**Education for Sustainable Development**
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**Lecture - 16**
**ESD for Technical and Vocational Education / Training (Contd.)**

Hello friends, welcome back to this class on ESD for Technical and Vocational Education. In the last class we have discussed about these steps to be followed for green jobs and green society, green economy so, to continue with that. Now, we will discuss about the next steps.

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The 3rd step comes as the implementing the institutional green plan. So, in the earlier discussion we have already discussed about how to design a plan of strategy actions etcetera. Now, then we are going to in the 3rd step which is we are going to implement this thing. So, implementing this institutional green plan, how to implement it in a proper way?

So, thing is that first thing is that delegation of what needs to be done. That identifying and assigning their responsibilities, plan for short term achievements. So, initially whatever what has been planned according to the plan like for example, who will be the stakeholder.

So, what are what would be the rights and responsibility of the different categories of the stakeholders, accordingly now the delegation of the works will be done; like delegation of what needs to be done at what level, who will be given what type of responsibilities, identifying and

assigning the responsibilities then plan for the short term achievements consolidating and embedding the embedding in the core system.

So, consolidating in the embedding in the core system means, what is the core what are the core subjects, what are the code disciplines, how to embed this green aspect green plan in that core system, in their core concept core system that the; that means, the main frame that is the main frame, the main the most important vital infrastructure.

So, vision formulating the goal setting, how to design how to price the people about the visions for formulating the goal setting, building blocks for the institutional green planning. Then the deployment resources deployment is under deployment resources that is ownership of the process by different stakeholder.

The different stakeholders who will be engaged and assigned these kind of different kinds of task tasks they are supposed to take the responsibility and accountable responsibility for this and our accountability accountable for this kind of action plan. So, articulated rights and responsibilities the different stakeholders rights and responsibilities there then their accountability, everything should be spelled out, everything should be dedicated, everything should be clearly mentioned and practice now introduced.

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So, the next step is that. So, this is what we have already done the creating and creating the first of all creating the rational or the logic for this then economic and. For example, economic

and as analyzing the economic and labor market and dimension environmental dimension, social dimension and the cultural dimension. So, these in the logic in the rational stage only we have it has already been explained like in the what how in what and how what skills and competencies we are going to learn how it is going to have impact.

And when how are these other training systems are different and impairing and how it affects the environmental aspects and what skills and qualifications the people need to do need to learn and train for the use how these skills are valued in the community all kinds of things what all kinds of questions regarding what skills how, when, where?

So, again similarly what the what is the change mindset of the people how to change the mindset of the people towards the greener society, green economy that has to be that is that has to be identified then. What sustains a culture of sustainability what system how can we develop a culture of sustainability. So, from the different cultures to develop a culture of sustainability how such culture and can be transport to the next generation all these aspects will be analyzed will be focused.

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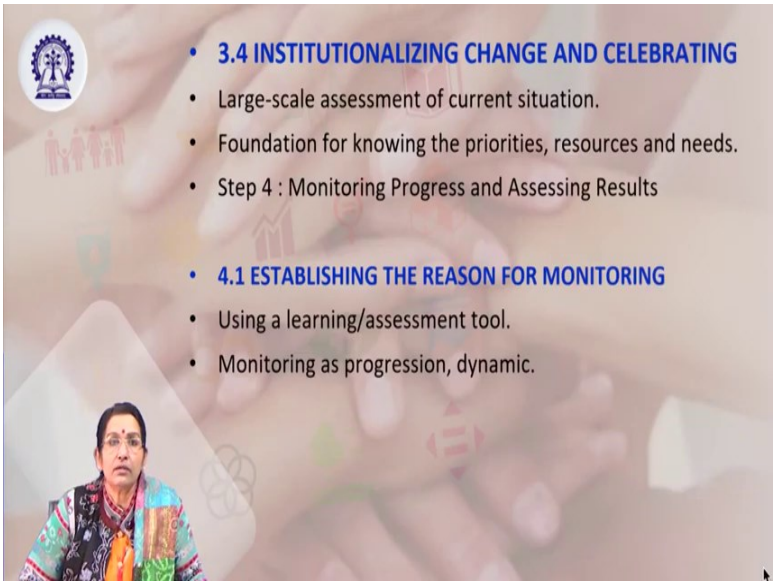


Now, the thing is that. So, institutionalizing the; then institutionalizing the change and celebrating it so, then once it has been tried out executed implemented etcetera. Now, then thereafter we are going to adopt it as a part of the policy and practice. So, here institutionalizing that is validating it, consolidating this change within the framework, within the workplace,

within the work process and celebrating it; that means, how to what extent we have achieved, we could achieve and we have been successful.

So, here the large scale assessment of the current situation then again in comparison to the earlier assessment, now here again another assessment will be done. Like the large scale assessment of the present situation then foundation for knowing the priorities and resources and needs. Again the same thing and then getting the feedback from these then we have to analyze again further priorities, for the resources available for the needs then monitoring the progress and assessing the results and then finding out the gaps.

Finding out the gaps like establish the reason for monitoring, proper assessment, large scale assessment, again after the assessment and feedback then again we have to move towards the further plan, for the strategy that is the further strategy for identifying the further priority areas, monitoring the progress, which is very dynamic what are the qualitative output, what are the quantitative benefits, all these are things have to be identified and further plan for the new mapping new plan can also be designed.

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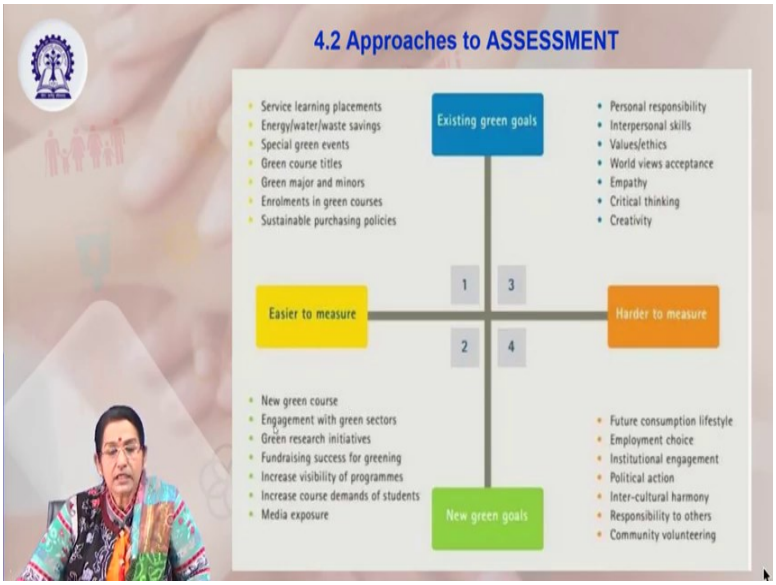


So, here again now we will be discussing about little bit approach towards different approach towards the assessment when we talk about large scale assessment, here we can have a positive approach and effective approach. Like for example, so, suppose this is the existing situation suppose you can see this is the existing situation, from the existing green goals from the existing

here, we can say this is the existing green goals our parameter our framework is the towards the new green goals.

So, here how the assessment can be done; so, from again from another domain another domain that is easier to measure and harder to measure; from suppose we are moving in this framework it is a continuous framework. And from here and from here to here we are going or coming. So, in these four quadrants so, what are the things that is to be assessed, what are the things assess aspects to be assessed.

That is 1st is that from the existing green goals assessment of; initial assessment that is the service and learning placements, energy, water, wastage savings, green special green events, green courses titles, green majors and miners enrollments all kinds of things policies etcetera will be analyzed.

And the this on the other side that is on the other side again the individual personal responsibilities of each and every category of stakeholder, their interpersonal skills values, ethics, soft skills, empathy, critical thinking, learning aspects, creativity all these things will be developed from this thing.

Then another and from the another aspect that is the new green course when we are designing a new green course, the engagement with the green sectors green research initiatives fundraising for the success of greening increase the visibility of the programs, publicity, advocacy increase the course demands of the students media exposure these things will be taken care of, ok.

Then another is that the future consumptions lifestyle, that is that focusing more towards the future generation, future activity there is a future consumption lifestyle employment choice, institutional engagement, political action, intercultural harmony, responsibility to others, community violent community volunteering.

So, these aspects when we talk about the assessment these would be the approach to assessment initially to measure all these attributes, then thereafter this individual progress in these aspects and responsibilities and creative thinking, then these kind of things the course effectiveness, course effectiveness is visibility of the program publicity etcetera media exposure, then its future plan there is a future consumption style etcetera. So, all these aspects like it will be for example, in initial stage it will be easier to measure maybe that or existing skills it will be

measured. Similarly, gradually when moved towards the individual interpersonal skill world views gets it is a little bit difficult.

So, we need proper assessment tool because it is difficult to measure individual attributes then we have to search for the tools. Then similarly, the course effectiveness and fundraising success these kind of things can be easy to measure in the beginning stage, but towards the future implications then again we have to identify the right assessment tools and techniques for identifying.

So, if you can distribute the attributes categorize these attributes in this way in that way then definitely for each for either for the technical techniques and tools available or we have to frame the tools and survey tools and assessment tools, then we have to be very clear about measuring all these aspects, then we can have a very good very clear picture about the progress that we have made.

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The next is that developing and monitoring the assessment framework, greening the curriculum, greening the curriculum and training that is the how to the developing the monitoring assessment framework that is the assessment framework that we have discussed about; this is the a cross-curricular focus of greening the curriculum is addressed through the study of topics across all the subjects. This an example given here, the example given here on the basis of that.

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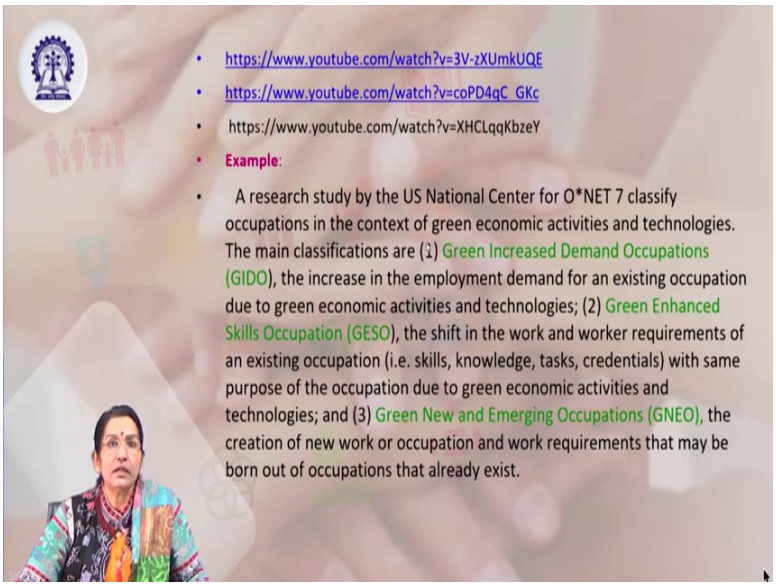


Similarly, we can also develop the curriculum framework training from this aspect by taking into the taking the tips from these aspects. So, these are some of the YouTube links are given here you can also go through for the detailed studies. Now, this is an example this is an example given here.

A research study conducted by the US National Center to classify the occupations in the context of green economic activities and technology; so, they have the study has been conducted by some US National Center for O NET 7. So, that is how they have approached it? How they have classified it? How they have done it? 1st thing is the main classification done.

Green increased the demand occupation, green increase demand occupations, the increase in the employment demand for existing occupation due to the green economic activities and technologies that is the 1st aspect. 2nd is that green enhance the skill occupation that is the shift in the work and the worker requirements of existing occupations such as the skills, knowledge, task, credentials etcetera with same purpose of occupation due to green economic activities and technologies that is the.

Then the 3rd is that green new and emerging occupations. So, that is the what is the increasing demand occupation right now, then the skills and competencies required for that kind of green jobs. And the new and emerging occupations that is new opportunities new scopes and opportunities that the creation of the new work the new occupation and the work requirement

that may be born out of this present situation that, which already exists that is the future scope of these things.

So, increasing demand current demand of green jobs what type of occupations are getting the high of high demand and the skills basic skills required for this green economy that is knowledge and skills tasks credentials required for this kind of occupation and the creating the new things or the emerging creation of the new occupation from these existing. So, this is the case study, this is an example done by some company from there we can also adopt some of the things.

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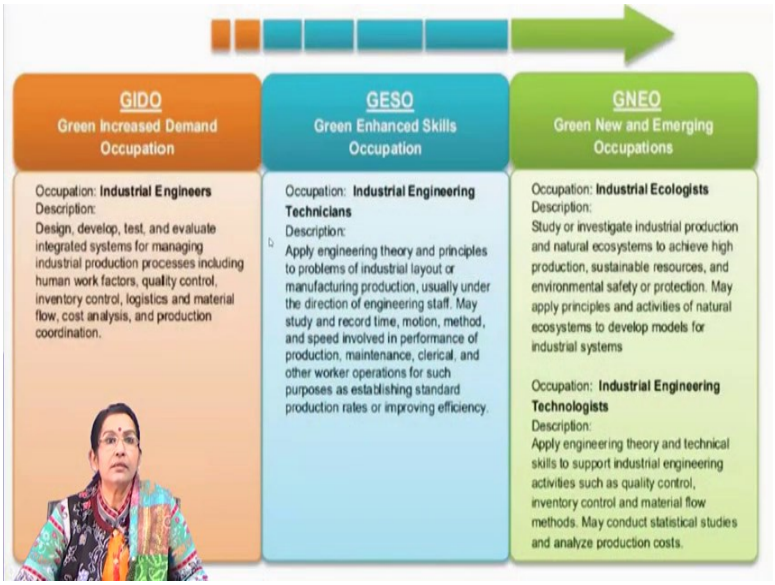


Now, next is that similarly how they have approached it. For example, that is green increased demand occupation, occupation that is industrial engineers for example, its an example industrial engineers. Description is designed, develop, test, evaluate the integrated systems of managing industrial production processes, including human work factors, quality control, inventory control, logistics, material cost, analysis etcetera, etcetera.

There is the increasing demand for the education industrial engineers. So, second then how, what are the green skills required that the green enhance skills occupation? Like apply the engineering theory and principles to problems of industrial layout or manufacturing productions are usually under the direction of engineering staff.

The many major study the record time, motion, method, speed involved in the performance of the production or any other like for example, any other industrial engineering theories then in performance production maintenance clerical and other kinds of works establishing the standard production rates for improving the efficiency.

So, here applying the theory engineering theories and principles for the present occupation for the present skill set from the present jobs applying this thing and recording the changes; and again improving the effect for production for enhancing the standard quality of production, as well as improving the efficiency.

Now, creating the new jobs new and emerging jobs. For example, now from new jobs can be industrial ecologist ecologistics; industrial ecologistics that is, description like study or they investigate the industrial production on the natural ecosystem to achieve high production, sustainable resource and the environmental safety and protections the may apply the principles and activities for the activities for the natural ecosystem to develop the models for industrial system.

That is the developing the new models and applications and occupation that is industrial engineering technologies for this again applying this engineering theory and technical skills to support the industrial engineering activities of quality control, inventory control, material flow method and that may also conduct the statistical studies to analyze the production cost.

So, this is an example of this like for example, is a course on industrial engineering how it is from the present occupation demands, how we can enhance the skills with the enhancement of the skills and competencies, how can we move forward towards is the thing like for example, towards the; now for example, simple planning and planning implementation etcetera, now we have moved towards the logistic the strategic logistics etcetera.

Similarly, from here is simple in industrial engineering to industrial ecologistics how can it, how can we move on. This is the kind of example from which we can analyze the different subjects technical and vocational education, subjects discipline and then accordingly develop the green curriculum and the training modules and the training modules and skills.

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Table 1. Future Skills

| | |
|---|---|
| Carbon capture and storage | technically more complex operations will involve workers with a very different skill set |
| Buildings | • due to energy-efficient equipment higher-skilled, higher paying employment;<br>• jobs are likely to be performed by workers who already work in the building sector. However, they will be redefined in terms of new skills, training and certification requirements;<br>• potential for highly skilled researchers and engineers. Extensive training needs in three main areas: diagnostic techniques, knowledge of renewable energy, installation, organizational skills (i.e. town planning). |
| Cement | jobs are expected to require higher levels of skills.0 |
| Wind power industry (renewable) | • many positions will require highly-skilled people;<br>• universities need to consider offering entirely new study fields and majors due to technology development. |
| Climate change | climate information and forecasting, research and development into crops adapted to new weather patterns could create specialized and high-skilled employment. |
| Agriculture | • jobs for agricultural skilled workers, clerks and craft and related trades workers will decrease;<br>• requirement for skilled agricultural and fishery workers about 2.2 million in 2015 |
| Electricity | probable that, together with technical competences, management skills will be required. |
| Rail sector | a dangerous shortage of skilled workers is emerging. This shortage might take place by 2030. |
| Waste treatment an recovery/recycling | rapid technological changes are increasing the demand for new skills. |

So, what would be the then again for the you know what would be the future skills let us discuss about what would be the future skills. Future skills that this carbon capture and the storage buildings. Like technically more complex operations will involve the workers with the different kinds of skill set. So, due to energy efficient equipments higher skill higher paying employment jobs are likely to be performed by the workers who already work in the building sector.

But again; however, to redefine in terms of new skills training and certification requirement, then potential for the highly skilled researchers and researchers and the engineers extensive training needs, such as for example, diagnostic training knowledge of renewable energy installation organizations these kind of town planning all kinds of things in the domain of the buildings etcetera.

Then again similarly, on the cement jobs expected is cement with the with the quality high quality levels higher level of skills etcetera. Then wind water industry renewable energy wind water industry many positions will require high skill people. Universities need to consider offering the new entirely new course and though in the renewable wind power industry.

Then climate change also climate change information forecasting, research developments and you know weather pattern to adopt the new other pattern create a specialized in high school employment that can also be. Similarly, in agriculture; agriculture also jobs for the agricultural skilled workers clerks and crafts etcetera.

That will decrease, but whereas, the requirement for the skilled agriculture and fishery workers that will increase. And electricity probably that in electricity the technical competencies management skill rail sector a dangerous shortage of skilled workers in emerging. That in the rail sector railway sector. So, this shortage might take place by 2030, then waste treatment that is recycling.

These are the these are the fields, these are the openings these are the venues where the new jobs future skills and jobs will be more created green jobs will be created and skills are required. Rapid technological changes are increasing to the demands of this new skill points of this new skills. So, these are the future jobs future skills and competencies likely to be introduced or will be required in future for this kind of jobs.

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Figure 1: 3-tier approach to a green TVET framework

Then so, then again then we have to come to the international framework for international framework for green greening the TVET and greens society a three-tier approach. So, for now we have talked about this till now we have discussed about the particular specific indigenous or specific framework on national framework for green TVET.

Now, well we will discuss about the international framework for green TVET, what is going on at the international level global level for green this green TVET and for the green society. So, they have adopted a three-tier approach, three-tier approach that is called as a is a three-tier approach from in TVET framework that is reformulation of a critical mass human infrastructure with a new approach.

Reformulation of a critical mass of human frastructures in when now when we are talking about the infrastructure now, it is human frastructures. So, with the new approach, that is 1st is that transforming the TVET institutions we have to completely transform three transform a change 300 degree change to bring 300 degrees 360 degree transformation to this TVET institutions, then again formulating the national policies again formulating the new national policies, and then forming the international alliance that is the collaboration.

So, 1st we have to convert totally transform our existing TVET institutions, 2nd then we have to again introduce new policies national policies and with the national policies how can we collaborate with the international organizations in international societies, international bodies that is the forming the international alliance. These are the three-tier approach and that should be the international framework; that should be the international framework for the TVET.

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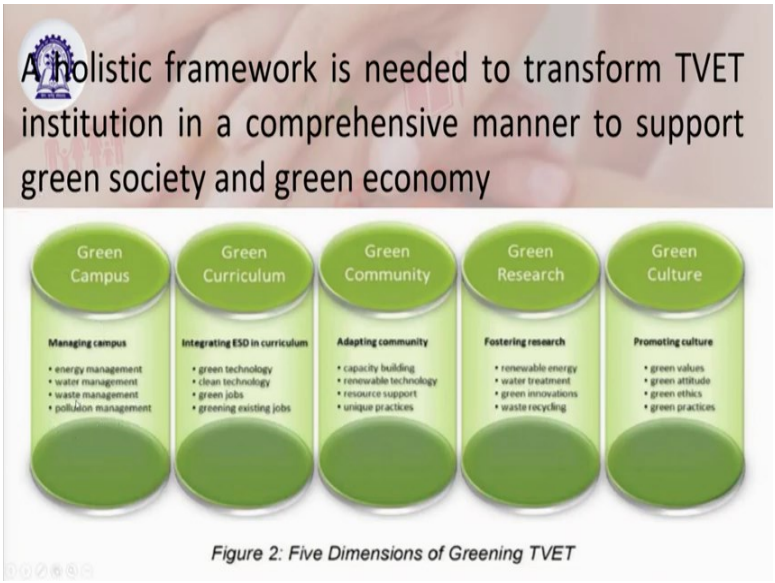

*Figure 2: Five Dimensions of Greening TVET*

So, first thing is that yes tier one that is transforming the TVET institutions. So, first thing is a holistic framework is needed, a holistic framework again whole institution approach, whole similarly a holistic framework is required for to transform the TVET institution in a comprehensive manner to support the green society and the green economy.

So, these are you can say like we have already discussed about how to develop a holistic framework, first is the green campus, green campus that is the with the energy management water management, waste management, pollution management how can we ensure a green campus ok.

Then thereafter move towards the green curriculum green, curriculum we are integrating ESD in the curriculum ESD components should be there embedded in the curriculum with a special emphasis on green technology with the minimum carbon emission technology, green technology, clean technology, green jobs and greening the existing jobs, whatever existing jobs are there again how to make it more greener.

So, that is the green curriculum, then they have to develop green community adopting that green community like the capacity building, training, renewable technology, resource support, unique practices, which can strengthen which can boost which can establish a green community.

Now, once the green community is established then we move towards the green research further research further research on in green research on the renewable energy, water treatment, green innovations, water waste cycling these are the priority areas of this green research areas.

So, with the new research, with the green research on these four aspects this important sectors water treatment green innovations, waste recycling innovation, renewable energy etcetera. Then we can move for the green culture or sustainable culture or how can we ensure for the future society to be the more greener society.

So, here the green culture is that promoting the culture not just work culture the whole training world TVET culture that is training as a technical and vocational education and training culture that is promoting the culture with green values, with green attitudes, green ethics green practices that is to develop the green culture. So, from there onwards we can say that how can we create a not only a green culture, but a sustainable culture.

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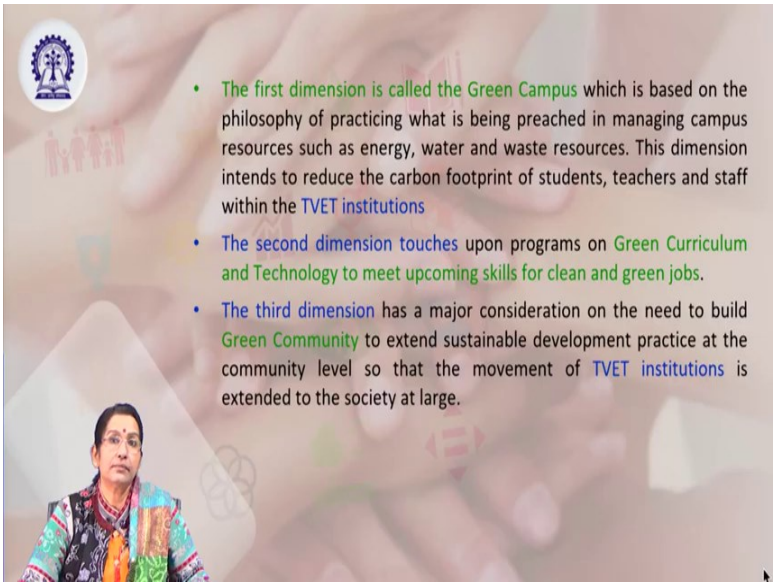


So, these are these has been again described here, that the green campus the first term is green campus is based on the philosophy and practice of which is being that is how to manage the campus with the resources, such as energy water waste resources these dimensions to be introduced how to reduce the carbon footprints.

Then second dimension is that is means, green curriculum and technology to meet the upcoming skills for the green jobs and the clean jobs. And the third dimension that is the green

community that is to extend the sustainable development practice at the community level. So, that the movement of TVET institution is extended towards the society at large.

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Then next the fourth dimension that is the green research that is the foster development of research culture within the framework of sustainable development or that sector. Then fifth dimension, promoting green culture that is to focus on strengthening the values ethos educational, ethical standards, attitude behavior that respects ecological resources and values the future requirement of the future generation. So, that is the again greening TVET indicators then again how to identify the TVET indicators, yes.

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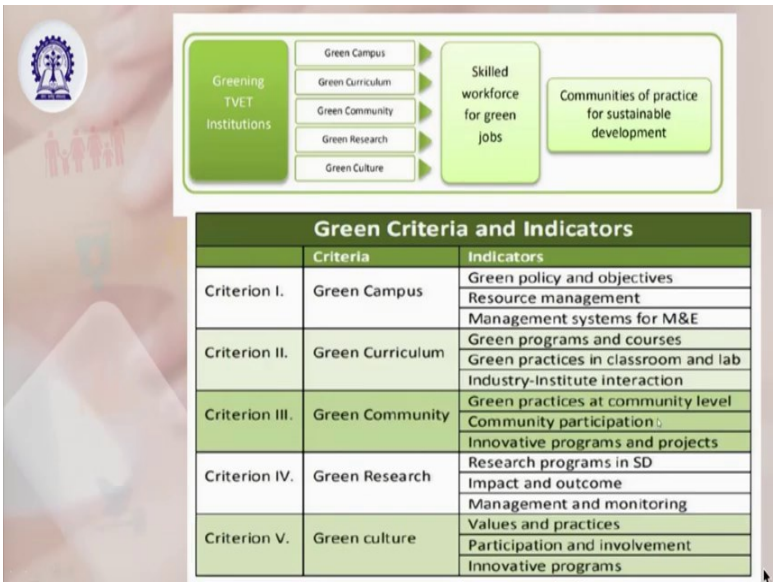


**Green Criteria and Indicators**

| | Criteria | Indicators |
|---|---|---|
| Criterion I. | Green Campus | Green policy and objectives |
| | | Resource management |
| | | Management systems for M&E |
| Criterion II. | Green Curriculum | Green programs and courses |
| | | Green practices in classroom and lab |
| | | Industry-Institute interaction |
| Criterion III. | Green Community | Green practices at community level |
| | | Community participation |
| | | Innovative programs and projects |
| Criterion IV. | Green Research | Research programs in SD |
| | | Impact and outcome |
| | | Management and monitoring |
| Criterion V. | Green culture | Values and practices |
| | | Participation and involvement |
| | | Innovative programs |

So, like for example, these are the greening TVET institution, green campus these are the five dimensions skill workforce for the green jobs and the communities of the practice for sustainable development. Then again who are the direct and indirect stakeholder who are going to use this that is the, decide that is the assessing that the identifying the communities of the practice for this sustainable development.

Who are the stakeholders, who are going to use it utilize this practices, what are the different types of stakeholders, the communities who are going to practice it. The communities of practice and so, that we can educate the people different group regarding the sustainable practice.

So, agree sustainable practice of this green jobs green economy. so, the communities of the practice for sustainable development for the all categories of the stakeholders. So, here now the what these are some of the green criterias and the indicators ok. Green criteria suppose criteria one that is on the green campus, at the green campus you can say that is the green policy and objectives are there how to assess is resource management system ok.

So, green campus when we try to evaluate this green campus these are the three things indicators green policy and objectives in terms of company policies organizational policies resource management, how they are managing the resources and management system what are the management system for monitoring and evaluation that is how they are evaluating it from time to time.

Then when we talk about the green curriculum, yes then we have to add the indicators are like green programs, what are the green programs and courses running going on. Then green practices in the classroom and law in the labs; that means, to measure the carbon footprint.

So, what are the practices the participants the students, the learners are using the classrooms and the lab labs, how to measure that carbon footprint they are creating then industry institution interaction, what is the degree of level of industry institution interaction.

Then green community when we talk about the green community the indicators of the indicators are green practices of the community at every level, in terms of using the different materials shopping behavior then day-to-day day–to-day purchase then consumer behavior where to observe the consumer consumable objects things.

So, green practice at the community level, then community participation, how much the community or the people in the community are very much aware of using the eco-friendly sustainable things. Then innovative programs and the projects what are the new innovative programs with that projects are coming up that utmost the green initiative.

Then comes the green research that is research program in sustainable development that is the to assess the impact and outcome and the management and the monitoring. And then green culture is that that is the values and the practices that we have already not only you have acquired, but we are already practicing it, we have embedded it in the curriculum, we have actually internalized it.

And we are using it practicing it in our day to day practice so, participation and involvement innovative programs. So, these are the green culture that is how do we promote this kind of sustainable development and green culture green aspects that how we are promoting it further.

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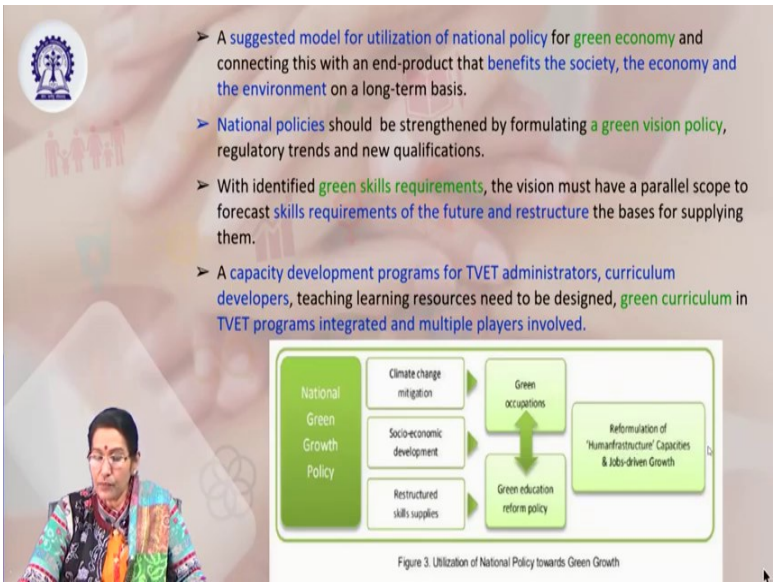


This the same this is the thing this national green policy. So, this is the green policy that is utilization of the national policy towards the green growth. So, is this the model which has been suggested for the national policy for the green economy suggested model; and the connecting this with the end product of the benefit of the society, economy and the environment because ultimately the beneficiaries will be the society, economy, our economic structure, economy infrastructure then environment.

So, the national policy should be strengthened by formulating a green vision policy regulatory trends and the new qualification for this kind of things. Green skill requirements that is skill requirements for the future and the restructure of the existing thing. Then the capacity building programs for TVET administrate; administrators curriculum developers teaching learning resources required integrity programs integrated in the multiple players involved.

Here we can see the first thing for example, is the national grain and growth policy regarding the first thing is that, suppose climate change mitigation that is one aspect suppose that is the most important vital, then socio economic development of the people in the particular community.

Then in the country then the restructured skills and supplies so, these are suppose these are the priorities as climate change mitigation how to mitigate it then socioeconomic development of the society of the people and the restructured skill supplies. What has what is the; what, how, what are the new skills and competencies to be developed and how it can be created? So, here

then on the basis of that then green occupations are created and green education reform policy also. With the green jobs green employment grew, green jobs and employment etcetera. We have to reframe the education policy also. So, here green education reform policy also is required ok, this is the model.

So, then thereafter reformulation of human press structure; human frastracture capacity capacities and the job driven growth. So, if this is the suppose this is an model we are going to adopt apply. So, suppose its the national green policy green growth policy adapt. So, we have to focus on this is an example focus suppose we are focusing on climate change mitigation and the social economic development of the people.

Then we have to restructure the skill supplies accordingly we have to create the green occupation, which will require required the green kind green TVET training that is green education. Hence the education reform should take place then ultimately then thereafter we can completely reformulate the human infrastructure capacities for the and the job driven growth. So, here comes the basic focus of objectives of the TV green TVET.

So, ultimate the goal of the green TVET is that, how to reformulate, how to modify, how to recreate, how to regenerate that human infrastructure capacities here. That infrastructure is not the physical infrastructure, but is the human infrastructure capacities that is, most suitable for the new green jobs and the jobs driven growth. So, this is the model that it has we have we can also.

So, this is the basic approach and this is the basic example of a model. So, every nation every country every state should adopt this kind of model to initiate not only to create the green economy and green society, but to create the green jobs and to green curriculum also green TVET curriculum. So, here do we stop here. Now, in the next class we will continue with other aspects.

Thank you very much.