Watershed Management

Prof. T. I. Eldho

Department of Civil Engineering

Indian Institute of Technology, Bombay

Lecture No. # 02

Watershed Management and Stakeholder Analysis

[FL] and welcome back to the video course on watershed management. In the module 1, in the second lecture, we will discuss about the watershed management and stakeholder's analysis.

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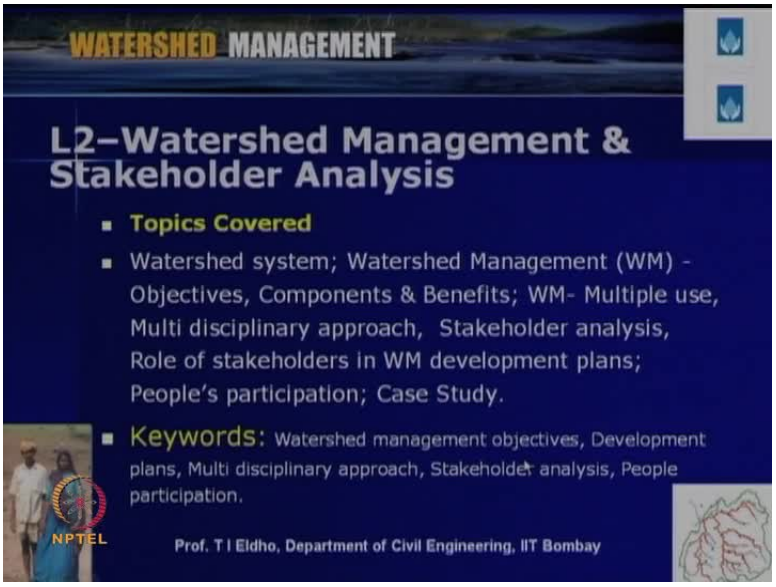

So, in the first lecture, we were discussing about the concepts of watersheds; then watershed approach; then various necessities of watershed managements, principles of watershed managements, and we have seen one case study also.

So, in today's lecture, the topic is on watershed management and stakeholder analysis. So, the topics covered includes watershed system, Watershed Management – Objectives, Components and Benefits; Watershed management - Multiple use, Multi-disciplinary approach, Stakeholder analysis, Role of stakeholders in watershed management development plans; people's participation, and finally, we will discuss a case study.

Some of the important keywords related today's lecture are watershed management objectives, development plans, multi-disciplinary approach, stakeholder analysis and people participation.

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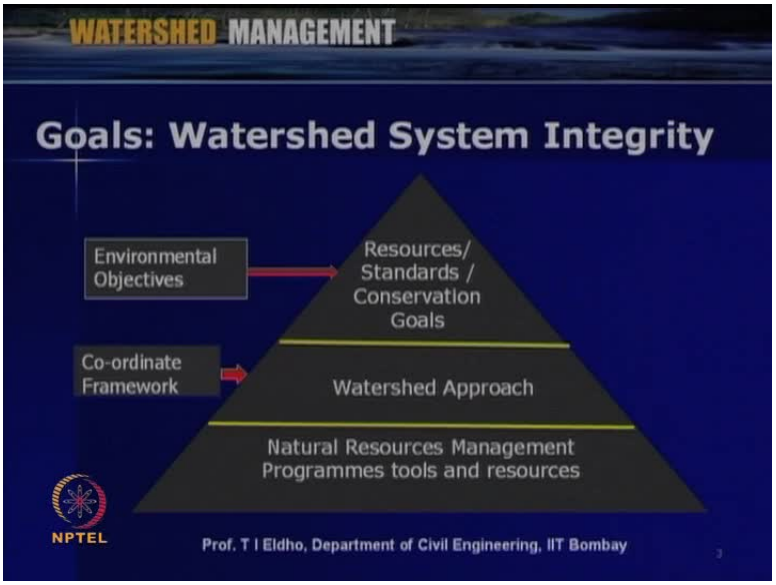

So, we were discussing the watershed management as the management of the area; the so called watersheds in a scientific way; so, in a sustainable way. So, within that conducts, the main goal of the watershed management is an integrated approach of the total resources available in the water source, the watershed.

So, the goal is the watershed system in an integrated way; so, that way we have various objectives, and then, we have what various resources within the watersheds. So, like, with respect to the environmental objectives, so we will be looking to the various resources, various environmental standards and the conservation goals we are setting for the watersheds.

And then we will be coordinating the various aspects of the watershed resources and watershed management plans. So, we will be having a coordinated framework. So, that is the way which we go for the watershed approach.

So, in this, there will be, we will be coordinating the various natural resources, and then, we will be coordinating the with respect to various tools and the resources available within the watersheds.

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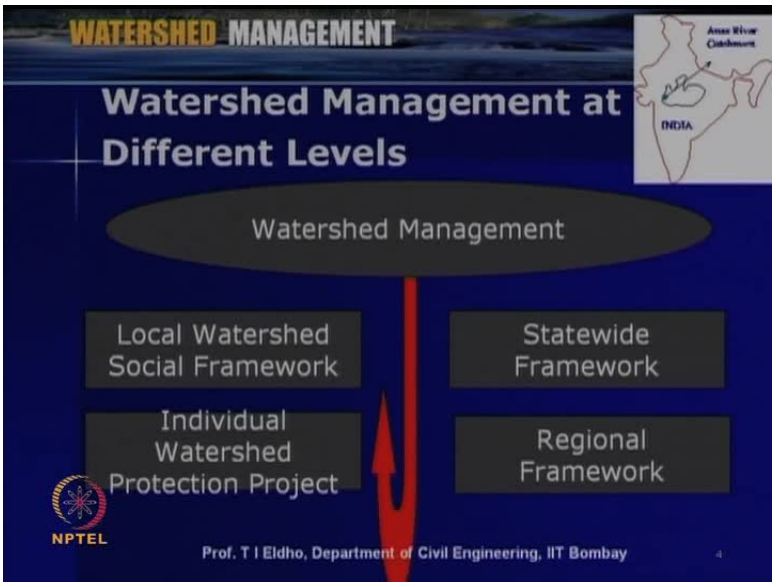

So, with this perspective, we will be now looking to the various watershed management practices. So, there can be an, the various watershed management practice can be at various levels. So, the watershed management can be, it we can formulate various plan for the total country or for the states concern.

So, that way, we can have a state wide framework. So, we can set the various management plans, various objectives and there in a various necessities, etcetera, on a state wide framework.

So, that can be put up under the state's rules and regulations, and then, whenever a development scheme, a watershed development, watershed management schemes is implemented, that guidelines can be followed.

And then, a second can be a within a regional framework. So, regional framework means that is suitable for a particular region. So, when we consider a river basin or when we consider particular district or particular say South India, North India or say the hilly regions, so like that. So, its requirements, say the as far as within the perspective of watershed management, the requirements may be different.

So, that way we can have a regional framework for the a particular region is concerned, and then, the next level can be local watershed, say within the social environmental and

sustainable framework. So, this, say here, so, this is formulated may be for a district or may be for as a various blocks or for various villages depending upon the need.

So, the third one is the local watershed within the social framework for that particular area is concerned, and then, finally, it can be individual watersheds for the particular watershed is concerned. So, this can be, this depends upon the various requirement of that particular watershed; various characteristics of the particular watershed.

So, that way as far as watershed management at different levels is concerned. We can have a state wide plans; we can have a regional plans or we can have a local watershed plans or we can have a plans for the particular watershed is concerned.

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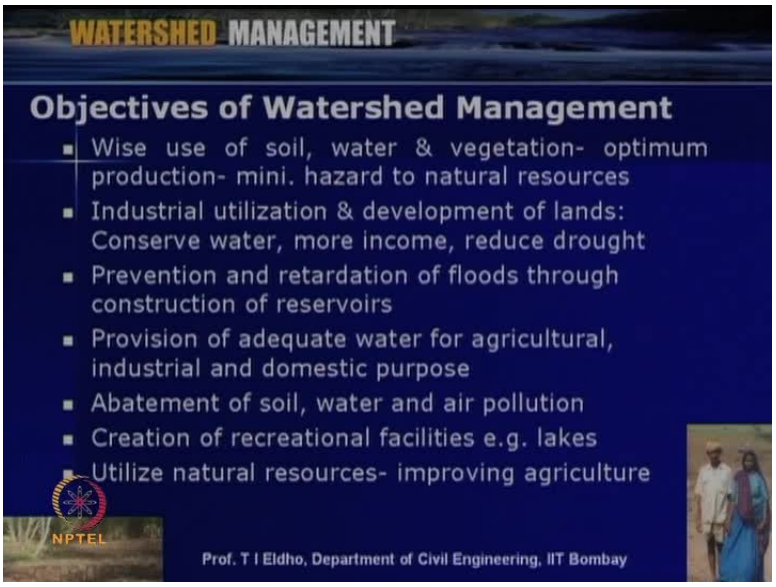

So, now, so, within this perspective, what we have discussed so far. Let us see what are the important objectives of watershed management. So, some of the important objectives are listed here. So, first one is wise use of soil, water and vegetation for optimum production, so, with the minimum hazards to natural resources.

So, when we have discuss the particular area, that means particular watershed, so, we have to see the aspects, various aspects of the lands; so, that means we have to see the land use, and then, what kind of soil is available and how much water is available, the quantity and quality the water available.

Then, how much is the forest cover for the particular area. So, by considering all these aspects, the objective will be the optimal biomass production with a minimum hazard to the various natural resources.

Then a second objective can be the industrial utilization and development of lands. So, here we conserve water so that we can have more income, and then, reduce the drought. So, as we can see that some of the problems concerned for a watershed is a, the occurrence of droughts and during the rainy season occurrence of floods.

So, when we looking to the watershed management within a holistic approach, so, say the various utilization is concerned. If you look in to the industrial utilization, we have to develop the land in such a way that we will be getting more income, and then, the, within the watershed, we have to conserve the water and then produce floods and droughts.

And then third objective can be the prevention and retardation of floods through construction of reservoirs. As I mentioned, flooding can be a big problem for many of the watersheds. So, we can have various management practices like a construction of check dams, construction of levees, etcetera, so that we can reduce the flooding problem for the considered watershed. Then fourth objective can be provision of adequate water for agricultural, industrial and domestic purpose.

So, we can, say as far as the watershed is concerned for the total utilization of water is concerned, there are various uses like a domestic use; then agricultural use; industrial use, etcetera. So, we have to see that optimum utilization of the available water resource; so, that can be another objective.

Then some other objectives like abatement of soil, water and air pollution. So, of course, the pollution is a major problem in a many areas; so, we have to see that the land is not polluted, the available water is not polluted, and due to any industrialization or its effect, air is not polluted.

So, this can be another objective for the watershed management plans. Then, some other objectives like recreational facilities. So, for the particular area is concerned, we can construct a lakes or ponds, so that time we can have the facility of recreation.

And then, also say the objective can be the utilization of the natural resources so that time we can have improved agricultural practices and better production from the land, and then, finally, the, the, the, in an overall way, the final objective will be the total, say the upliftment for the concerned area with respect to the flora and fauna, and then, of course, the people concerned. So, that will be the objective with respect to the socio-economic aspect of the watershed is concerned.

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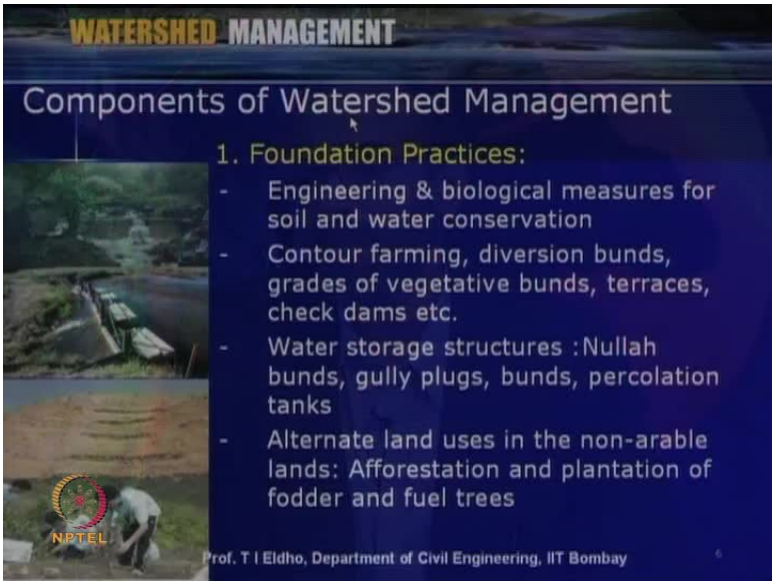

So, now, we have seen the various objectives of the watershed management practices. Then, here, in the next slide, we will see the components of watershed management. So, there can be two important component as far as a watershed practice are concerned - one is foundation practices and second one is improved production practices. So, both can come together as far as watershed management practice are concerned. So, the foundation practices include the various measures which we undertake to have, say better resources utilization, and then, optimal production as far as various the biomass and other aspects are concerned.

So, as far as the foundation practices are concerned, here I have listed various points, so, like engineering and biological measures for soil and water conservation. Then contour farming, diversion bunds, grades of vegetative bunds, terraces check dams, etcetera. So, here, you can see that various structures are constructed in some watersheds.

So, this can be some of the foundation practices. Then water storage structures, so, just like a construction of a lake or a construction of a check dam, and then, nullah bunds, then gully plugs, then percolation tanks, etcetera.

Then alternative, alternate land uses in the non-arable lands, such as, afforestation and plantation of as for fodder and fuel trees are concerned.

So, these are some of the foundation practices. So, when we make plans for the watershed management, so, these foundation practices are very essential for the better utilization of the lands; better utilization of the available water, and then, various other resources are concerned.

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Then, next one is the improved production practices. So, if we are having better foundation practices, then based upon this we will be looking for improved production practices. So, some of the aspects as far as production practices are concerned, such as, in-Situ water conservation, then agricultural water management, then improved crop and cropping system.

So, these are some of the improved production practices which we can look into with the plans when we prepare the watershed management plans. So, then, you can see that as far as foundation practices are concerned, we have to invest lot of money and resources to the watershed.

So, we need financial supports and assistance from the governments, whether it is states or local governments, and then, also the various NGO's are concerned. Then as far as the production practices are concerned, this depends upon the people participations.

So, you can see that, say the watershed is concerned, its area is concerned, they will be holding by farmers within the watershed. So, to have better agricultural management or better production is concerned, so, people within that watershed should cooperate within the watershed management plans are concerned. So, the improved production practices generally depend upon the people participation.

So, now, we have seen the various practices, various components of watershed management practices. So, now, say within this perspective, we will see what are the important benefits which we can get through watershed management.

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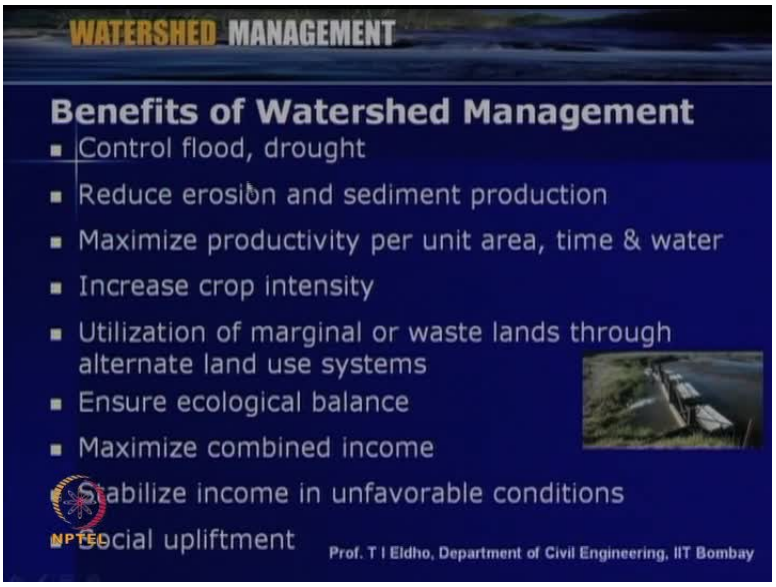

So, some of the important benefits are listed here. As we already discussed earlier, so, we can have better control of flood and droughts, and then, reduce erosion and sediment production; then maximize productivity per unit area, time and water; then increase crop intensity; utilization of marginal or waste lands through alternate land use systems; ensure ecological balance; then maximize combined income; stabilize income in unfavorable conditions and finally social upliftment.

So, there are number of benefits as listed here as far as watershed management practices are concerned. So, some of the important benefits is like optimal utilization of the available resources so that we can increase the income for the people are concerned; then we can increase the forest area; we can have better vegetative cover.

We can reduce the soil erosion, and then, we can have better quality of water and sufficient quantity of water. So, these are some of the important benefits as far as any watershed management plans are concerned.

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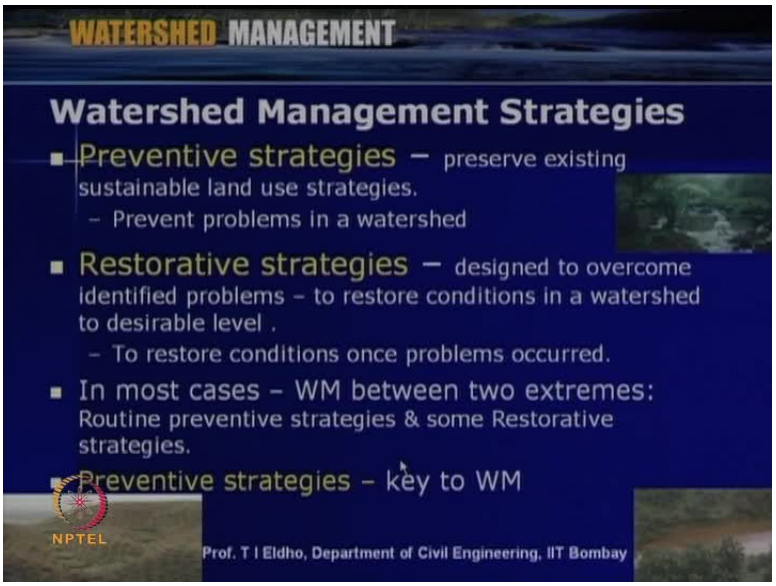

So, now, we will see, say there can be various strategies as far as watershed management is concerned. So, two important strategies generally coming to watershed management include preventive strategies and restorative strategies.

So, these are the two important strategies when we look into watershed management practices. So, preventive strategies means preserve the existing sustainable land use strategies. So, you can see that in most of the watershed is concerned. As far as natural watershed is concerned, say there will not be much soil erosion, and then, the land use will be in a better way.

And then a sufficient vegetative cover would be there. So, in the preventive strategies, what we are trying to do is that none of these good aspects of the existing, what is

existing within the watershed? We are trying to preserve those aspects for the sustainable land use, and then, sustainability of the total resource is concerned.

So then second one is the restorative strategies. So, generally restorative strategies are designed to overcome identified problems. So, each watershed as we have seen earlier, watershed can have a various deterioration problems; so, its consequence also we have seen in the first lecture. So, based upon that for the particular watershed is concerned, there can be special type of or specific type of problems.

So, the, in the restorative strategies, we are making various plans to overcome identified problem. So, for each watershed is concerned, it can be either the soil pollution or water pollution or a non-availability of sufficient water or the lack of sufficient forest. So, like that for particular watershed is concerned, particular problems can be there.

So, in the restorative strategies, what we are trying to do is we will be concentrating on that specific problems, and then, we will be trying to overcome those problems. So, for example, we can restore conditions once problems occur. So, that is what we are trying in this.

So, the example can be we can go for water harvesting structures so that there will be some better availability of water. So, that can be restorative strategies, and then, when we construct a various structures, we can also reduce the soil erosion problems. If in the watershed, soil erosion is a major problem, then we can restore the soil erosion problem by constructing various structures.

So, in most of the watershed management plans, when we look in a holistic way, this we will be implementing some preventive strategies, and then, we will be implementing some restorative strategies. So, depending upon the area is concerned.

So, watershed management - there will be most of the time, there will be two strategies coming together. So, it will be a routine to go for preventive strategies, and then, generally depending upon the area and there will be some restorative strategies which will be aiming at for the watershed management.

So, generally, the key to watershed management is preventive strategies. The various preventive strategies, which you will be setting as far as the watershed management is concerned.

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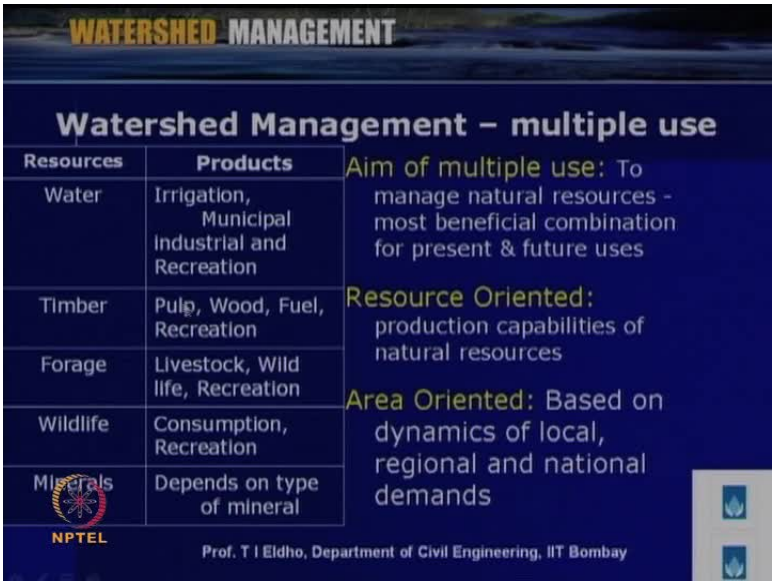

So, now, we have seen the various strategies. We are adopting for the watershed management. So, you can see that for the watershed is concerned, there are various resources which you will be managing within the perspective watershed management.

So, there would be for the given resources, multiple users will be there, and then, multiple stakeholders will be also come into picture. So, here, in this slide, you can see the watershed management within the perspective of multiple uses. So, aim of multiple use is to manage natural resources with the most beneficial combination for present and future uses.

So, the available resources for the present use and for the future use, we put for the most beneficial combination. So, then the watershed management can be resources oriented. So, there, we look for the production capabilities of various natural resources. So, it can be either land or water or other resources. Then, this, as far as multiple use is concerned, it can be also area oriented.

So, this depends upon the dynamics of local regional and national demands. So, what kind of demand is there? Say, for example, agricultural practices are concerned, whether

the region requires, whether rice or wheat or vegetable. So, accordingly, the farmers can plan the various agricultural practices accordingly.

So, now, here, in this slide, I have put a table where the various resources are listed, and then, its products within the perspective of multiple use are listed, say for example, what is concerned? We use water for irrigation, municipal, industrial and recreation purposes.

And then, timber or the forest is concerned, W\we look for pulp production, and then, uses for wood fuel, and then, recreation purposes; then forage is concerned, say we will be looking within the perspective of livestock, wildlife recreation; then wildlife is concerned, it is the consumption as far as a wildlife is concerned, then its recreation and other facilities.

Then minerals are concerned, say what type of mineral is available within the watershed; then an what kind of uses can be there depending upon, say for example, stone or sands, so, various uses we can put, and then, accordingly, we can go for the management measures as far as the watershed is concerned.

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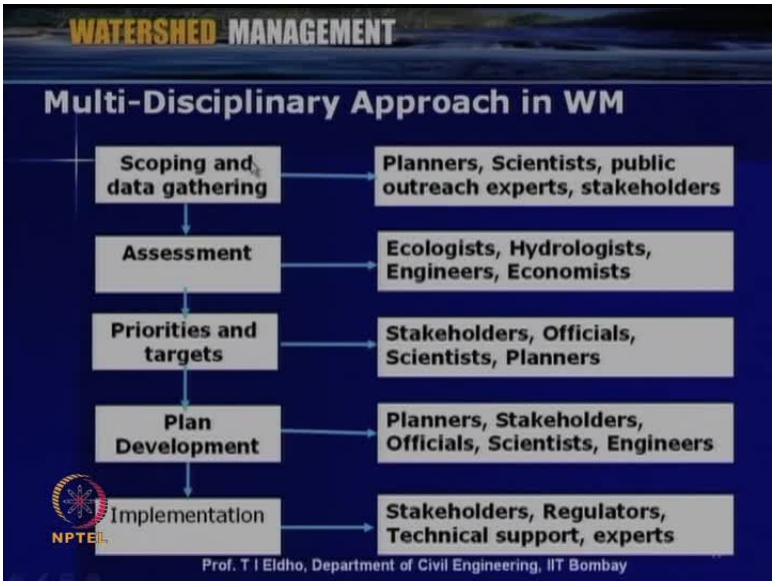

So, we have seen the watershed management is concerned. Various uses will be therefore each resources or depending upon the resource or depending upon the area. So, now, when we look into watershed management practices, actually it is a multi-disciplinary approach.

So, various discipline will be coming together so that we can have better watershed management plans. So, here, some of the important aspects, here I have listed – so, first one is starting from the scoping and data gathering. So, let us assume that we are going for watershed management plans for a particular watershed.

So, then first one is we have to identify what are the important problems as far as that watershed is concerned. So, then, accordingly, according to the strategies, whether we have to go for a restorative strategies or preventive strategies. So then, we have to define the scope as far as the watershed plans or watershed management plans are concerned.

So, the scope has to be defined, and then, accordingly, we have to gather the data. So, for this, we need the experts as far as planners, like planner's, scientists, then public outreach expert's stakeholders within the watershed.

So, all these people have to come to whether to have to define better scope and then data gathering is concerned. So then next stage as far as watershed management plan is concerned assessment. So, we have already put the scope, and then, we have gathered the data, so then we have to assess which way we have to go for the various plans.

So, whether we are going for various kinds of land management plans or water resource management plans, so, accordingly, we have to assess the system, and then, accordingly, we have to make plans. So, as far as assessment is concerned, so, ecologists can come to, hydrologist can come to and then with the help of engineers and economists.

So, we can define appropriate plans, and then, we can assess the various problems or various issues are concerned, and then, next stage is priorities and targets. So, you can see that for any area for as far as watershed management plan is concerned, the available money to spend or the resources to be utilized will be limited.

So, we have to prioritize. So, what are what is the first thing to be done whether it is to go from the drinking water supply or to construct wells or to construct check dams or go for recreational facilities, so, what kind of priority? So, that depends upon the area, then depends upon the needs of the people.

So, here, we have to prioritize, and then put the targets, so the first targets, second target, etcetera. So, here, the first and foremost people will be they are the stakeholders of the watershed, and then, comes the officials, scientists, planners and engineers.

So then, finally, by considering all these things, we can develop watershed management plans. So, here, we develop various plans for the watershed management. So, there, we can utilize the skills of planners; then of course stakeholders; then the officials concerns; then scientist, engineers.

So, all these people will come together, and then, finally, say we can select the particular plan, and then, we can go for implementation. So, implementation is very important aspects. So, there, we need the resources, we need the money, and then, the implementation is concerned, the, of course, people participation is one of the important aspect; so, that we have already discussed in the first lecture itself.

So, there the stakeholders will be coming to picture; then the regulators. So, the, while implementing, we have to see that it is implemented properly. So, regulators will be coming to picture; then technical support from various agencies; then experts all will come together. So, like this, when we go for watershed management plans, it is a multi-disciplinary approach.

So, various experts have to come together, and then, make appropriate plans as far as the watershed management is concerned. So, now, we have seen that stakeholders are very important or the people participation is very important in the success of any of the watershed management.

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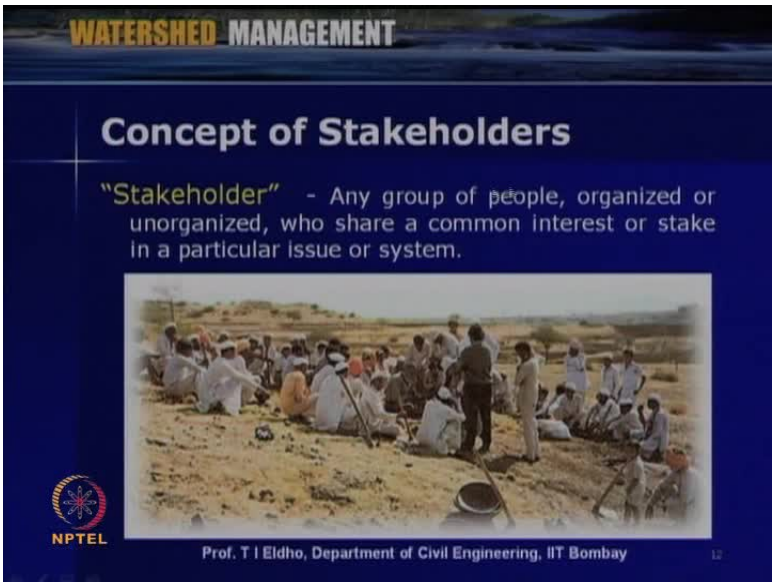

So, now, in the next slide, we will discuss about the stakeholders, what is the concept of stakeholder, and then, what is so called stakeholders analysis. So, stakeholders - we can define as any group of people organized or unorganized, who share common interest or stake in a particular issue or system.

So, within the perspective of watershed management, we can see that the stakeholders mainly will be the, mainly the people staying in that watershed area, and then, the various government agencies working that area. So, these are the stakeholders as far as a particular watershed is concerned.

So, the, this can be, this stakeholders can be a group of people; so, it can be either organized or unorganized. Then, so the common interest is here as far as the overall development of the watershed or better management plan. So, that is the common interest, and then, so for the particular management plans are concerned, people are coming together or the stakeholders are coming together so that we can have better watershed management plans.

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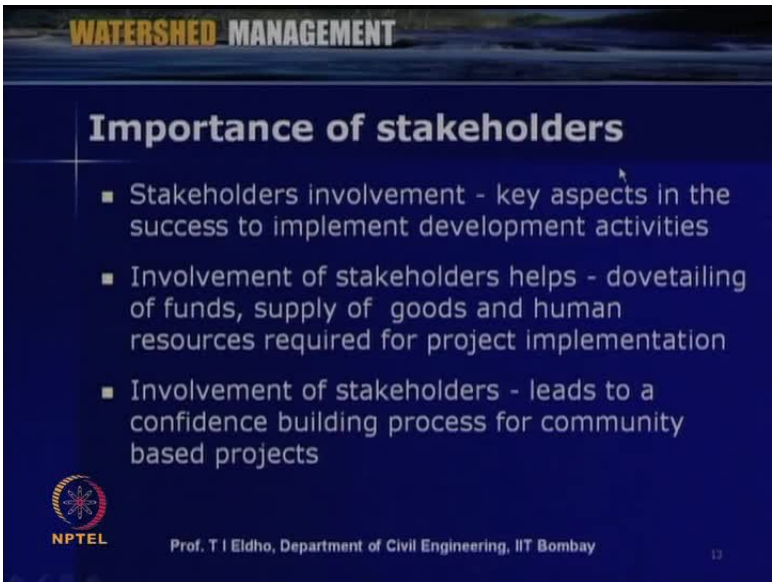

So, this is the concept of stakeholders. So now, as far as watershed management is concerned, here we will discuss the importance of stakeholders. So, as we have already seen people participations or the stakeholder's participation is very important.

So, stakeholder's involvement is the key aspects in the success to implement, development activities. So, as far as watershed management is concerned, we are looking to the development of the area in a holistic way. So, to implement the development activities, stakeholder's involvement is a very important; otherwise, we cannot achieve, success as far as the watershed management is concerned.

Then, second one is involvement of stakeholders helps - dovetailing of funds, supply of goods and human resources required for project implementation.

So, as far as implementation is concerned, so, how to get the funds, and then, how to utilize the funds in an effective way, and then, human resources are required for the implementation of the project.

So, all these stakeholders involvement is a very important, and then, third one is involvement of stakeholder's leads to a confidence building process for community based projects. So, you can see that as far as watershed management is concerned, it is definitely a community based project.

So, the community has to involve, get involved in the project. So, as stakeholders, we have to develop their confidence; that means this project, particular project as far as watershed management plans are concerned, this particular project is implemented for the betterment of the area; betterment of the society; betterment of the people. So, that way the confidence level should be increased so that people will be participating in the in the project; so that we can succeed in the implementation and maintenance of the of the particular watershed management plans are concerned.

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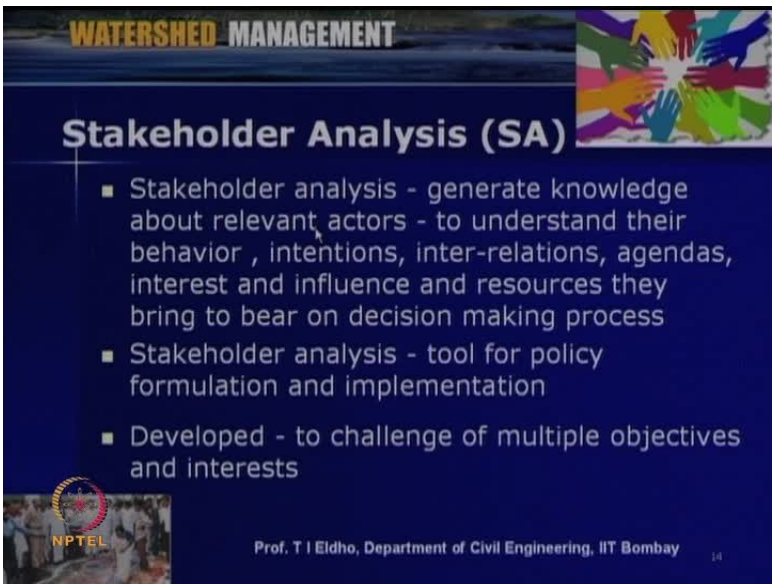

So, now, various scientific tools are available as far as to for these stakeholder analyses. So, before going for the preparation of watershed management plans and implementation, it is better to go for a stakeholder analysis so that there are specific methodologies available in literature.

As far as stakeholder analysis is concerned, some important aspects are listed here, but we will not go into all the discussion on the stakeholder analysis will be very limited to the people participation, and there coming together as far as the watershed management is concerned. Only, that way only, we will be discussing here - the stakeholder analysis.

So, stakeholder analysis is generally is to generate knowledge about relevant actors to understand their behavior, intentions, inter-relations, agendas, interest and influence and a resources they bring to bear on decision making process.

So, this is the main motto of the stakeholder analysis. So, stakeholder analysis a generate knowledge, then the various intentions of depending upon the scope; the resources should be mobilized, and then to be done it properly.

So, the main motto of the stakeholder analysis to generate knowledge about the relevant actors and to bear, to have a better decision making process. So then, stakeholder analysis can be also used as a tool for policy formulation and implementation.

So, depending upon the various norms as far as watershed management is concerned, we can go for the policy formulation, and then, how we can implement it, and then, say stakeholder analysis developed to deal with the challenges of multiple objectives and interest.

So, we have already seen that as far as watershed management is concerned, there can be multiple objectives. So, to meet all those objectives, all the interest, so, we have to analyze the roles, and then, the activities of various stakeholders.

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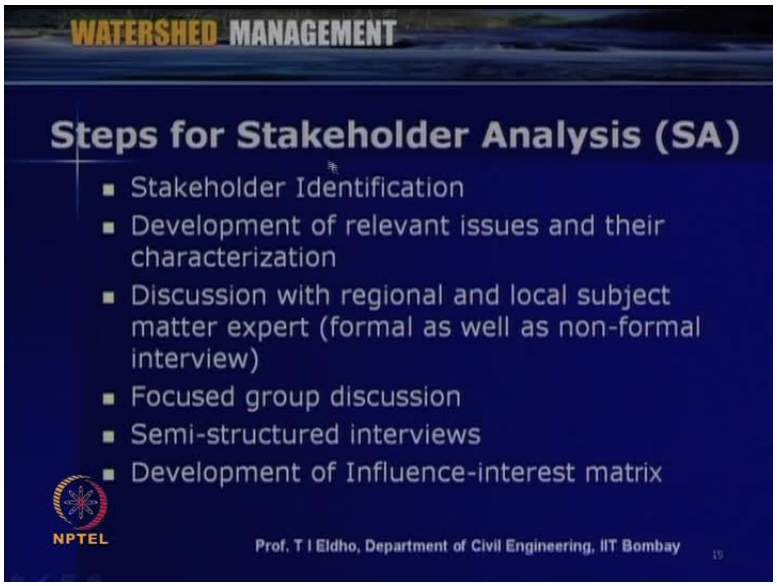

So, a stakeholder analysis is very essential in preparation of a better watershed management practices. So, now, let us see here in this slide - what are the important steps as far as stakeholder analysis concerned. So, these important steps are listed here.

So, first is - we have to identify the stakeholders within the watershed; so, that means stakeholder identification; then development of relevant issues and their characterization.

So, this depends upon the area; depends upon the watershed, and then, the objectives as far as the watershed management is concerned, then discussion with the regional and local subject matter experts. So, it can be formal discussion or a non-formal interview; so, through this, we can achieve; we can have better plans; we can develop a matrix as far as the various issues are concerned.

Then, the next step can be focused group discussion. So, the various issues like a land management or water management or the other resource management, we can get the experts or we get the stakeholders, and then, we can have a group discussion, and then, from that group discussion, depending upon need, we can formulates the various steps as far as watershed management is concerned.

Then, next can be semi structured interviews. So, the stakeholders, then come up with a the various solutions as far as various problems are concerned, and finally, we can develop an influence-interest matrix. So, depending upon the various stakeholders needs, then various objectives set, we can develop and influence-interest matrix. So, that can give an idea for the total development plans as far as the watershed is concerned. So, now, with this background as far as stakeholder's analysis, and then, the steps for stakeholders is concerned.

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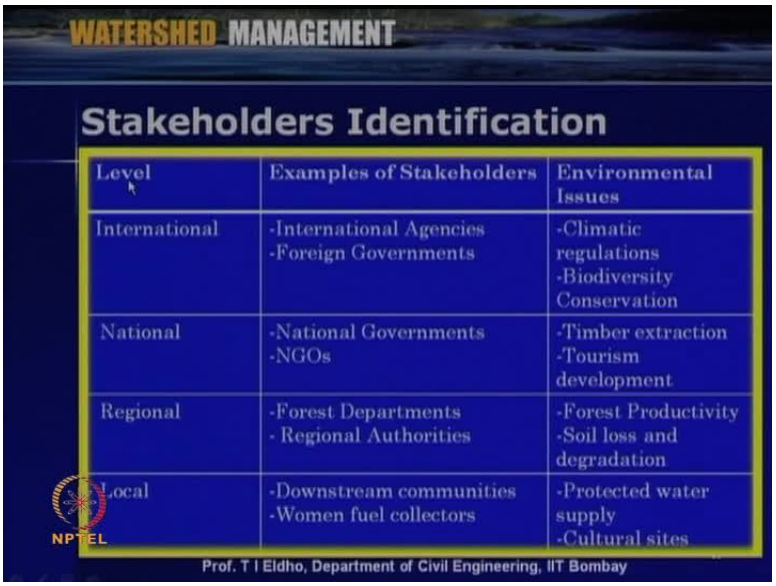

So, let us look into identification of various stakeholders. So, in this slides, you can see here the various levels of stakeholders are listed; then examples of stakeholders are listed; then the various issues are also listed.

So, on international level, so you can see that as far as various within a perspective watershed management or river basin scale management. So, various agencies are the stakeholder's - international agencies - like world bank funds or IMO funds for the various watershed management activities.

So, international agencies will be coming under the many times foreign governments may give support to various agencies through NGO's or through direct government. So, the international level, the foreign governments can be a stakeholder. Then, the issues generally they will be looking into is may be climatic regulations, for the particular region is concerned.

Then biodiversity conservation, then afforestation, etcetera. So, depending upon the area, depending upon the needs, so, you know, the level can be international and then the stakeholders can be international agencies or foreign governments.

So then, national level is concerned, of course national governments and then of course state governments as far as the various states are concerned, and then, various NGO groups can be there. So, this people can be the stakeholders. So, like, the various issues

which may come as far as watershed management is concerned, and like forest developments or timber extracts, then tourists and developments or recreational facilities or the hydropower production or the agricultural management, so, like that the national level stakeholder identification, and then, issues can be there, the level can be regional. So, it can be either particular region is concerned; a groups of districts or particular district is concerned.

The examples of stakeholders can be forest departments, regional authorities, district authorities, etcetera. So, here, say for example, the issues can be the forest productivity, soil loss and degradation. So, this this can be some of the issues.

Then local stakeholders are concerned, so the, that is, particular watershed is concerned; so, the various communities involved; then various people involved within that particular area; so then, even groups are concerned or the various user groups are concerned.

So, that way, say for example, the issues can be protection of the available water resources, and then, the, say rotation of grazing as far as cattle management is concerned, and then, forest utilization, and then, cultural sites, etcetera.

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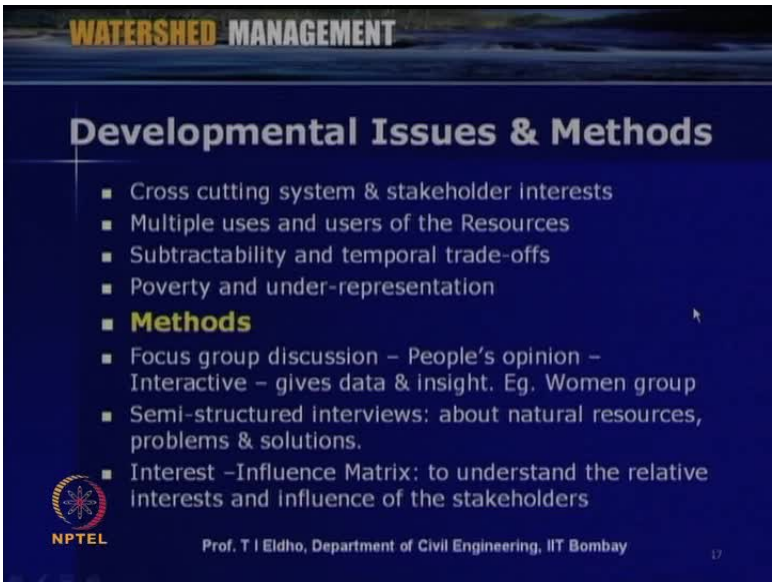

So, these are the some of the ways where we identify the stakeholders, and then, the concerned levels, and then, various issues as far as the stakeholders are concerned.

So, now, so, we have seen the stakeholder's issues, and then, we have seen the various levels of stakeholders. Then, we have to identify the various issues as far as the watershed is concerned. So, we can have developmental issues and then methods.

So, some of the developmental issues and methods are listed here. So, as far as the watershed development plans are concerned, we can look into cross cutting system and stakeholder interest; then multiple uses and uses of the various resources as far as the management is concerned.

Then subtract ability and temporal trade-offs, so, between the resources or between the areas, say how that trade-offs taking place, and then, poverty elevation, and then, to improve the under-represented people. So, these can be some of the important developmental issues as far as the stakeholder analysis concerned.

Then, as far as stakeholder analysis is concerned, various methodologies are there. So, some of the important methodologies are listed here - we can focus on various groups, like focus group discussion, like people's opinion can be sought; then we can interact with various groups and to gives that may give data and insight; so like the women group or the water user group or the farmers group.

So, like that, we can discuss the various issues with the groups. So, that methodology through the stakeholder analysis can be achieved. Then second can be semi-structured interviews. So, this can be about natural resources, and then, various problems and solutions which you will be looking for that particular problems.

So, we can go to the particular stakeholders and then interview them and then get the ideas and then collate those ideas, and then, we can get the solutions for the various problems are concerned. Then, there can be depending upon the interest for various stakeholders, we can develop an influence matrix.

So, as we have seen various stakeholders are there, they have various interests. So, whenever the common interest is coming, there the stakeholders influence on various issues can be listed so that we can understand the relative interest, and then, we can have influence matrix so that influence of the stakeholders can be understood through this processes.

So, these are some of the important methodologies which we adopt as far as the stakeholder analysis concerned. So, various agencies like United States environment protection agency and other agencies have developed various approaches as far as the stakeholder analysis concerned.

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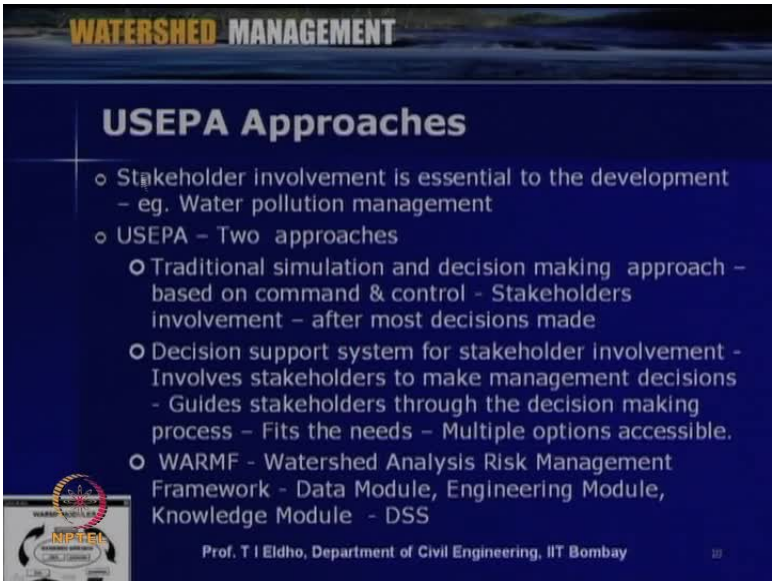

It can be for watershed management; it can be for to sort out the water pollution problems or ground water pollution remediation, etcetera. So, the USEPA approaches some of the approaches are listed here.

So, the stakeholder as for USEPA the stakeholder involvement is a very essential to the developments of the watershed or the pollution abatements, etcetera. So, generally, as for united state environmental protection agency is concerned, they will use two types of approaches - First one is traditional simulation and decision making approach. So, here, the, this approach is based command and control. So, the stakeholder's involvement is not from the beginning. So, most of the decisions are made by the concerned agencies, and then, put those decisions to the people.

And then further get their opinion on that and then come up with or finalize the plans. So, this is the first method, and a second method is so called decision support system for a stakeholder involvement. So, here, actually this starts from the beginning, so, the stakeholders are involved from the beginning.

So, this involves the stakeholders to make management decisions and guides stakeholders through the decision making process. So, various needs of the stakeholders will be analyzed, and then, accordingly the plans will be made. So, definitely there will be good as far as the stakeholders are concerned.

So, multiple options will be accessible. Say for example, USEPA has developed a system called WARMF, so, that means watershed analysis risk management framework. So, to deal with a watershed problem or watershed management problems or water pollution problems as per USEPA, they are developed this system.

So, this system include various modules like a data module, then an engineering module, then a knowledge module, and this modules interacts together. So that, finally, there will be a decision support system or so called DSS.

So, within the framework of this DSS, the stakeholders interact, and then, finally a system will be developed in this second approach. So, these kinds of the decision support system will be very useful as far as the stakeholder's analysis, and a stakeholder's involvement as far as the particular system is concerned.

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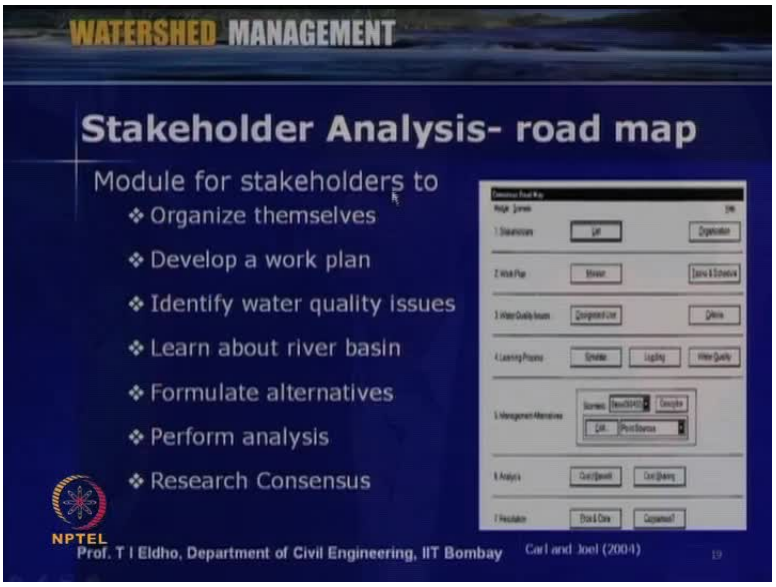

So, now, say for the stakeholder's analysis, a road map is listed here. So, just to, as we discuss that like what USEPA used. So, the various steps include first organize as far as the needs and as far as the what we are looking for in the particular analysis.

Then develop a work plan; then next step is identified. If it is water quality issues, then identify the water quality issues; then learn about river basins. So, particular river basins concerned, study about that river basin; then formulate the various alternatives; then we do analysis called performance analysis.

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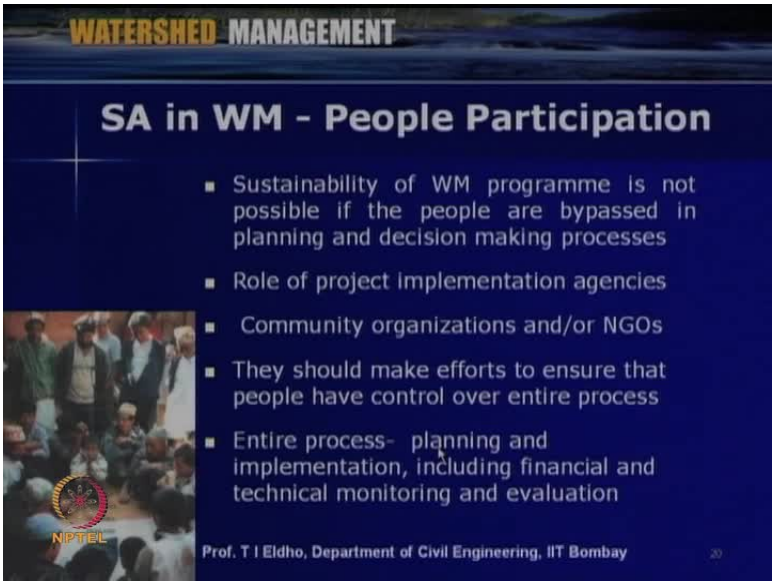

And finally, we can, the stakeholders can come with the various consensus. So, here, a particular in a graphical user interface is developed by this USEPA is shown here. So, various issues can be listed like this, and then, finally we can involve all the stakeholders, and then, stakeholder's opinion can be sought.

So, now, we have seen this stakeholder analysis in watershed management plans, and then, you can see that stakeholder's involvement is very important in watershed management plan.

So, that way as I mentioned earlier also people participation if it is there from the beginning in the development plans, and then, implementation phase, then people involvement will be very much there, and then, the system will be maintained properly and a sustainable system can be developed.

So, within the perspective of people participation management is concerned, the sustainability of watershed management programme is not possible. If the people are

bypassed in planning and decision making processes, then there is definitely there is a role project implementation agencies.

But these agencies should interact with the concerned people, and then, the particular plan should be made, and then, a community organizations and NGO's also can play a major role. So, these agencies should make efforts to ensure that people have control over the entire process.

So, that is, if you analyze the any successful watershed management projects, then we can see that when these projects have done like that, then the project here have succeeded in all the sense.

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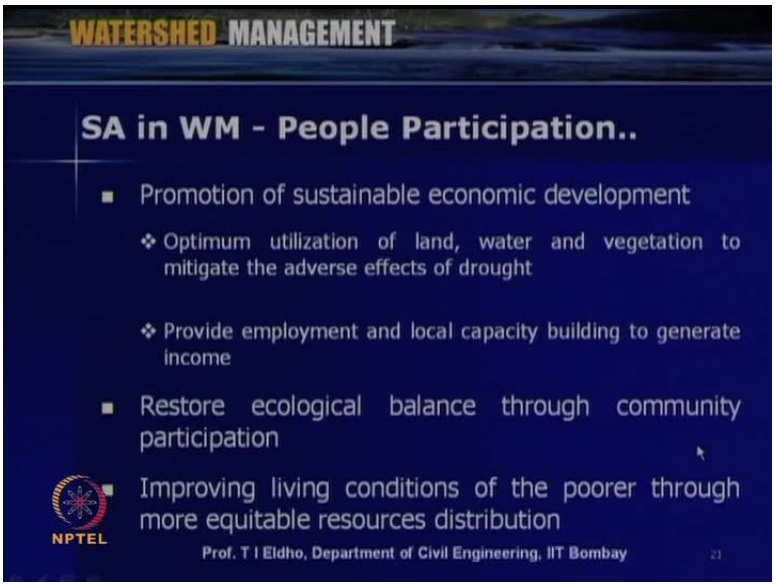

So, the entire process starting from planning, implementation, including financial and technical monitoring and evaluation, people participation is very important. So, the people participation is concerned, we will be looking as far as the promotion of sustainable economic development for the particular area is concerned.

Then optimum utilization of land, water and vegetation to mitigate the adverse effects of droughts and floods for the particular watershed is concerned. Then provide employment and local capacity building to generate income so that total upliftments take place; then a restore ecological balance through community participation. So, one of the important aspect in watershed management is ecological sustainable development.

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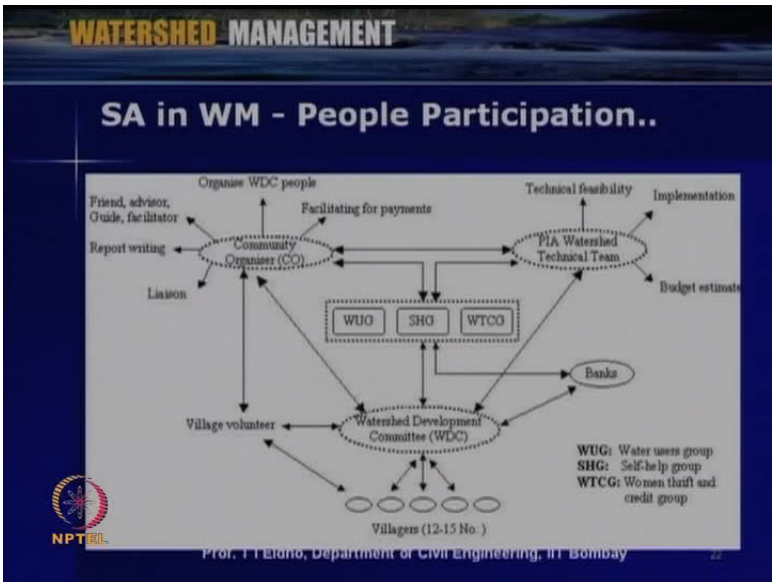

So, we can achieve ecological balance through people participation. Then, improving living conditions of the poorer through more equitable resource distribution. So, these are some of the important aspects as far as the people participation in any watershed management plans are concerned.

So, within this perspective, so, here, say for example, say a block diagram is put here how the various stakeholders can come together, and then, how the people participation is possible within the watershed management perspective is concerned.

So, the watershed development committees can be formed and where various villages for the particular watershed will be interacting, and then, there can be various groups like a water users group, self-help group, then women thrift and credit group, so like that, and then, of course, in these the project implementation authorities will be overall coordinators, and then, the NGO's or poor controlling the particular watershed management plans are will be coordinating this aspects, this various thing, various issues or various as a system is concerned.

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Then, there can be community organizers, and then, various teams. So, all those people be coming together as far as the watershed management plans are concerned. So, various stakeholders come together, and then, we can go for a successful watershed management plan as far as watershed management plans are concerned.

So, in this, as we already discussed the people can participate at various levels as listed here. It can be for the natural resource mapping to collect the various data, and then, social mapping, so, like on the population of the area, the socio-economical aspects. Then a village volunteers can be there to implement the project, and then, we can meet different people and a participatory appraisal can be done. We can prioritize the options and then go for the implementations.

So, now, whatever we have seen is the stakeholder analysis and then people participations. So, finally before closing this lecture we will have a brief discussion on a successful case, where the people participation stakeholder analysis has been effectively utilized.

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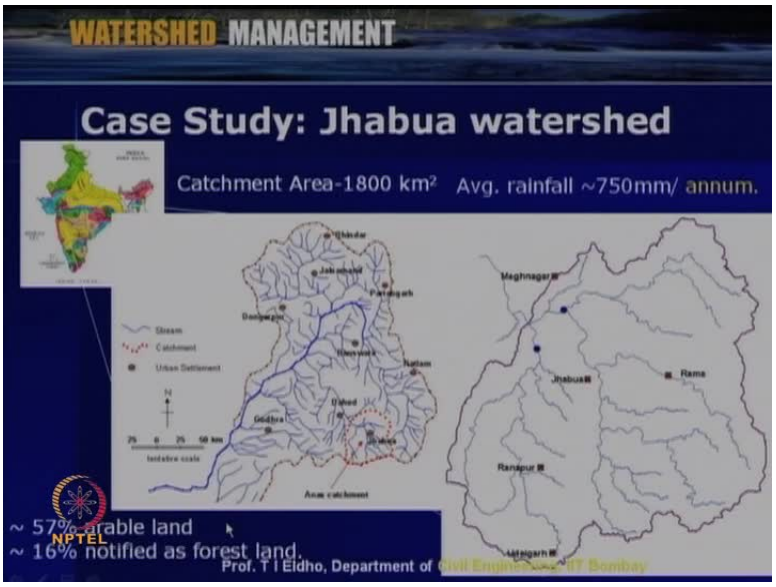

So, the case study is on Jhabua watershed. So, this Jhabua watershed is in Madhya Pradesh; so, this is the area. So, the total area is about 1800 square kilometer; average rainfall in the area 750 millimeter per annum, and this area is concerned before the watershed management practices are implemented in 1990's and beginning of 2000 about 57 percent area was arable land and 60 percent notified as forest land.

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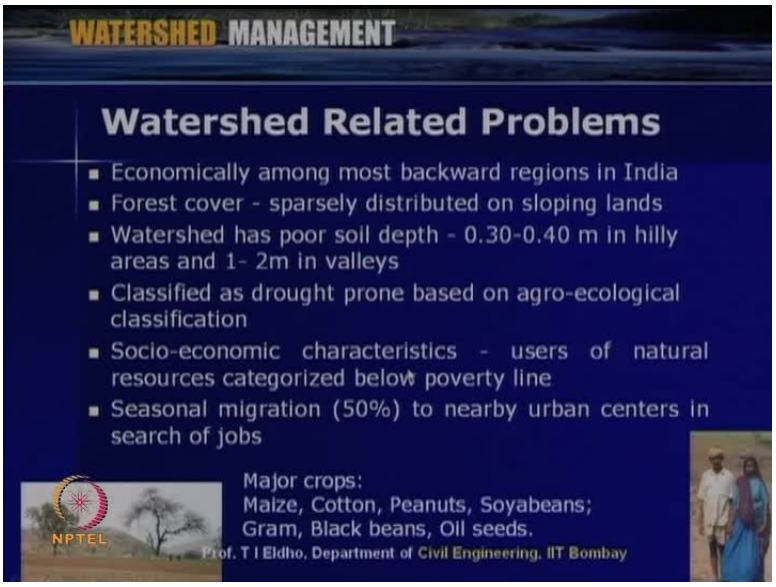

So, some of the important problems found for this area is economically among most backward region is in India; forest cover was a very sparse; then watershed has poor soil

depth; classified as drought prone area, and a socio-economic is concerned, most of the people were below poverty line.

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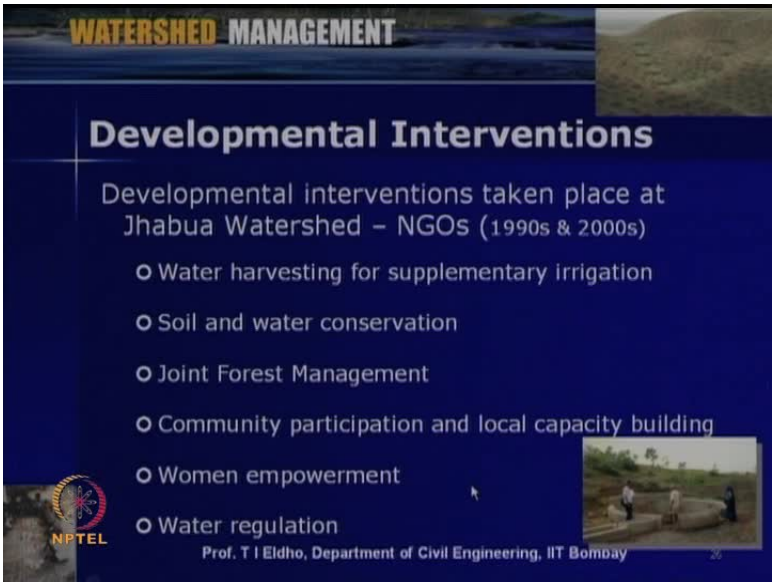

And then, the area is concerned, there is used to be seasonal migration to nearby urban centers in search of jobs. So, these were some of the watershed related issues, and then, some of the NGO's with the help of state government and central government came together to implement the watershed management plans in 1990's and 2000.

So, the development interventions where water harvesting for supplementary irrigation in the region in the watershed; Soil and water conservation activities; joint forest managements; then community participation and local capacity building; women empowerment, and water regulations.

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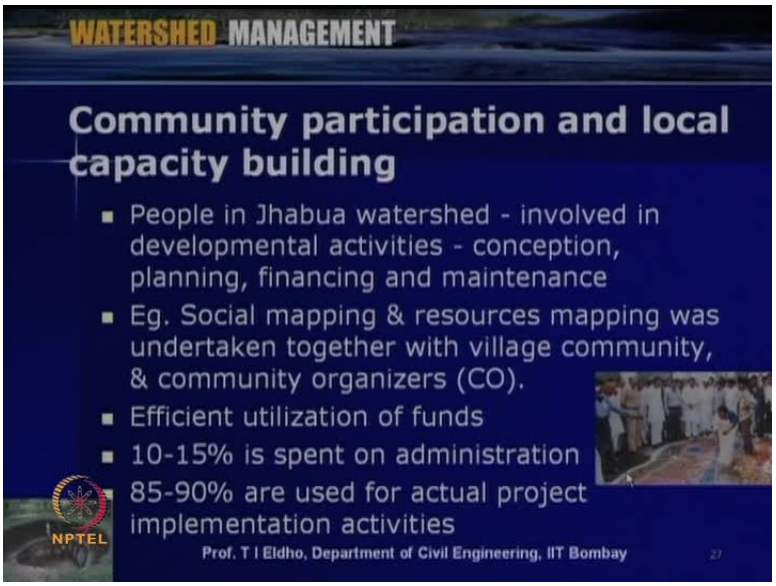

So, these were some of the development interventions put in this watershed. Then community participation and local capacity building was very much there in this particular watershed. So, people in Jhabua watershed involved in various developmental activities starting from conception, planning, financing and maintenance.

And then, they were very active in social mapping, resource mapping. Then community organizers were available for the all the activities. Then efficient utilization of the funds available that was one of the important aspect of this project, about 10 to 15 percent is spent on only on administration, but 85 to 90 percent were used for the actual implementation of the project.

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So, as far as the implementation and then its effect is concerned, water regulation and forest management various groups were formed. So, self-regulation for community based watershed monitoring system. Then local people - developed a system for water management; then accounting uncertainties of rainfall and retaining the run-off from the watershed; sharing of water - so, that was according to the family size, location of fields close to source.

Then water use priorities had been given, like first is domestic use or life supporting system, then for agricultural and other purposes. So, the, as far as forest and grass land is concerned, they develop a social fencing system.

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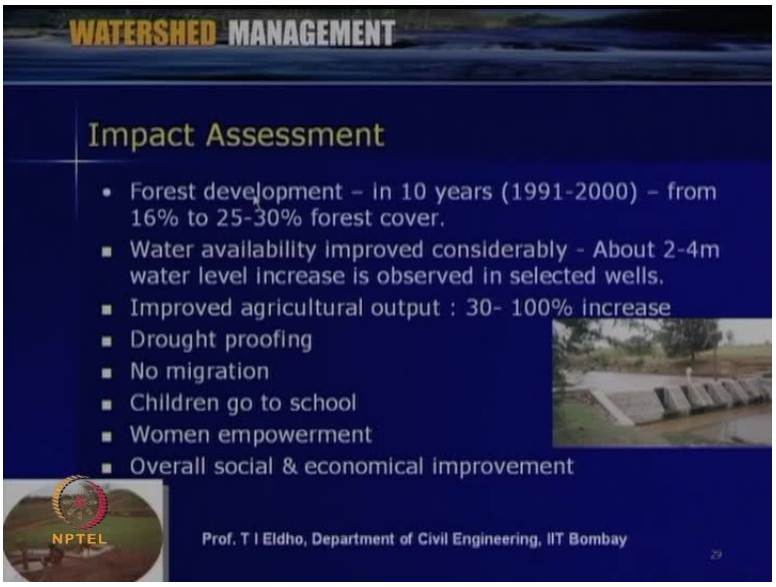

So that overall say people participation was there in overall planning management. So, when this project was assessed in a 2005, so what we observe is that a about 25 to 30 percent the forest cover is improved to 25 to 30 percent. Then water availability improved considerably about 2 to 4 meter water level increase was there in selected wells.

Then improved agricultural output about 30 to 100 percent for various crops output increase was observed. Then even a severe drought here, drought was not affected in this area. So, finally, there was no migration and the children go to school in this particular watershed and women were very actively involved in all the projects implementation and maintenance.

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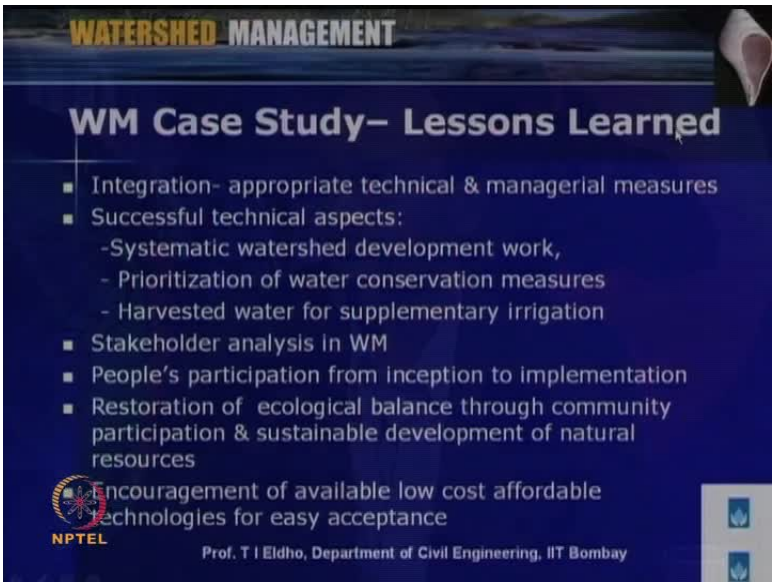

So, finally, overall social and economic improvement has been achieved in this particular watershed. So, some of the important lessons learned in this case study is listed here – so, this is the integration of appropriate technical and management measures. Then a successful technical aspect as far as prioritization is concerned or implementation is concerned.

And then appropriate stakeholder analysis for the particular watershed and people participations was very important in this particular case study, and then, restoration of ecological balance through community, and then, encouragement of available low cost affordable technologies for easy acceptance.

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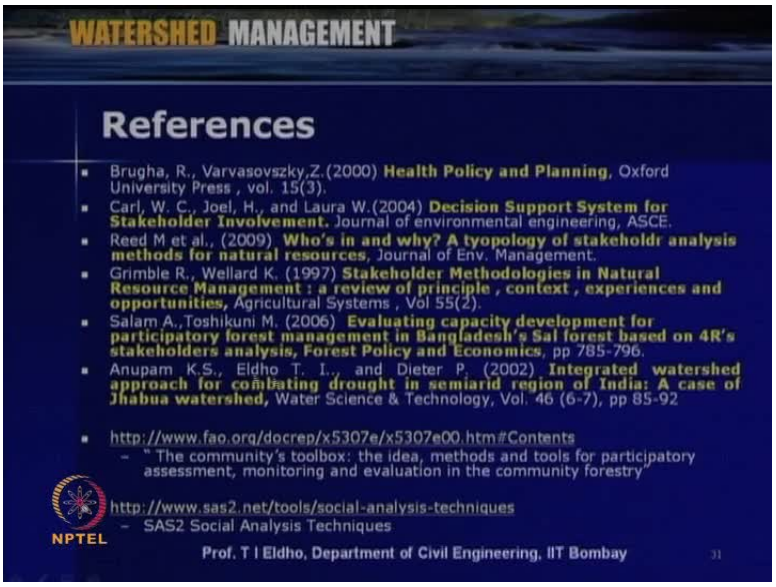

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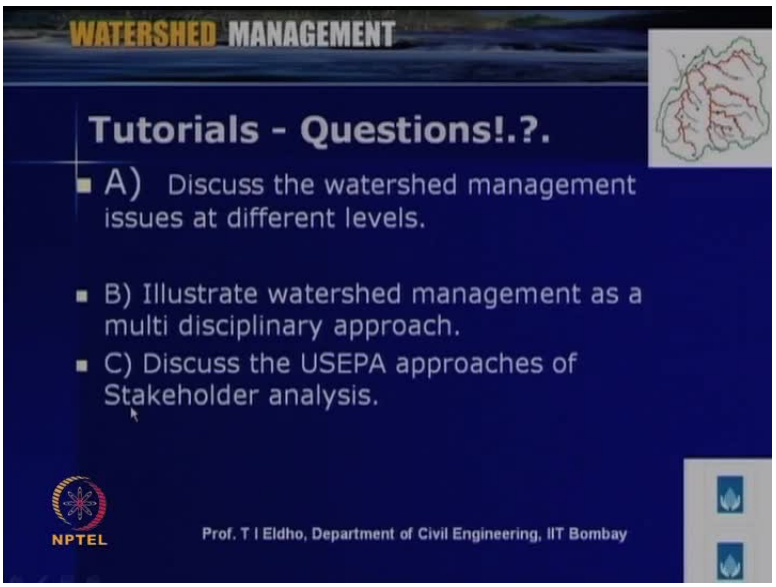

So, these are some of the important lessons learned from the watershed, the successful case study of Jhabua watershed. So, for this lecture, some of the important references used are listed here. So, finally before closing, this lecture some of the tutorial questions.

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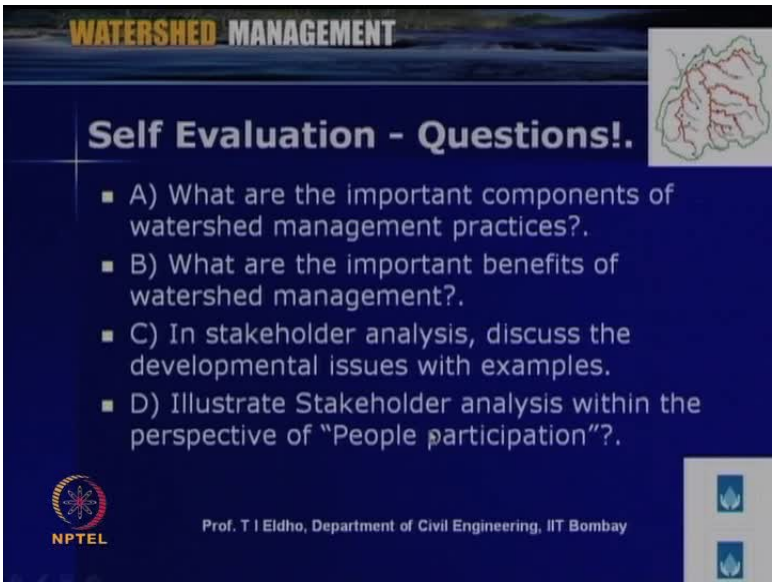

So, based upon the topics discussed, first one is discuss the watershed management issues at different levels, already we have discussed in detail; then illustrate watershed management as a multi-disciplinary approach; then third one is discuss the USEPA approaches of stakeholder analysis. So, this already we have discussed.

And then, some self-evaluation questions are also put here – so, first one is what are the important components of watershed management practices; What are, second question is what are the important benefits of watershed management; then in stakeholder analysis, discuss the developmental issues with examples.

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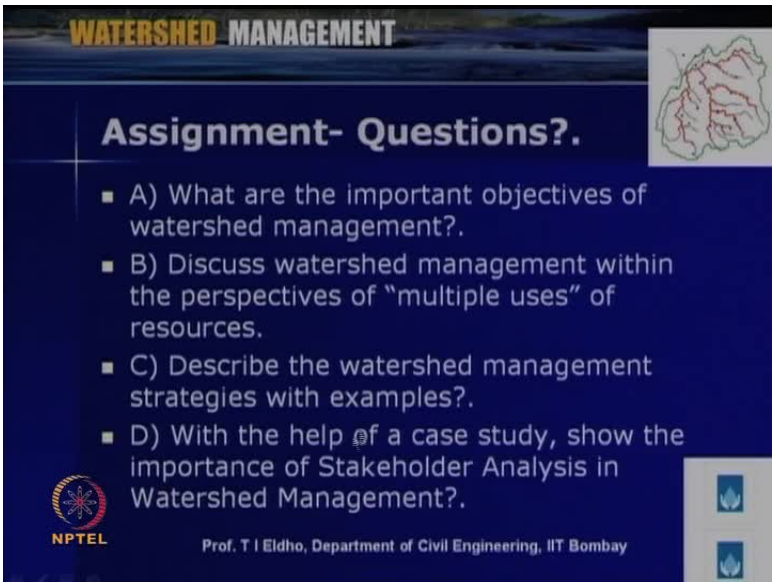

Then fourth question is illustrate stakeholder analysis within the perspective of people participation. So, all these things are discussed in this lecture. Finally, some assignment questions - what are the important objectives of watershed managements; then discuss watershed management within the perspective of multiple uses of resources.

And third one is describe the watershed management strategies with examples. Fourth question - with the help of a case study show the importance of stakeholder analysis in watershed management.

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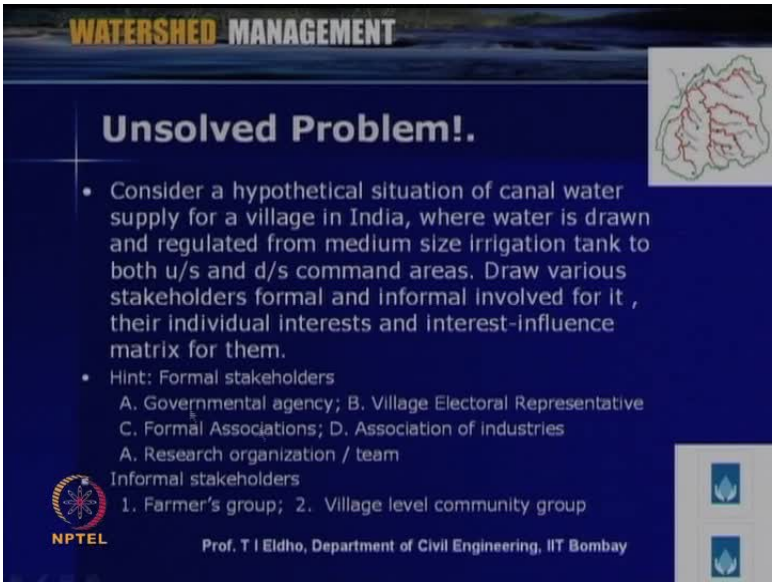

Finally one unsolved problem is also put. The question is - consider a hypothetical situation of canal water supply to for a village in India, where water is drawn and regulated from medium sized irrigation tank to both upstream and downstream command areas.

Draw various stakeholders formal and informal involved for it, their individual interest and interest influence matrix for them. So, it can be a complete analysis as stakeholder analysis and their importance.

So, like formal stakeholders, like government agencies, then various associations, then informal stakeholders can be farmers, community group, etcetera. So, with this, this second lecture on this watershed management is over. So, the various issues discussed will be further elaborated in the other lectures. Thank you very much.