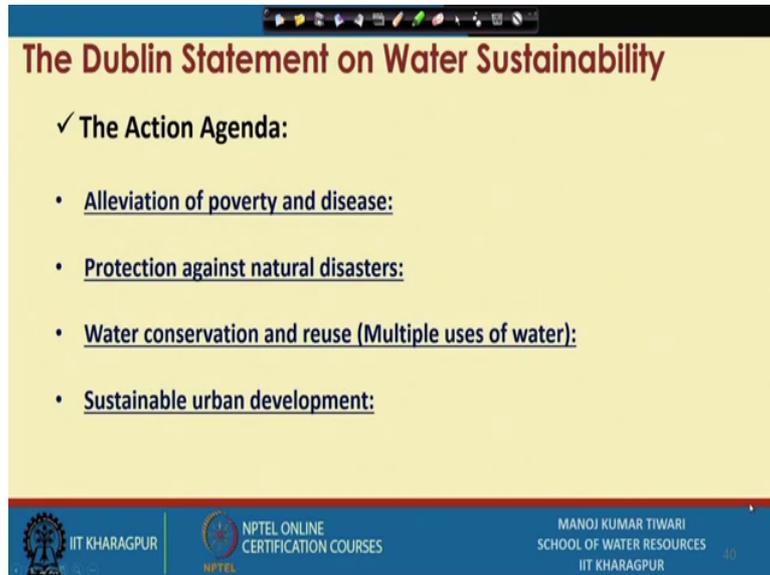


**Water Economics and Governance**  
**Prof. Manoj Kumar Tiwari**  
**School of Water Resources**  
**Indian Institute of Technology, Kharagpur**

**Lecture – 13**  
**Action Agenda in the Dublin Statement on Water Sustainability**

Hello everyone. So, in the previous lecture we did talk about the background of the Dublin statement, what kind of meeting took place and what are the major 4 guiding principles of the Dublin statement onto the water sustainability? So, this we discussed. We were basically then talking about the action agenda set under the Dublin principles on water sustainability.

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The Dublin Statement on Water Sustainability

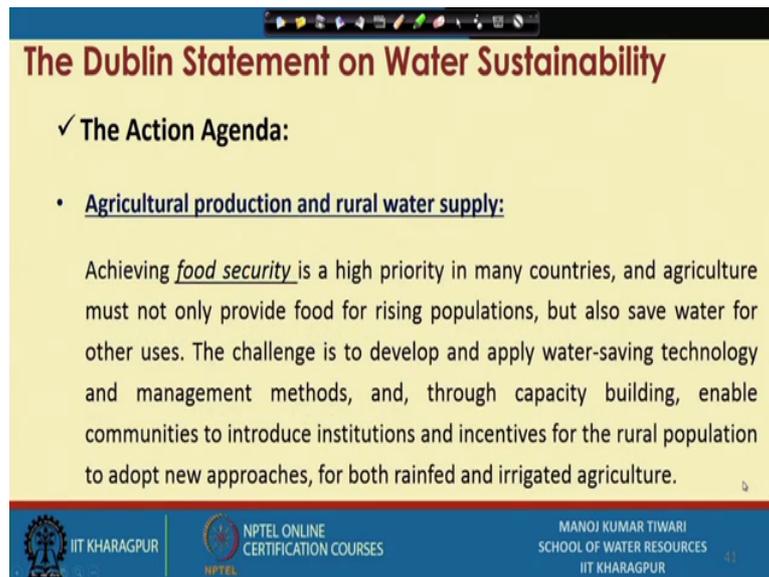
✓ The Action Agenda:

- Alleviation of poverty and disease:
- Protection against natural disasters:
- Water conservation and reuse (Multiple uses of water):
- Sustainable urban development:

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So, what were the different action agendas we are discussing that. We did talk about the 4 aspects in the previous lecture, one onto the alleviation the poverty and disease then protection against natural disasters, water conservation and reuse and sustainable water development. So, this we discussed.

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**The Dublin Statement on Water Sustainability**

✓ **The Action Agenda:**

- **Agricultural production and rural water supply:**

Achieving *food security* is a high priority in many countries, and agriculture must not only provide food for rising populations, but also save water for other uses. The challenge is to develop and apply water-saving technology and management methods, and, through capacity building, enable communities to introduce institutions and incentives for the rural population to adopt new approaches, for both rainfed and irrigated agriculture.

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Now, we will continue actually on to the other action agendas which were suggested in other action agendas, which were discussed or which were proposed in the Dublin statement. So, one was on to the agricultural production and rural water supply. So, achieving food security was thought of very high priority in many countries and agriculture must not only provide food for raising population, but also save water for other uses.

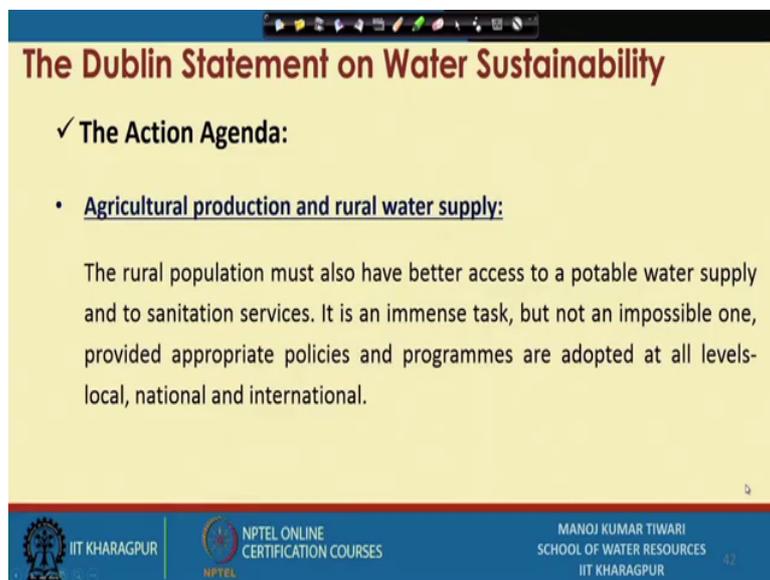
So, that was like in order to basically food security or in order to enhance agricultural production, in order to ensure the food security because food security is a very high priority area, but it is not like the agriculture is not responsible just for providing food for growing population but, also ensure the ensure the water security as well because agriculture why due importance was given on to the agriculture because agriculture is the major consumer of the water. This we have discussed earlier also that in India let us say around more than 80-85 percent of the water consumption is in the agricultural sector only for irrigation purpose and all these uses.

So, because agriculture is so water intensive this thing. So, they have this responsibility this added responsibility of working towards the water saving technologies or water saving management practices. The challenge is to develop and apply water saving technologies and management method and through proper capacity building basically, one need to ensure the community is need to basically ensure that they are producing or they are enabling systems to

introduce like initiatives or incentives for rural population to adopt new approaches for both rain fed and irrigated agriculture.

So, in what better way they it is not only for irrigated agriculture even for that rain fed agriculture because eventually you do not want all of your water to be retained in the field crops there is requirement of natural streams. So, there needs to be runoff generated, there needs to be infiltration takes place. So, if you retain water even the rain fed water for larger period of time the system of nature gets disturbed. The processes through which water percolates or moves on to the different aspect and different reasons we will eventually get disturbed. So, that was basically thought about and discussed.

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The Dublin Statement on Water Sustainability

✓ The Action Agenda:

- Agricultural production and rural water supply:  
The rural population must also have better access to a potable water supply and to sanitation services. It is an immense task, but not an impossible one, provided appropriate policies and programmes are adopted at all levels- local, national and international.

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Further the rural population must have better access to potable water supply and sanitation services as well. So, along with the agricultural production this rural water supply was also given due importance and it was thought that their water supply and sanitation services should also be properly ensured. This is the immense task because the major population lives in the rural sector, the facilities are not that much and the settlements are in smaller scales.

So, for example, planning a water supply system for town with a population of 5 lakhs is more financially viable than planning a 5 lakh rural population, because for a 5 lakh urban population you can make a centralized system, you can put through a system through a supply system networking the communities or the population is within the premises of a city

within the periphery of a city and the laying of pipelines, network and all this is not going to cost too much per unit if you see the per unit consumer. But, if you want to put that same if you want to feed the same 5 lakh people from rural setups. So, maybe if let us say there are villages of some population 1000 or even 5000, so, for 5000 population of villages if you want to cover 5 lakh people, you will have to end up picking up 100 different villages.

Now, putting a centralized system for even 3-4 villages together or 5 villages together you will have to layout the pipelines to cover all those distances which is becoming a very expensive affair. If you try to do it on a village to village scale, you will instead of one centralized system in a city one needs to go for 100 decentralized system in a village scale.

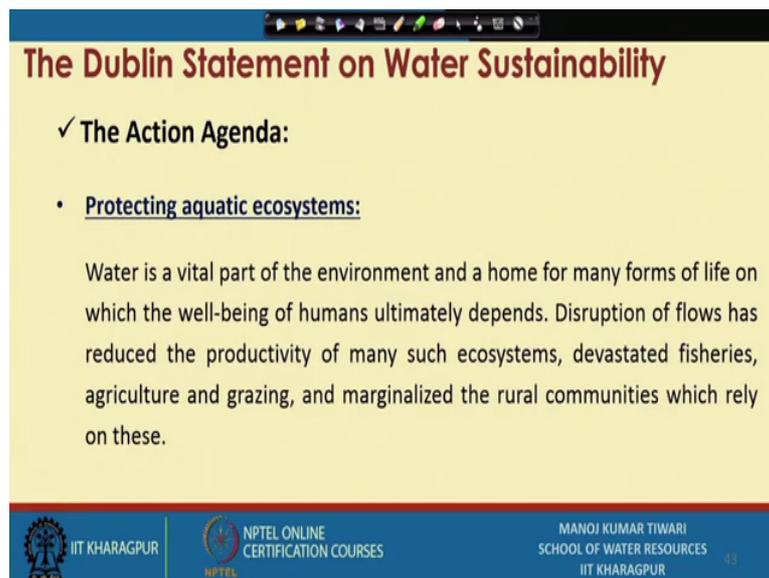
So, instead of one centralized system if you put through 100 decentralized systems you are going to increase the cost multifold because let us say talk about the manpower cost first. So, for example, managing a centralized system of these many customers you may need a workforce of or let us say just plant operation if you see maybe 10 people can operate the plant, because you will have a few number of pump, then there is a security guy, then there is an operator guy a couple of operators guy and these exchanging safes and all that people of 10 – 15, a team of 10 to 15 people can manage that.

But, for 100 decentralized system even if you keep just 2 person, let us say because system is a small and one person has a responsibility of doing everything and just in order to change the safety if you have one more additional person. So, with just 2 person at one facility with a 100 decentralized system your requirement will be 200 people. So, the job that is being done by just 10 – 15 people at a centralized system will need 200 people.

So, their salaries, their all these things it will enhance the cost. Similarly, the equipment, the setup, the buildings, the pipeline, infrastructures, if you see all this is going to increase the cost multifold. So, that is why, it is very it becomes relatively much difficult and it is a it will be very immense task to fulfill all the rural population with the piped water supply system and proper at rural scale. However, it is not impossible one it will need fund it will need resources because there are some positive and negative aspect both. If at one place you are putting more funds like instead of 15 people you will need 200 people that is true, that it will increase your cost, but at the same time you are putting you are giving the job opportunities also to 200 people.

So, you are creating some 185 extra job opportunities. So, that kind of development will take place. So, this has another beneficial aspect as well. All these things putting into this thing that it may be a very big, very huge, very immense task, but it is not an impossible one and for that reason basically, the appropriate policies and programs needs to be adopted at all level including national, international and local level in order to set this rural water supply systems.

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The Dublin Statement on Water Sustainability

✓ The Action Agenda:

- Protecting aquatic ecosystems:

Water is a vital part of the environment and a home for many forms of life on which the well-being of humans ultimately depends. Disruption of flows has reduced the productivity of many such ecosystems, devastated fisheries, agriculture and grazing, and marginalized the rural communities which rely on these.

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Then, there is a protecting aquatic ecosystem which was again included in the action agenda in the recommendation that water being a vital part of the environment and a home for many forms of life including like fishes and all the aquatic ecosystem survives on water only. So, this is that important. So, this like we should not only be centered about the human beings, but we should be thinking about the aquatic ecosystems as well and the disruption of flows particularly in the surface water channels in the rivers, in the extracting huge amount of water from the lakes disturbs the productivity of many such ecosystem.

It will have devastated effects on the fisheries, agriculture, grazing and sort of marginalized rural community which could be relying on to those.

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**The Dublin Statement on Water Sustainability**

✓ **The Action Agenda:**

- **Protecting aquatic ecosystems:**

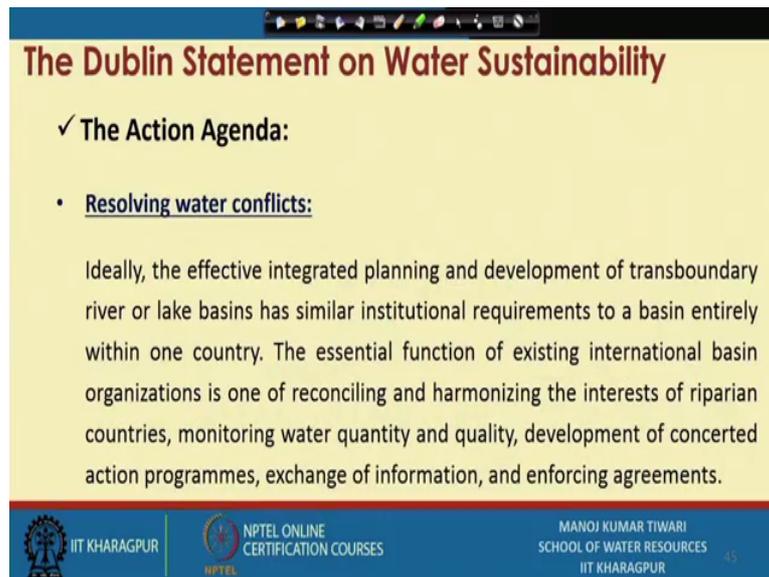
Various kinds of pollution, including transboundary pollution, exacerbate these problems, degrade water supplies, require more expensive water treatment, destroy aquatic fauna, and deny recreation opportunities. Integrated management of river basins provides the opportunity to safeguard aquatic ecosystems, and make their benefits available to society on a sustainable basis.

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So, this ecosystem protection need also to be ensured and there was a recommendation given into the in the form of action agenda in the Dublin statement on to the protecting ecosystem they said that various kind of pollution including transboundary pollution and exacerbate of these problems. They degrade water supplies; they require more expensive water treatment, because if your source water quality is deteriorating and you are pumping water from that source in order to supply that water because quality is poorer, you will need better degree of treatment. You will need a higher degree of treatment which could actually be again costly.

So, it will be more expensive water treatment. It will destroy aquatic fauna. It will deny the recreational opportunities; you have a fresh water lake people going in there for recreational purpose, spending an evening, roaming around, develop going for picnic there, develop as a tourist spot, picnic spot whatever events do that, but if that water quality is not good, if the water is smelling, if let us say there are insects and there are unpleasant situations there who will go there. So, all those basically opportunities also go with this. So, the integrated management of river basin should incorporate and will provide opportunity to safeguard aquatic ecosystems and basically, make their benefit available to the society for a sustainable basis. So, that was also incorporated included into the one of the action agendas in these Dublin statements.

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**The Dublin Statement on Water Sustainability**

✓ **The Action Agenda:**

- **Resolving water conflicts:**

Ideally, the effective integrated planning and development of transboundary river or lake basins has similar institutional requirements to a basin entirely within one country. The essential function of existing international basin organizations is one of reconciling and harmonizing the interests of riparian countries, monitoring water quantity and quality, development of concerted action programmes, exchange of information, and enforcing agreements.

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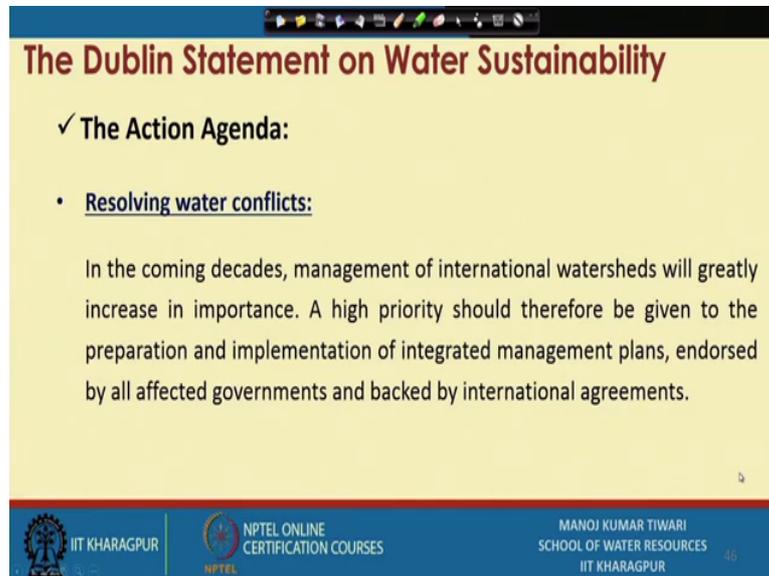
Now, then the due emphasis was given on to resolving water conflicts. So, ideally effective integration planning and development of trans boundary river or lake basins has similar institutional requirement to a basin entirely within one country. Because, if let us say we have a river in one country or one states, how we are using water, how many population is getting fed with this in the upstream, in the downstream of the river who has how much of authority to withdraw water, same concept should be applied when there is a trans boundary issues.

So, like a river going from one country to another country or one state to another state because, eventually it is a natural resource, its service is to basically maintain the ecosystem, feed the requirement of the ecosystem as well as human being. So, how much ecosystem is onto the other side of the boundary, how much ecosystem or how much population is in this side of the boundary, how much population is that side of boundary should be done in a judicious way, but that is not how it happens. Many times if river is flowing from a country to another country the upstream one wants to take the maximum advantage in maximum benefit of it, because they have that flexibility to extra to get water first.

So, those kind of issues basically turns into the water conflicts and there is essentially the essential function of existing international basin organization is one of the sort of a reconciling and harmonizing the interest of these riparian rivers, monitoring the water quantity and quality, development of concerted action programs, exchange of information and enforcing the agreed arrangement between the 2 parties or 2 nation or 2 different states.

So, that is what is basically that is how one should give emphasis on to the resolving water conflicts that becomes a very prime and prominent issues for trans boundary rivers.

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The Dublin Statement on Water Sustainability

✓ The Action Agenda:

- Resolving water conflicts:

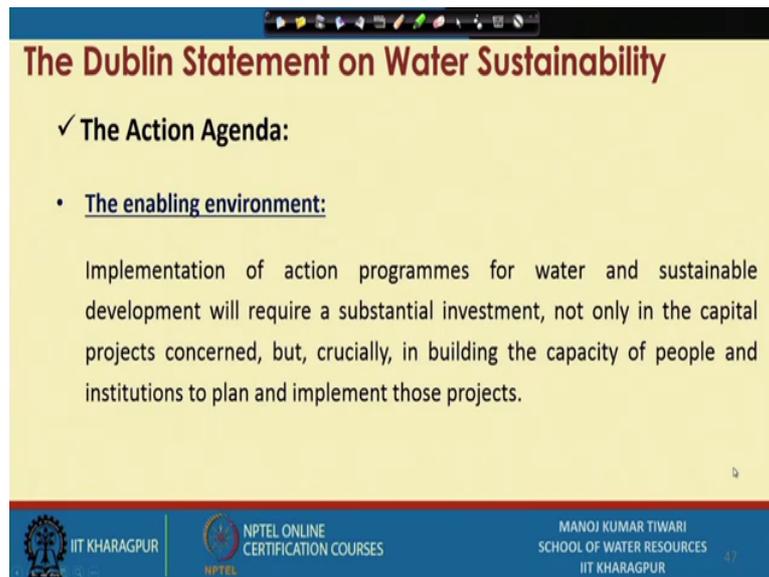
In the coming decades, management of international watersheds will greatly increase in importance. A high priority should therefore be given to the preparation and implementation of integrated management plans, endorsed by all affected governments and backed by international agreements.

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In coming decades, the management of international watershed will basically greatly increase in importance a high priority should therefore, be given to the preparation of implementation of integrated management plans endorsed by all affected government and backed by the international agreements. So, that was sort of recommendation made in the statement that for trans boundary rivers particularly where there could be a water conflict could arise.

So, that should be dealt with proper priority and in a proper prepared implementation system and an integrated management plan agreed by the both parties, both or more agreed by all the involved parties and governments and under a purview of some international agreement so that nobody, basically people are enforced to do that recently if you know there has been issues related to the discharge of water into the Indus and China, Brahmaputra river with China or with Pakistan. So, there has been this kind of conflicts at time keep on arising.

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**The Dublin Statement on Water Sustainability**

✓ **The Action Agenda:**

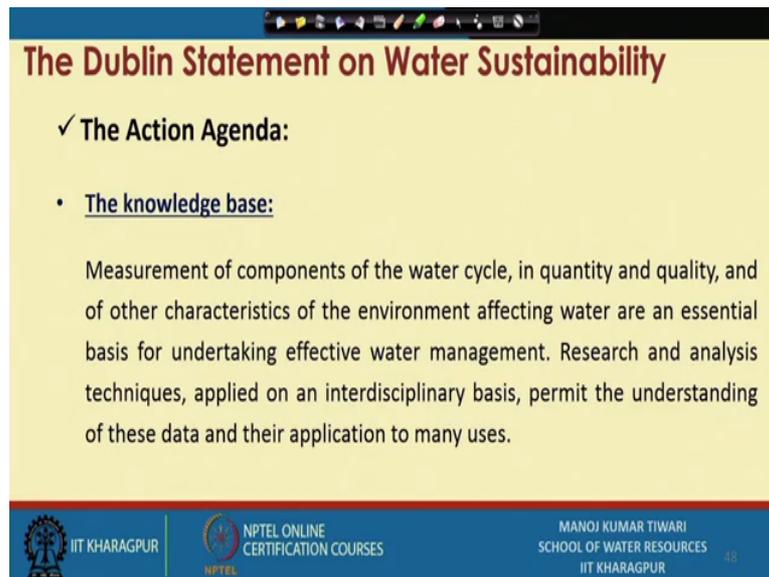
- **The enabling environment:**

Implementation of action programmes for water and sustainable development will require a substantial investment, not only in the capital projects concerned, but, crucially, in building the capacity of people and institutions to plan and implement those projects.

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The another action agenda was basically on to the enabling environment in terms of basically implementation of action program for water and sustainable development, because the when you go for implementing these program you need a substantial investment. Not only in terms of capital project concerned but, crucially in capacity building of people, institutions, plan and implementation of these project. So, those sort of like capacity building and the putting this proper implementation program action program and how much capacity how much financial resources are needed for these are also put through the due attention in the recommendations under the Dublin statement.

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**The Dublin Statement on Water Sustainability**

✓ **The Action Agenda:**

- **The knowledge base:**

Measurement of components of the water cycle, in quantity and quality, and of other characteristics of the environment affecting water are an essential basis for undertaking effective water management. Research and analysis techniques, applied on an interdisciplinary basis, permit the understanding of these data and their application to many uses.

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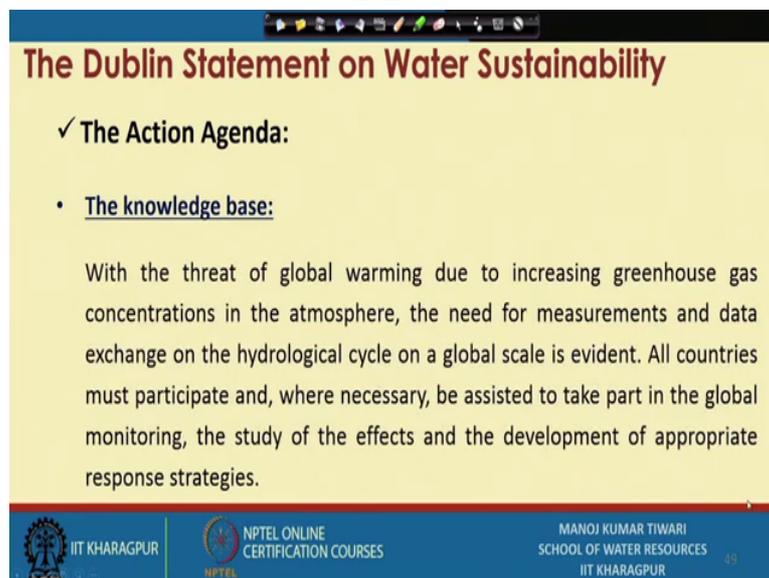
Then, there was again related this thing which was on to the knowledge base. So, measurement of component of the water cycle in quantity as well as in quality and of various other characteristics of environment that affect directly or indirectly the water resources should be basically, clearly understood and knowledge base onto these processes, these data base, these contributions should be prepared base. So, that will eventually help in the undertaking effective water management.

Because, once we have the data, once we have the knowledge of actual status; how much water is coming, what is the quality of water expected, how much water is minimum requirement for ecosystem development, how much water could be available for the human uses, all this information and knowledge of all integrated processes could help us in better decision making and in taking the overall integrated water management or integrated river basin management or whatever the water basin we are talking about entering integrated water basin management in a more comprehensive and effective way.

So, research and analysis techniques, applied to the interdisciplinary basis, permit the understanding of these data and their application in many uses. And, water is not a subject of particular discipline it is a totally interdisciplinary this thing, we have discussed this earlier also that you need variety of disciplinary knowledge in order to comprehensively understand the issues and situations and practices related to the water management.

One needs to look at ecological aspect of water which probably ecologist will be in a better position to understand that. One needs a planner or policy or financial managers for which you may need management guys, then one may need actually for development of water infrastructures, treatment plant, supply systems all these that would actually need people from like public health engineering or civil engineers or architectural engineers, city planners they will be needed for this kind of knowledge then there is a law and policy issues social issues. So, humanities people will be needed. So, that way it is a holistic if you want to look the water as a management in a holistic approach. If you want to take water management in a holistic approach, holistic way, one need people from different disciplines because of its interdisciplinary nature.

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The Dublin Statement on Water Sustainability

✓ The Action Agenda:

- The knowledge base:

With the threat of global warming due to increasing greenhouse gas concentrations in the atmosphere, the need for measurements and data exchange on the hydrological cycle on a global scale is evident. All countries must participate and, where necessary, be assisted to take part in the global monitoring, the study of the effects and the development of appropriate response strategies.

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So, further with threat of global warming due to increasing greenhouse gas concentration in the atmosphere, the need of measurement and data exchange on hydrological cycle on a global scale is also evident. So, we have actually like, but this data should be monitored the climate data, temperature data all this meteorological data, hydrological data should be monitored properly, should be stored properly. The information should be accessible to the relevant people at least those who needs to those who are involved in some sort of water management or water technological management aspect should be available.

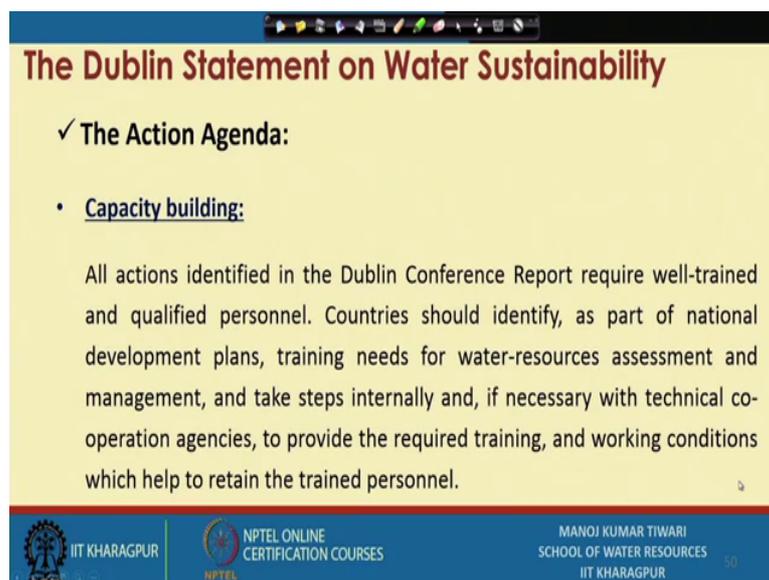
All countries must participate and where necessary, be assisted to take part in global monitoring. So, because of this climate change and all that issues are becoming there is sea

level rise, there is the you see the saltwater intrusion taking place all these are issues which can only be think about when you have data available. Otherwise based on just knowing the concept that yes sea level will rise, yes there is a possibility of saltwater intrusion affecting the groundwater.

How you will develop a policy when you do not know that how deep it can, when you do not have the proper appropriate knowledge of the effective process that how deep it can go, how basically it can affect, what is the rate, what is the limit, what is the extent. So, all aspects all those aspects need to be assessed and it should be done in a participatory fashion. So, that particularly for the global scale or global issues all country must participate and the particularly, the monitoring global monitoring and studies on to the effect of development of appropriate response strategies should be planned and developed.

So, that was another action agenda out there in the Dublin statement.

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**The Dublin Statement on Water Sustainability**

✓ **The Action Agenda:**

- **Capacity building:**

All actions identified in the Dublin Conference Report require well-trained and qualified personnel. Countries should identify, as part of national development plans, training needs for water-resources assessment and management, and take steps internally and, if necessary with technical co-operation agencies, to provide the required training, and working conditions which help to retain the trained personnel.

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Then, there was capacity building which we earlier talked also that all actions identified in the Dublin conference report require well trained and qualified personnel. So, you if you have manpower capacity for implementing or designing or policy making on to these aspects then only things will be done.

So, we need trained people, trained personals for all these aspects for policymaking, for implementation, for designing purpose, designing of a scheme, designing of systems, putting

through interventions in the practice, then monitoring of that, monitoring effect maintaining that, regulating that, assessing the impact, during the implementation let us say the revenue generation, the financial modeling experts, all these sort of people sort of personnel would be needed at some stage or other.

So, countries should identify basically as a part of their national development plan on to the training needs for water resources assessment and management and take due step internally and if necessarily with technical cooperation with other agencies, other states, other governments to provide the required training and sort of working conditions which help to retain the trained personnel.

Because, many times what happens that there are places which will provide adequate due amount of training which will train the personnel, but there is no advantage at that person leaves the system, because their working conditions are not proper. So, in order to capacity building one aspect is that when you are building the capacity, when you are training a manpower, when you are producing qualified personnel, it is responsibility of the system, it is responsibility of the government to ensure that these persons these systems these qualified peoples retain in the system. They do not leave away because of probably better opportunities, better salaries or better work atmospheres.

So, we need trained personnel, but we need to not just train them we need to retain them and take advantage of the knowledge that they have gained during the training. So, this capacity building is one of the very important part in implementation of any program including the sustainable water management practices.

The government must also assess their capacity to equip their water and other specialists to implement the full range of activities in integrated water resource management. So, in a holistic way, in integrated way what kind of capacity a set of people has generated, how we can utilize those capacity for that particular activity or that particular management water management or water basis management related activity in a holistic way and for that we need people from the people of different capacity of different caliber like if you want to manage a water supply system, for example; with all qualified engineers you will not be able to do.

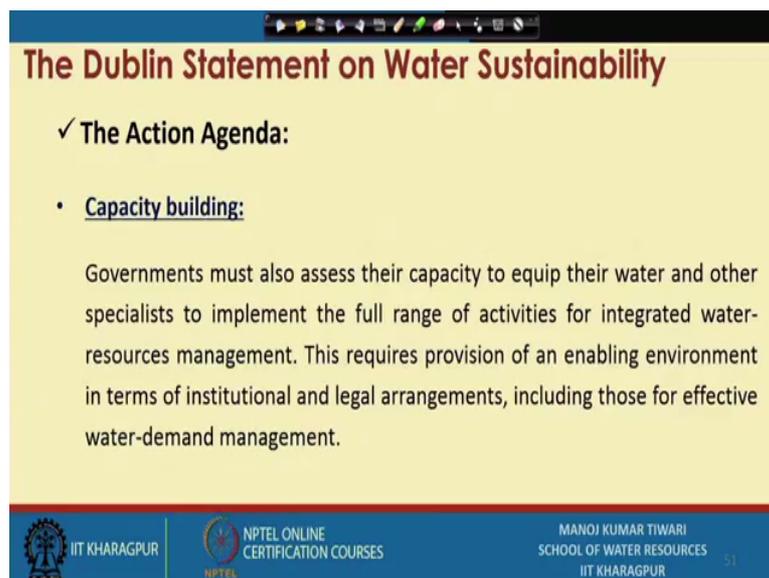
You need people at different levels. So, you will have you will need the people of capacity of the planner, capacity of the designer, capacity of the operator, then capacity of the labor,

capacity of the safety guards. So, we will have basically if the full implementation of a program needs people of different capacity at different levels.

All the work cannot be done by same person or same type of trained person. A person trained in engineering will not be fitting enough to do some other like revenue collection and all these duties that efficiently as the one who is specifically trained in that section or if you put a management person on policy making person and give him a task to design a basically water treatment plant or estimate the pump capacity or design a water intake system from a river or from a lake he may not be able to do it, because he is not trained enough.

So, the different people getting training into the different aspects we will need sort of to deploy their learned skills in such a fashion that integrated water resource management system could be effectively developed and conceptualized.

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The Dublin Statement on Water Sustainability

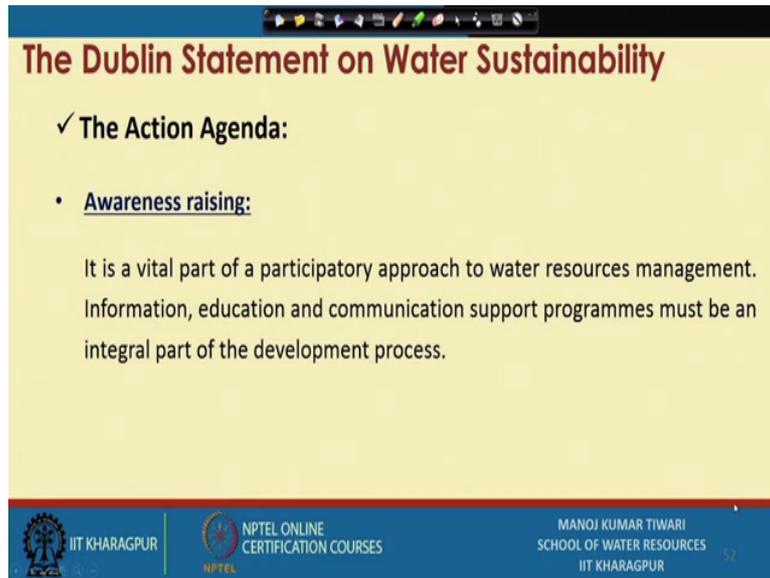
✓ The Action Agenda:

- Capacity building:  
Governments must also assess their capacity to equip their water and other specialists to implement the full range of activities for integrated water-resources management. This requires provision of an enabling environment in terms of institutional and legal arrangements, including those for effective water-demand management.

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This requires the provision of enabling environment in terms of institutional and legal requirements including sort of those effective water demand management scenarios and management sectors. So, this was another point in the Dublin action agenda.

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**The Dublin Statement on Water Sustainability**

✓ **The Action Agenda:**

- **Awareness raising:**

It is a vital part of a participatory approach to water resources management. Information, education and communication support programmes must be an integral part of the development process.

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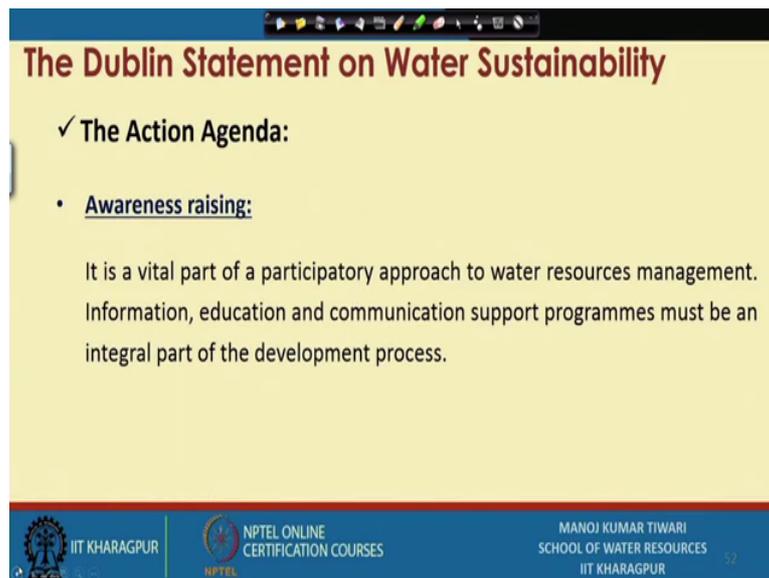
Then, there was a point onto the awareness raising. So, that it was felt that it is of vital importance. It is basically of vital importance that the participatory approach which was discussed earlier also to the water resources management is ensured and how it will ensure? It will be ensured by the awareness raising. So, there should be program, there should be information, there should be systems to support these sort of awareness raising campaigns.

The educations and the community educations and the communication support programs must be put into the integral part of the development process. So, that it is not just saying that governments say that all the stakeholders should be involved or community participation should be there we are welcoming the community. Just saying this is not enough, because on paper you can write that like any user, end user or any community representative is welcome to have discussed and participate in these things.

But, until unless you go on to there and tell them that yes, we need your participation, we need your this thing, you make them aware that this is the system, this is what we are going to put through, this is how you will be basically getting your water facilities worked, this is how much water this is the water that we are allocating for your uses, this is the time of supplies, this is how basically this thing will be managed in a holistic way. So, until unless you go to their end, to them makes them aware with the system asked for their participation then only the government will be getting something.

Otherwise, just by saying that we are welcoming the community participation it is not going to work. So, there is a need of raising awareness for community participation. It is an integral part of ensuring the community participation that one go for an awareness raising campaigns so that they can ensure the participation from the community in a very effective and efficient manner.

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The Dublin Statement on Water Sustainability

✓ The Action Agenda:

- Awareness raising:

It is a vital part of a participatory approach to water resources management. Information, education and communication support programmes must be an integral part of the development process.

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And, with this actually we will end this session here. These were the various action agendas described in the Dublin statement on water sustainability and that Dublin statement released onto the water sustainability.

So, there were some guiding principles 4 grinding principle, which we discussed in the previous lecture and a set of action agendas which were sort of a set of recommendations was provided on each of these action agendas that how these can be taken into the existence, into the system and this is what was the Dublin statement onto the sustainable uses of water.

So, we will end this session here and in next lecture, we will talk about the various viewpoints of sustainability and how it means various key ingredients and various viewpoints onto the sustainability and how it is a very challenging task to ensure sustainability in reference to the contrasting viewpoints, so that we will be discussing in the next class.

Thank you.