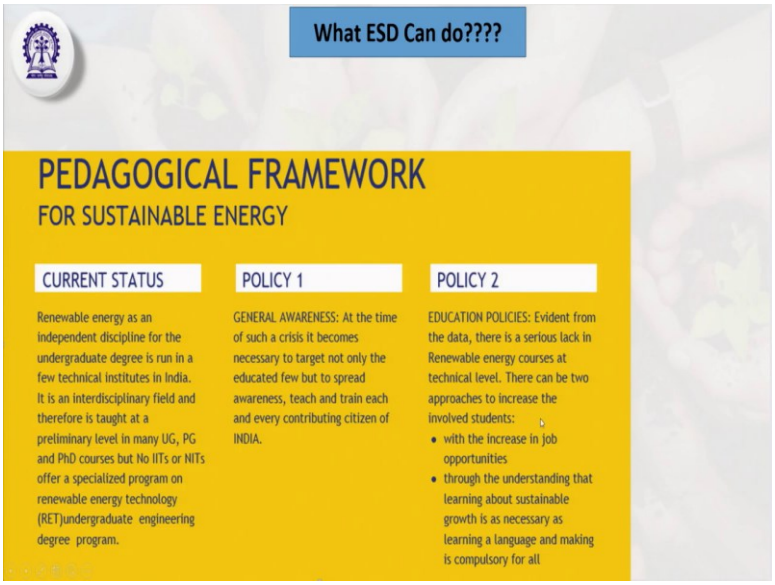

Now, we will come to the pedagogy; now we will come to the ESD. Now how ESD can help us? In enhancing the education, information, dissemination and how it can be blended in our curriculum and the pedagogical frameworks. So, what ESD can do in this in this SDGs achievement? That is affordable and clean energy sustainable energy.

So, the pedagogical framework for sustainable energy let us discuss or this is the current status that we have already discussed. Renewable energy as an independent discipline for the undergraduate degree courses. So, in the academic stream how it can be incorporated renewable energy? I think in IIT Kharagpur also we have the energy and the centre for energy clean and energy sustainable energy centre is there and especially almost all the technical mostly in the IITs and NITs this energy as a discipline has been already been introduced and research and developments are going on.

So, renewable energy as an independent discipline for the undergraduate students should be included in should be included is running in a few technical institutes, this is the status quo ok. In the few technical institutes in India it is an interdisciplinary field and

therefore, it is taught as a preliminary at the preliminary level in many UG, PG courses and PhD courses. But not, but no IITs or NITs offer specialized program on renewable energy technology.

Even though we have started, but the; that means, more you can say more specialized kind of you know energy source exclusively on solar or hydro or; that means, more higher level of research and education are not being not being provided till date because of maybe because of the concern limitations of you know experts and resources.

Gradually we are picking up it has been introduced, but UG, PG PhD level, but we have not been specialized too much in this field. And policy 1 that is the general policy 1 has said that in general awareness at the time of such a crisis it becomes necessary to target not only to educate few, but also spread the awareness among our stakeholders.

To teach them to educate them, to train them, how to conserve, how to conserve the energy, how to how to save energies these are kind this kind of education information should be should be disseminated among our stakeholders through rigorous and rigorous and repeated and repeated workshops trainings and through all kinds of media channels also.

So, that can yes that is also a part of ESD that can contribute. So, the how. So, that can that can contribute towards the citizens awareness regarding the power saving or energy saving. Then policy 2 education policy 2 education policies should also it should be evident from the data that there is a serious lack of renewable energy courses.

So, serious lack of energy courses at the technical level there can be two approaches to increase this and involve the students. First thing is that with the increase in the job opportunities in the energy sector, then we can encourage our students to go for the specialized research in this sector.

And through the understanding that the learning about sustainable growth is as necessary as the learning of as learning as language or any other compulsory subject for all. So, that means, we have to create; we have to create an awareness among the youth among the students, among the stakeholders that like any other discipline, like any other language or any other technical subject energy sector, energy domain, energy discipline

is as important as any other language because it is related to the sustainable growth and sustainable development.

So, sustainable growth and sustainable development and because of this focus as disease and focus. So, energy sector, energy discipline, energy education should be over emphasized, should be given the focus. So, that more and more you know more stakeholders, more learners, more students, more youth will be keen to learn this subject and for them the job opportunities should also be created.

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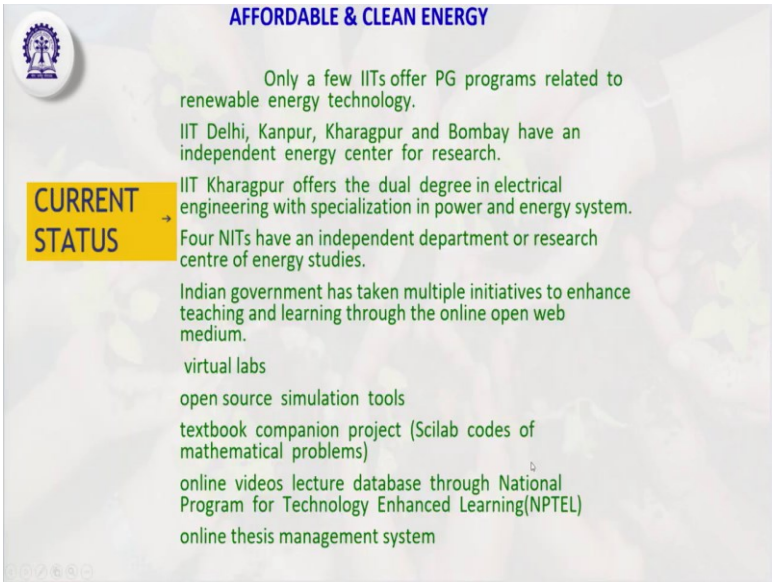

So, this is the current status of affordable and clean energy right now. So, only few IIT's offer this PG program related to renewable energy like IIT Delhi, Kanpur, Kharagpur etcetera Bombay etcetera. IIT Kharagpur offers the dual degree in electrical engineering with specialization power engineering system.

Four NITs have an independent department or research centre and energy studies. Indian government has taken multiple initiatives to enhance the teaching learning through online, open web courses over medium MOOC courses Swayam portal virtual labs and even open source simulation tools etcetera.

So, textbook companion projects like scilabs codes are also mathematical having the code mathematical problems, it also these are also being used in the research labs. Online

video lectures database are also there through NPTEL programs, online thesis management systems.

So, now, these are being updated gradually, these are being given more importance it has been updated gradually slowly and it has been emphasized over emphasized from time to time. But we need to we need to spread it as soon as possible among all the technical institute across the country.

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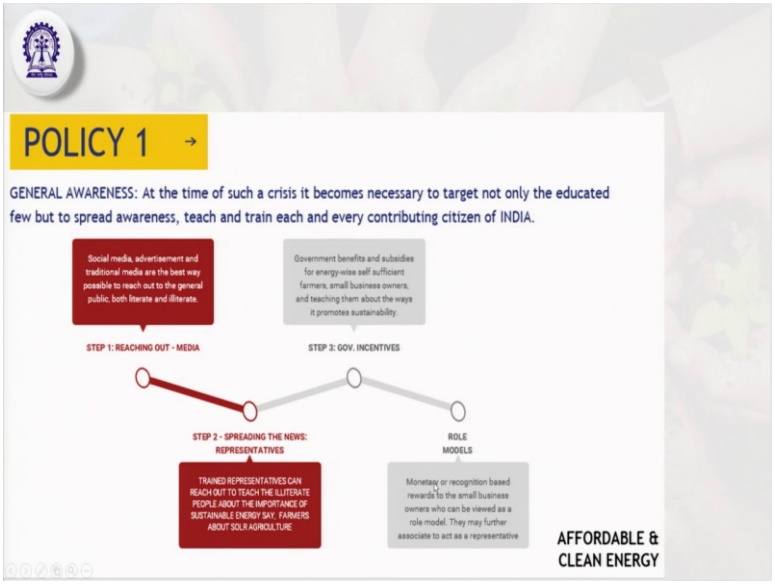

So, then the policy 1 let us focus on the policy one that is general awareness at the time of such crisis it becomes very important, very necessary to target not only on the educated mass, but also you know among the rural and rural areas the urban slums and create a kind of awareness, train the awareness, teach and train the people regarding; every aspects of every aspects of energy sector.

So, and how to save energy how what and how to encourage them and even for the encourage the small time or the small small to medium entrepreneurs by you know by providing them the seed money for the loans as the loans. So, that they can install the you know rural so rural or the village in the small small you know grids solar grids or solar grids grid forms in the rural sector in the semi urban sector.

So, here we can see. The step 1 will be step 1 will be reaching out towards the people; reaching out to the people, reaching out to the media through that the social media,

advertisements you know traditional media of television and radio etcetera and the possible way to reach to the people to reach out to the general public.

So, both the literate as well as semi literate and the illiterate and both urban, semi urban and rural people that is the first step to reach out to the media and to spread the information generate to create the awareness. Then step 2 will be spreading the news representative; news representative like the trained representatives of the journal journalists. Trade trained representatives can also reach out to teach the literate to teach the illiterate people about this energy sustainable.

What is sustainable lifestyle sustainable consumption, saving energy, how energy is important for all our activities technical, how it is important for our industrial growth, economic growth? Even for the farmers will be introduced to all kinds of latest technology for the farming for organic farming for you know for enhancing the agricultural products, how energy is very much required, what are the alternative energy sources available, how can we use; that means, affordable some tools some equipment some machineries to create energy and to save energy ok.

So, farmers rural farmers, agriculture farmers litreates all illiterates rural people semi urban people even the urban slum people they will be educated from time to time through trained representative like the you know like the trained personnel, media personnel, journalist even from the ministries you know ministries field workers; ministries field work different and field worker, then the persons that mean field assistants doing the survey or researchers who are engaged in the action research.

Then from yes governments initiative it should also be there. So, governments initiative up to this, then the governments initiative that with the third step that is the government what incentive the government benefits subsidies for the energy wise. You know self sufficient farmers agricultural farmers, small time businessman business owner, shop keepers,. wholesalers, then a small made entrepreneurs start up entrepreneurs etcetera.

So, and to educate them, to teach them to facilitate them, to guide them regarding how to the different ways, how this saving energy and sustainable consumption of energy how can it bring us can help us in achieving the sustainable development in other sector 17 sustainable development in our country.

So, to promote this way of sustainability way of thinking, paradigm, then way of you know lifestyle, consumption production it has it definitely it requires a lot of time investment and efforts to bring them to the this mainstream sustainability mainstream.

But; however, it is a continuous work, it is a rigorous work, it is the rigorous effort. So, and all the stakeholders should it is not just only the job of NGOs or the government or just educational institution, but it is the job of every stakeholder, every citizen every citizen. So, government should initiate take some incentive give some incentive some in initiate some action plans to mobilize this kind of resources for education training information etcetera.

Then thereafter then some of the role models from there role models can also act like monetary international, monetary form monetary recognition based awards rewards like presidents awards different kinds of citizenship awards these are these kind of things can be introduced as the incentive to promote; to promote the sustainability aspect even among the small business houses and even like for example, the corporate sector also MNCs corporate organizations.

So, in their even they are in their CSR investment also they are also getting the rewards and similarly citizenship rewards for the promoting literacy from social service from sustainability from you know all kinds of social activities and promoting socio-economic activities.

So, this kind of monetary and recognition, awards, incentives scholarships ok. So, these kind of things can be introduced; introduce, so that the people the general people public can follow a kind of role model to you know role model to follow to; that means, to adopt their lifestyle their and to follow their path for path of advice and work aspects.

So, this can be yes this can be; this can be planned. So, these things policy these policies can be put into the framework in the into the pedagogical framework that is from up to this we can say from this to that from step 1 to step 2 from there we have to link to the step 3 and then from the step 4.

So, these are yet to be done these two things are yet to be done. Even the government is doing on its own, but all this should be properly integrated; all this should be properly

integrated collaborated and monitored from time to time. So, that with the feedback the feedback mechanism it can be sustained it can be enhanced.

So, with this I am closing this session, the next class we will continue with other issues of this ESD.

Thank you very much.