Watershed Management

Prof. T. I. Eldho

Department of Civil Engineering

Indian Institute of Technology, Bombay

Module No. # 05

Lecture No. # 20

Socio-Economy, Private Sector Participation and Gender Issues

[FL] and welcome back to the video course on Watershed Management in module number 5, on the topic of socio economic aspects of watershed management.

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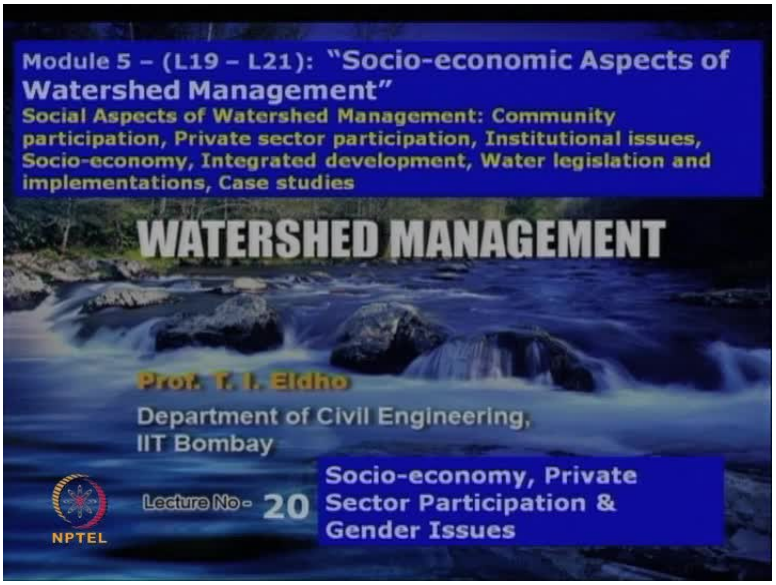

Today, in lecture number 20, we will discuss about Socio-economy, Private Sector Participation and Gender Issues.

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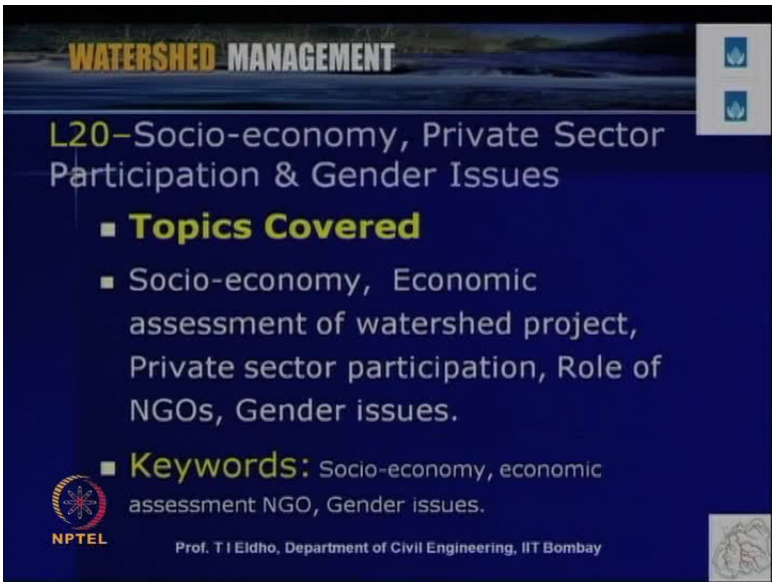

Some of the important topics covered today include the socio-economy aspects of watershed managements, economical assessment of watershed projects, private sector participation, role of NGO's and gender issues. Some of the key words for today's lecture: socio-economy, economic assessment, NGO, gender issues.

As we discussed earlier, when we deal with watershed management plans, we have to see the social aspects and the economical aspects. So, both we have to consider in an integrated way, as we discussed in the last lecture. As far as the watershed management plans are concerned, it is not just the physical environment, which we are dealing. It means the area, which we are dealing or the various resources, which we are dealing, but we have to deal with a human environment or we have to deal with the people living within the watershed.

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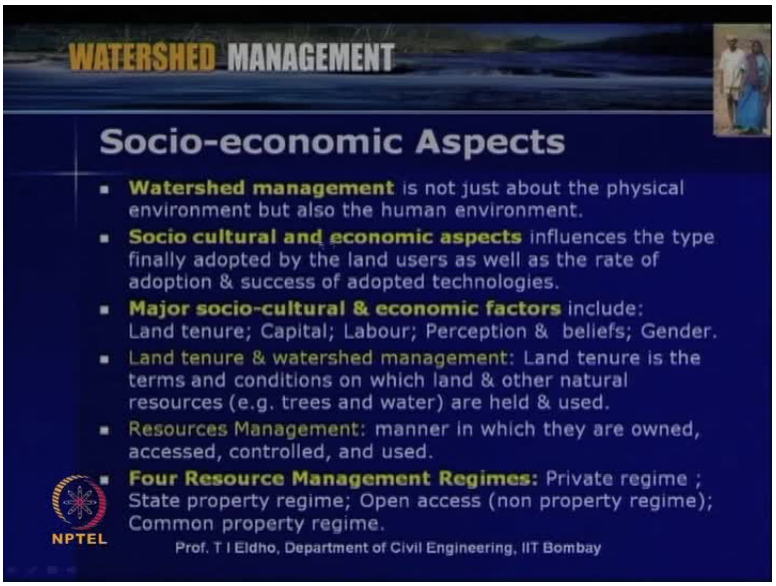

We have to see their social equipment or social related issues, then the economical issues, cultural issues and all those things have to be considered, when we deal with the watershed management plans. So, the socio cultural and economic aspects - it influences the type finally adopted by the land users as well as the rate of adoption and success of adopted technologies. So, for example, when we are preparing a watershed management plan and that area will have number of private land owners within that watershed. So, whatever plans we make, the individuals or the individual land owners should adopt the plans and they have to implement it.

This adoption will take place, if it is properly designed, if it is economically viable, if it is socially needed and if it is culturally also the background is there, So that way we have to see the rate of adoption and success. It depends upon the adopted technologies that we use for the watershed management plans. So, major socio cultural and economic factors include the land tenure, capital, labour, perception and beliefs, gender. Here, we can see that as far as watershed management is concerned, whether land belongs to a private owner or the public or the government or with what type of land is, for example, leased for so many years or what kind of tenure is there; land tenure is very important. So, the land tenure is the terms and conditions, on which land and other natural resources example – trees, water, mineral sources etc are held and used. Sometimes, the land or the various resources within the land will be leased. Accordingly, we have to see the land tenure and next is capital. So, we need a good amount of money to start any watershed

management plans. So, how much money is available? What kind of activities can be done? Accordingly, we have to see.

Next one is labour. So, labour is one of the important part of any watershed management plans, since we have to construct various structures or various water harvesting plans. So, how we can get the labour, whether locally the people will help or the stake holders themselves will help? Next are perceptional beliefs. When we are dealing with the watershed management plans, for example, if you are going to intensively change the land use pattern, then we may have to deal with many things. We may have to change the location of some religious structures and people have their own belief in many aspects. So, all those things we have to consider.

Gender issue - most of the time, the water is a main subjects for the women. So, there we have to get their feedback, their opinions as far as the watershed management plans are concerned. When we deal with the various resource management, we have to deal in such a manner, in which they are owned, accessed, controlled and used. So, whatever we are doing within the watershed, it should be planned in such a way that there should be an ownership feeling for the stake holders or the people within the watershed.

There should be easy accessibility and local people have to control and maintain it. Generally, when we deal with the various issues, we have four resource management regimes - As far as the land tenure or related land issues are concerned, we have the first one - private regime, second is state property regime, third is open access that means non- property regime and fourth is common property regime. Here, you can see that when we deal with particular watershed or particular area, some of the land will belong to the private people or the private landowners. Some part belongs to the government, which we can call it as public land and then some part, where all the people have access like a forest area.

Like that we can classify and accordingly, when we prepare the particular watershed management plan, we have to consider the socio-economical aspects of each regime and then we have to make appropriate plans. So that way we can see that whenever we deal with watershed management plans, most of the watershed management plans are very much capital intensive. We have to see that how much money is available and what are the sources of money available. How much money can be obtained from government

sources or if any external funding, then how the how much money can be spend by the concerned stakeholders. So, we have to deal with all those issues, when we discuss about the socio-economical aspects of watershed management.

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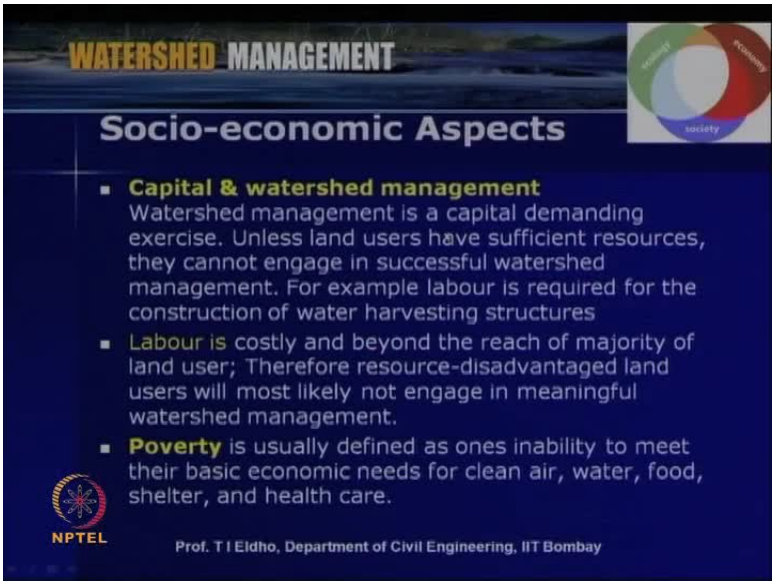

Unless land users have sufficient resources, they cannot engage in successful watershed management. If the total fund is not coming from government or other agencies and if the individual landowners do not have sufficient funds, then they will not engage in watershed management plans. For example, labour is required for the construction of water harvesting structures. If you have to construct a check dam or if you have to construct a nala bunding or all that kind of structure, we need a labour; we need material. For all those things, we need to get funding from either government sources or other funding agencies or from the landowners itself.

As we discussed, labour is very costly and it is most of time beyond the reach of majority of the land user. Therefore, resource disadvantaged land users will most likely not engage in meaningful watershed management. We have to see the labour issues and as we have discussed in the last lecture, most of the watershed management plans have to couple with the poverty alleviation. So, poverty is usually defined as one's inability to meet their basic economic needs for clean air, water, food, shelter and health care. So that way when we link the watershed management plans with the poverty alleviation, various schemes have to planned with social perspectives, but integrating with the

economical perspectives and then the ecology or environmental perspective. That kind of watershed managements plans will be acceptable to the public or acceptable to the community and then they will implement it or they will cooperate in the implementation, usage and maintenance. In that way, we have to see the various socio-economical aspects as far as the watershed management plans are concerned.

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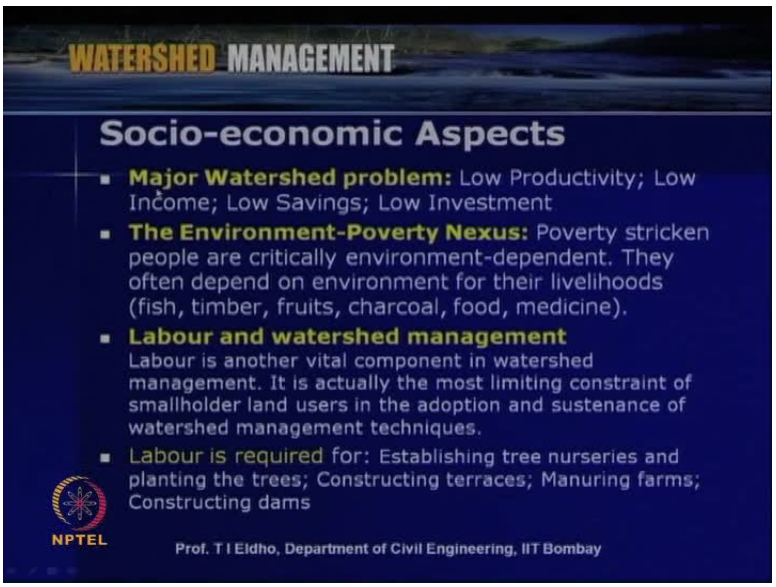

When we discuss about the major socio-economical aspects major as far as especially in third well countries, the major watershed problems, which we can prescribe here, are four: first one is low productivity. For, agricultural productivity is concerned and it will be very low, since water will not be available for irrigation and people, who do not have money for buying fertilizers and other thing, so that way the agriculture productivity or animal husbandry productivity will be much less.

When the low productivity is there, the income will be affordable to the people and low income will be there. The after effect will be low savings and then if we ask the stakeholders to invest, for example, further development plans or further construction work will not be money for investments, so that way it is low investment. When we look into all these aspects, where is the environment and poverty nexus? It means all those things come together, so poverty-stricken people are critically environment dependent. The people, who do not have sufficient money for various activities, so they depend the environment for various things like their livelihood and all other activities. so like People

will be looking for fish, timber, fruits, charcoal, food, medicine etc. So, the poverty stricken people will be looking to environment like forest or river or various resources available within the watershed. Then next aspect is labour and watershed management. Labour is another vital component in watershed managements, so it is actually the most limiting constraint of small land users in the adoption and sustenance of watershed management techniques.

To construct various structures like water harvesting structures or other structures within the watershed area, labour is required, so that way a labour is very expensive. This is one of the constraint for which various schemes like government agencies or other NGO's or other funding agencies can help the individual land owners. Labour is required for establishing tree nurseries, planting the trees, constructing terraces,. manuring farms constructing of check dams etc.

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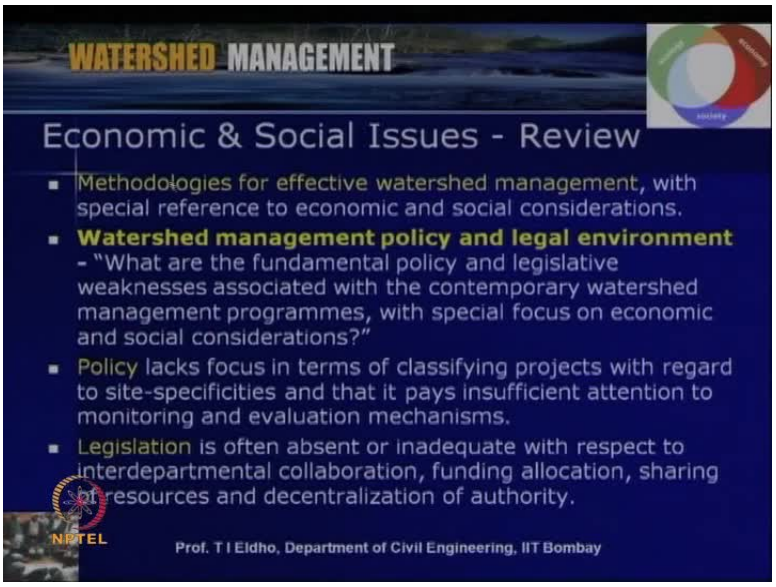

When we look back again or when we review, what are the problems? What are the related issues? How we can sort out this with respect to economical aspects of social issues? We have to frame methodologies for effective watershed management with special reference to the economical aspects and the social considerations. So far from the discussion on the slides, which we have seen so far, we can see various issues related to social aspects or economical aspects. We have to see all these aspects when we develop appropriate watershed management plans.

The watershed management policy and legal environment - we have to frame appropriately, so we have to look what are the fundamental policy and legislative weakness associated with the contemporary watershed management programs with special focus on economic and social considerations. So, when we review or when we look at the various watershed management; plans are proposed by federal government or central government or state governments. When the implementation comes, we have to see what are the problems, what are the weakness associate with the present schemes, so that all the social aspects or the environmental aspects or the economical aspects are concerned in an appropriate way.

We can see that most of the existing policies lack focus in terms of classifying projects with regard to site specificities and it plays insufficient attention to monitoring and evaluation mechanisms. Since, each watershed has its own characteristics and then in each location, the people needs will be different. If we frame a common policy or common watershed management policy and legal environment, it will be very difficult to deal with the individual requirement or individual watershed basis requirements. So, we have to see whether we can decentralize these kinds of norms and policies, may be to the Panchayath level or to the grass root level, where the issues can be.

The local people, who can present their own problems and they can come up with particular scheme as far as watershed management is concerned. Legislation is often absent or inadequate with respect to the interdepartmental collaboration, funding allocation, sharing of resources and decentralization of authority. So, we can see that when we look, for example, government of India structure, agriculture ministry is there, ministry of water resource is there, ministry of environment is there. When we deal with many of these ministries or agencies that are dealing with water or dealing with watershed related projects, we can see that there is no interdepartmental collaboration.

So, whatever proposed by ministry of environment, there might be inadequacies, when we look into the perspective of ministry agriculture. Lot of issues are there, so we have integrate each of the departments or the ministries or various activities by considering the economical aspects, social aspects or environmental aspects. We can frame appropriate policies or appropriate legal environment as far as the watershed management is concerned. This will generally be possible at local level than the state level or central level. So, we have to frame the legislation.

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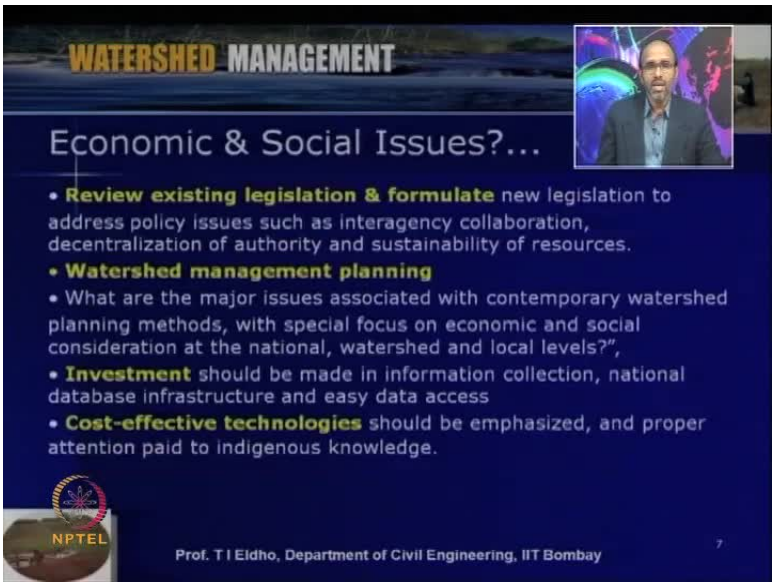

The number of issues, when we deal with the watershed related issues within the perspective of economical issues or social issues. So, we have to review the existing legislation and formulate new legislation to address policy issues, such as interagency collaboration, decentralization of authority and sustainability of resources. We have to see that the resources are sustainable like water, land or the various other resources within the watershed. They are sustainable and there is appropriate collaboration between the various agencies or various departments. So, we have to frame the appropriate legislation and this should be in a decentralized way, so that can be easily implemented in the particular watershed.

We should have appropriate watershed management plans. So, we have to look into what are the major issues that are associated with a contemporary watershed planning methods with a special focus on economic and social consideration at the national state or the district and watershed and local levels. At all various levels, we have to see the various problems and come up with appropriate plans, when we deal with economical social or environmental issues as far as watershed management plans are concerned. We have to see that investment should be made in information collection, a national database infrastructure and in easy data access.

If anybody want to study particular watershed or anybody want to prepare this particular watershed management plans, they have to get data collected by various departments. It

should be easily accessible, easily available to the concerned resource or concerned agencies, so that whatever information collected should be available and it should be easily accessible to the particular agencies or NGO's, who are going to implement particular watershed management schemes.

We can see that the schemes, which we are developing is cost effective. So, cost effectiveness should be emphasized and then proper should be attention paid to indigenous knowledge. So, we can see that when we deal with a watershed management plans, we cannot have same type of plans from one watershed to another watershed. So, for particular area, for particular river basin, indigenous requirement will be there, which is relevant to that particular area. Indigenous knowledge is also relevant to that area. We have to look into it, when we discuss or when we frame watershed management plans.

When we deal with watershed management plans or when we have already implemented for the implemented watershed management plans, we have to do economic assessment. So, we have to see that whether the project is economically viable and then whether the project will be success, whatever the capital investment or money spent are recoverable in various attempts.

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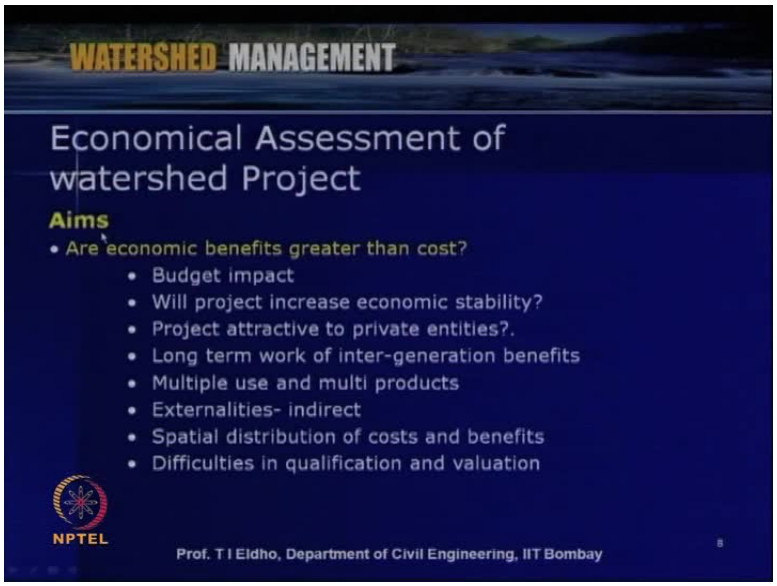

Economic assessment of watershed project is a very important. The aims of most of the economic assessments are whether economic benefits are greater than cost. When we

implement any type of project, we have to see that the benefits are greater than always the cost. So, whatever budget we keep for the particular project or particular area, what will be the impact of that budget or that investment? We have to see whether that has the positive impacts and after few years, benefits will be coming up. Will that benefits be more than whatever the cost, so that we have to see. Will project increase economic stability? When we deal with the people of the particular watershed or the economical aspects, we have to see that whatever schemes we are implementing, whether that will increase the economic stability of the people within that watershed, whether the project is attractive to private entities.

As I mentioned, when we deal with particular watershed, number of private landowners will be there. So, we have to see that if we come up with certain plans, which are economically attractive to the private entities, then only private people or private landowners will implement it. Long term work of inter generation benefits, so we have to see that the system is sustainable and then benefits are there for not only for the present generation, but number of generations or coming generations. Multiple use and multi products, so whatever we are implementing, multiple uses should be there. For example, when we are implementing a check dam for a particular watershed, the water available can be used for the domestic purpose, agriculture purpose or the ecological purposes or other kinds of various purposes. We can set our own multiple uses.

We have to see the externalities, what kind of direct impact and the type of indirect impact, when we look into economical assessment, then spatial distribution of cost and benefits. When we are implementing particular plans, we have to see that all the people within watershed are getting the benefits. So, we have to see that the cost also should be shared by the various land owners or various people and similarly the benefits also. Most of the time, it is not easy procedure to quantify all those things. So, there are number of difficulties in the valuation process and qualification as far as the economical assessment of the particular watershed is concerned.

When we discuss with the economical assessment, why economical assessment is required? As I already mentioned, we have to see that the money, which we are spending is recoverable through the various benefits, which are occurring with respect to that project.

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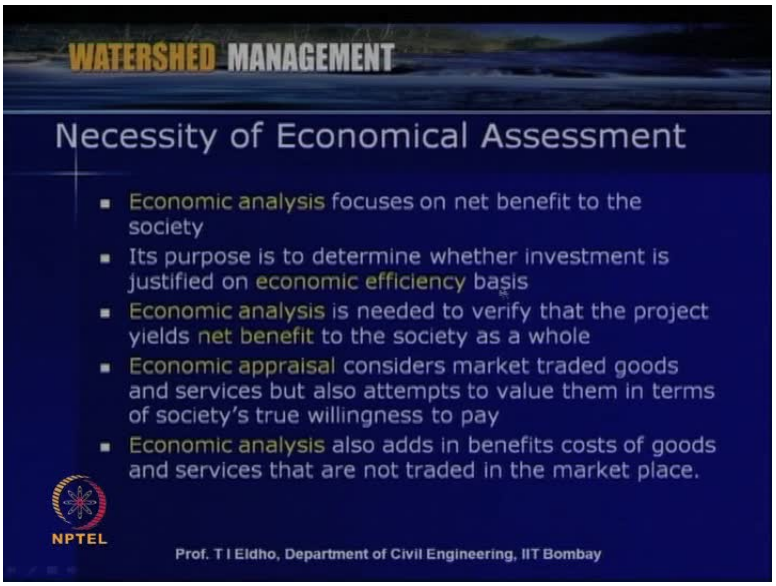

Economical analysis focuses on net benefit to the society. Its purpose is to determine whether investment is justified on economic efficiency basis. So, when we identify that the benefits are more. When benefit course ratio is more than 1, we say that the project is economically efficient. So, we have to see the economic efficiency of the particular project. Economic analysis is needed to verify that the project is net benefit to the society as a whole. So, whatever we are implementing as the watershed management plans, we have to see that it will be useful for the total community with watershed.

Economical appraisal considers market traded goods and services, but also attempts to value them in terms of society's true willingness to pay, when we are implementing. For example, through construction of a dam or check dam for a particular watershed, if water is available, then the costs associated, whether the people are ready to pay for that. So, we have to see the economic appraisals within that perspective. Economic analysis also adds benefits costs of goods and services that are not traded in the market place. So, we have to see the various benefits, which are not directly in terms of market analysis, but indirect benefits and also we have to see, when we go for economical assessment.

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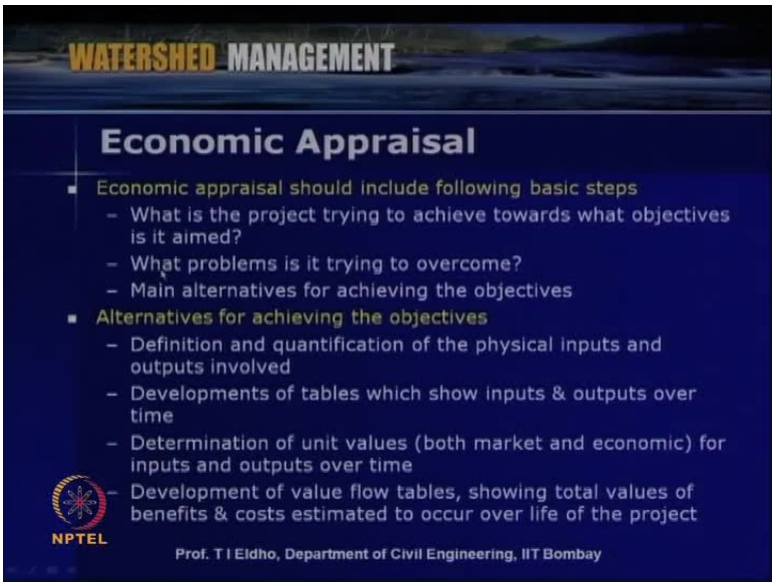

Now, let us see what are the ways in which, we have to consider an economical appraisal. In this slide, you can see the various things to be considered. Economical appraisal are listed: economical appraisal should include following basic steps. So, the questions like, what is the project trying to achieve towards? What an objective is it aimed? What are the objectives for that particular project? What problems is it trying to overcome? Is it trying to overcome the water availability problems or the land degradation problem or sedimentation issues? We have to see the main alternatives for achieving the objectives for each problem and there will be number of alternatives.

We have to see the important alternatives and then we have to do a cost benefit analysis. We have to see the maximum beneficial schemes. So, we have to see main alternatives for achieving the objectives and we have to see its costs and benefits, alternatives for achieving the objectives. What are the alternatives available? So, like definition and quantification of the physical inputs and outputs, involved for the particular project. Developments of tables, which show inputs and outputs over the time, so we can make tables for what will be the input for particular project and what will be the output coming from the implementation of that project.

We can have tables and then we can compare, determine unit values for both the market and economic for inputs and outputs over time, say per 10 agriculture products, what will be the price available? To produce per ton or per hector, what will be the cost involved?

Like that we have to see both on market terms and economic terms. Development of value flow tables to show total values of benefits and costs estimated to occur during the life of the project.

When we deal with watershed management plans, so the plan what we have been implementing for particular watershed may be from 50 years or 100 years. We have to see for that the total years, how the benefits are coming over the life of the project; whether it is increasing or decreasing and then cumulative effect. So, all those things, we have to economically analyze with respect to the particular watershed management plans. So, we need to have an effective economic appraisal for the particular watershed project.

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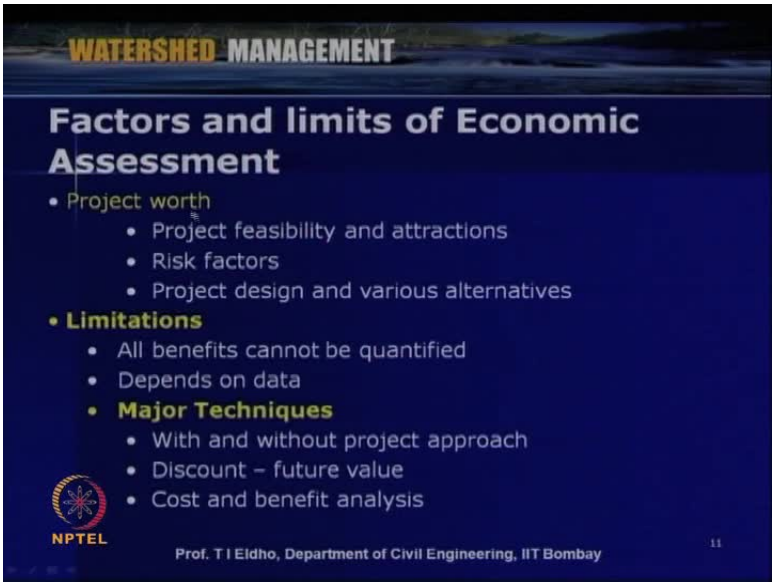

Now, let us look into what are the important factors and limits of economic assessment, when we deal with the economic assessment of watershed projects. The project worth - what is the worth of the project? What is the project feasibility and attractions? We have to see that the project is attractive to the people and the feasibility of that particular implementation of the project. What are the risk factors? Once it is implemented, what will be the problems? What are the environmental problems, whether how much land will be flooded, if you construct a particular check dam or whether the soil erosion problems will be more, when we go for particular farming or that kind of things.

Project design and various alternatives - we have to see in terms of the project worth, what are the various alternatives and then its design. What are the costs and benefits? What are the limitations with respect to the economic assessment for particular watershed projects? We cannot quantify all benefits, the number of direct benefits and number of indirect benefits will be also there, so all those things we cannot quantify.

Those are some of the limitations as far as the economic assessment is concerned and what kind of assessment we can do depends upon what kind of data is available. So, we need a huge amount of data, when we deal with the economic assessment, since we have to see the cost with respect to various implementations. What will the benefits like direct benefits, indirect benefits, future benefits?

Some of the major techniques used for economic assessments are listed here. We can see that if that project is not there, then what will be the problems once we implement the project, what will be the economical improvement or economical benefits? So that way, with and without project approach, we can study. That is one of the major techniques used, when we deal with economic assessment.

We can see next one is discount. How much discount for the particular capital investment is done? For the coming years, what kind of discount we have to put? So, we can calculate discount rates or future values. We can find cost and benefit analysis. As I mentioned for particular project, which we are going to implement for a watershed, what will be the cost and what will be the immediate benefits or future benefits. So, we can do extensive cost and benefit analysis.

We can see that in all these cases, we have to collect all the data with particular methodology. We have to analyze this data and come up with particular methodology. If the project is there or if the project is not implemented, what will happen? You can identify, what discount rate, which we have to keep for the particular investment or we can calculate the benefit cost ratio with respect to the implementation of that project.

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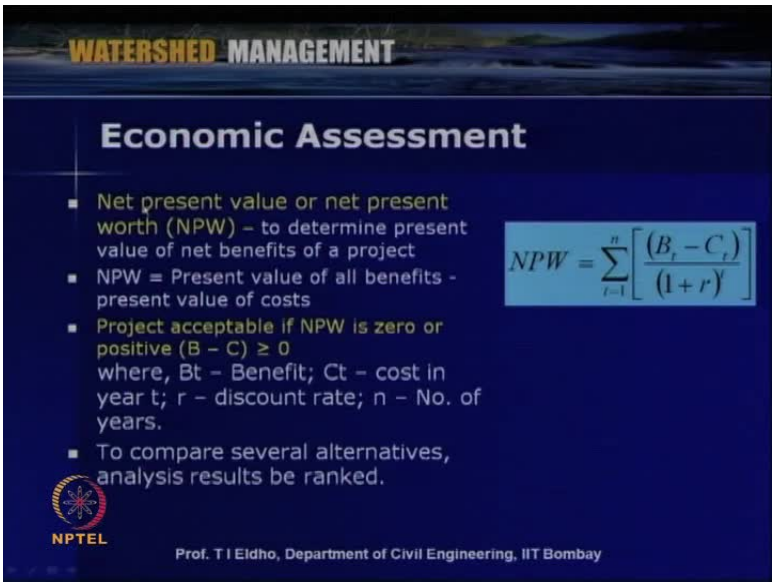

Now, let us discuss in detail about some of these techniques, which are used for economic assessment. We can calculate the net present value or net present worth for that particular investment. In the case of this net present worth, we are trying to determine present value of net benefits of a project. This net present worth is equal to present value of all benefits minus present value of costs, so that will be net present worth for that particular project.

We can identify, what will be the present value of cost for this year, next year and for years to come, what we have to spend for that particular project. So, we can identify what will be the present value of those cost. As the benefits are concerned, what will be the immediate benefit and then future benefits? So, for 10 years or 20 years; whatever be the expected life period of that project. So, we can identify or the present value of all benefits.

We say that the project is acceptable, if this net present worth is 0 or positive. So, when benefits minus cost is greater or equal 0, the project is acceptable. This net present worth can be calculated using this formula given here. Net present worth is equal to sigma and t is equal to 1 to n B t minus C t divide by 1 plus r to the power t, where C t is the cost in year t, B t is the benefit in year t, r is the discount rate and n is the number of years, which we consider for that particular project.

We can calculate the net present worth of the project and for various alternatives, what we propose for that particular project or particular watershed. We can calculate this NPW, net present worth and then identify which will give more benefits. Accordingly, we can choose that alternative. We have to compare several alternatives and we can calculate this net present worth. We can make a table and then we can rank it. Accordingly, the decision maker can chose particular project or particular scheme, which will give a maximum net present worth. So, this net present worth is one of the technique used in the economic assessment of watershed management plans or watershed projects.

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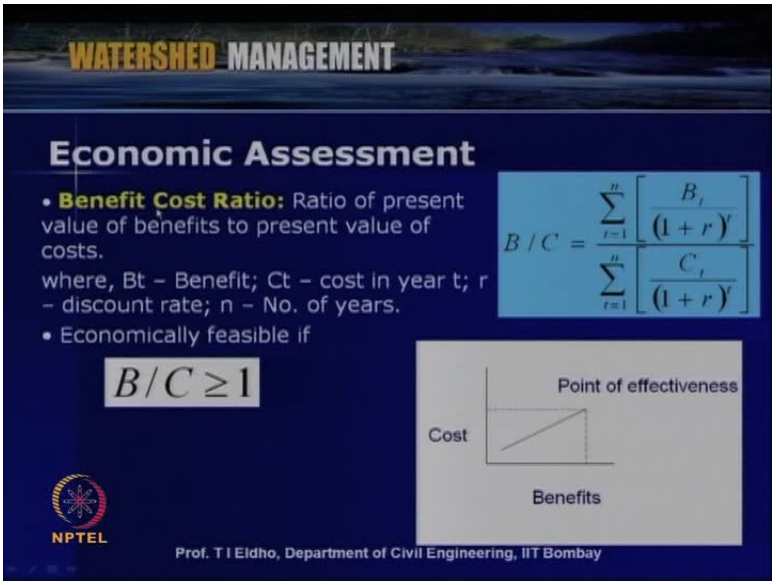

The next methodology as far as economic assessment is concerned, it is called as benefit cost ratio. It is the ratio of present value of benefits to present value of cost. It can be calculated by using this equation B by C qual to sigma t is equal to 1 to n into B t divided by 1 plus r to the power t divided by sigma t is equal to 1 to n C t divide by 1 plus r to the power t, where B t is the benefit of that particular year and C t is the cost in that year. Then r is the discount rate, which we have to assign and n is the number of years, which we consider.

As I mentioned already, we say that an alternative or particular scheme for a project or a watershed project is economically feasible, when the benefit cost ratio is more than 1 as given here. If you plot the benefits on the x axis and cost on the y-axis, the point of effectiveness is when, this particular point, where least the benefits is equal to the cost of

benefits exceeding the cost, so that the particular project is economically beneficial or project is acceptable by considering this benefit cost ratio.

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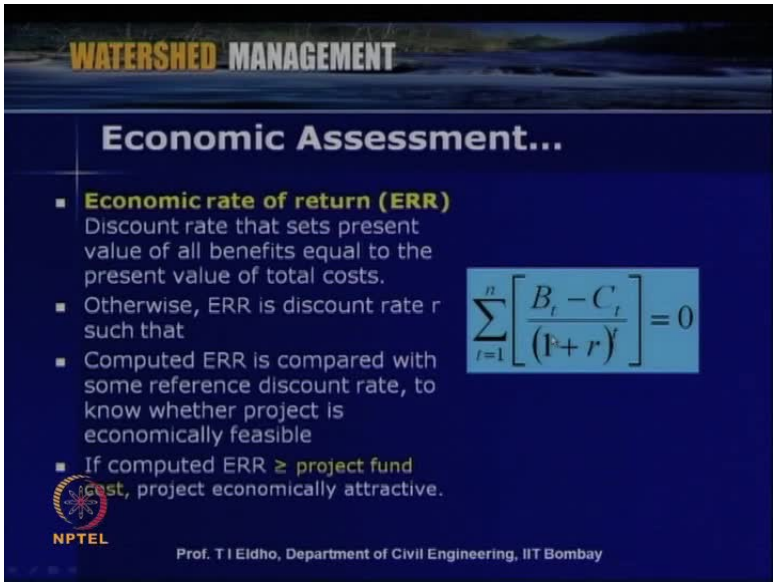

Then another methodology, which is commonly used is called economic rate of return or ERR. Here, we calculate the discount rate by using an equation. The discount rate sets present value of all benefits equal to the present value of total costs. Otherwise, we can identify this economic rate of return; r such that the computed ERR is compared with some reference discount rate, to know whether project is economically feasible.

We can identify this rate of return or discount by using this equation sigma t equal 1 to n B t minus C t divided by 1 plus r to the power t, where B t is the benefits for the particular, C t is cost and r is the discount rate and t is the number of years. So, to solve this equation, benefits and costs are known and the number of years are known. We can identify what will be the discount rate, so whatever the discount rate, which we are getting, we can compare with some reference discount rate. If computed economic rate of return is greater than the project fund cost, correspondingly, what is the reference cost? So, then the project is economically attractive. In that way, we can identify what will be the discount rate with respect to that particular project investment. From that we can identify, whether the project is economically viable or economically attractive.

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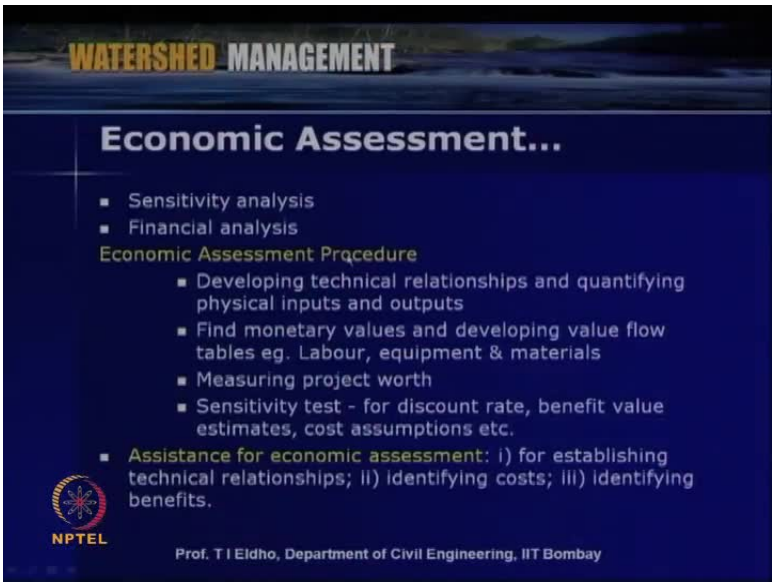

When we deal with the economic assessment, we can carry out a sensitivity of various parameters like sensitivity analysis and we can do a total financial analysis. So, all those things, we can consider within the perspective economic assessment. Economic assessment procedure - we can list various steps like what is given here. We can develop technical relationships and quantifying physical inputs and outputs. Find monetary values and developing value flow tables. As I already mentioned, value related to labour, equipment and materials or initial investment etc.

Next is measuring the project worth. What is the worth of the project? We can identify it to carry out sensitivity of various parameters. For example, discount rate, benefit value estimate, cost assumptions etc, so that will also indicate the economical viability of that particular project, when we deal with watershed management.

The agencies like NGO's or other external agencies have to give appropriate assistance for the assessment for establishing the technical relationships. Since, most of the time, the particular stake holders or particular people may not knowing all these issues, we have to give assistance in the economical assessment for establishing technical relationship, identifying the costs and identifying the benefits. So, this is required in most of the watershed areas.

Now, what we discussed is the socio economical aspects of watershed management plans or watershed management development programs and how to economically asses the watershed development projects or various alternatives. If I am using various schemes, then come up with an economically viable project or wherever the benefit is more than the cost or benefit cost ratio is more than 1. That particular scenario or particular alternative can be chosen as far as the implementation is concerned.

As we discussed in the last lecture about implementing particular watershed management plans, we need various departments of the government, stakeholders, community participation etc. As we discussed, with the participation from various agencies, we can see that a private sector has a major role to play as far as the various watershed management plans, preparation, implementation and maintenance are concerned. So, private sector is a very important. Private sector participation is actually one way and another way is people's participation. It means the stakeholders within that watershed or outside agencies, non-government organization; NGO's have a major role in many of the watershed development schemes.

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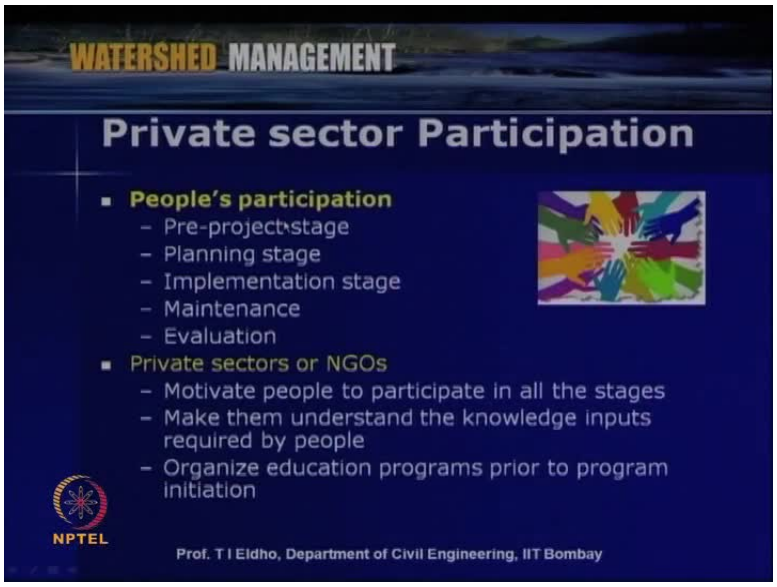

When we discuss the people's participation, we have to see that the participation can be at the development stage like a pre-project stage or planning stage or implementation stage and it can be for maintenance and evaluation etc. So, the people's participation or this private participation can be in any of this.

Private sector would like our NGO's. We can effectively use the NGO's in the watershed management plans, as demonstrated in many case studies in India and other countries. So, the NGO's can motivate people to participate in all the stages like pre-project planning or implementation or maintenance and evaluation stages. The NGO's can make them understand the knowledge, inputs required by people. So, NGO's are from the beginning itself; pre-project itself. They can go to the people, can demonstrate and make the people to understand the inputs required and then how they can do this particular watershed management plans.

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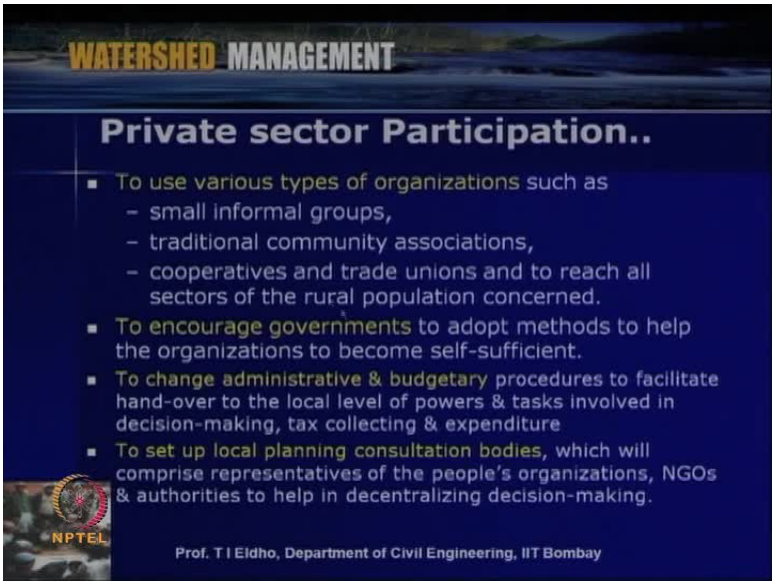

NGO's can organize education programs prior to program initiation. NGO's can play a major role in many of the watershed management plans. When we discuss the NGO's or private sector participation, we can use this organization in various ways. It can be in small informal groups or traditional community associations or cooperatives and trade unions to reach all sectors of the concerned rural population.

We can have various types of organizations as far as the private sector participation is concerned. Private sector participation can be used to encourage governments to adopt methods to help the various organizations like NGO's to become self-sufficient or the cooperatives like the Amul cooperatives. These cooperatives have been formed with support of the government. Now, it has become so big that they can control the new

production in at various states, so that is the advantage of private sector participation of cooperatives and trade union.

To change administrative and budgetary procedures to facilitate handover to the local level of powers and tasks involved in decision-making, tax collecting and expenditure. So, once the project level implementation comes and as far as execution and maintenance is concerned, NGO's or private sector can play a major role. To setup local planning consultation bodies, it will comprise representatives of the people, organizations and NGO's. Authorities have to help in decentralizing decision making, so that way the private sector participations or NGO's can play a major role in many of the watershed management schemes or plans.

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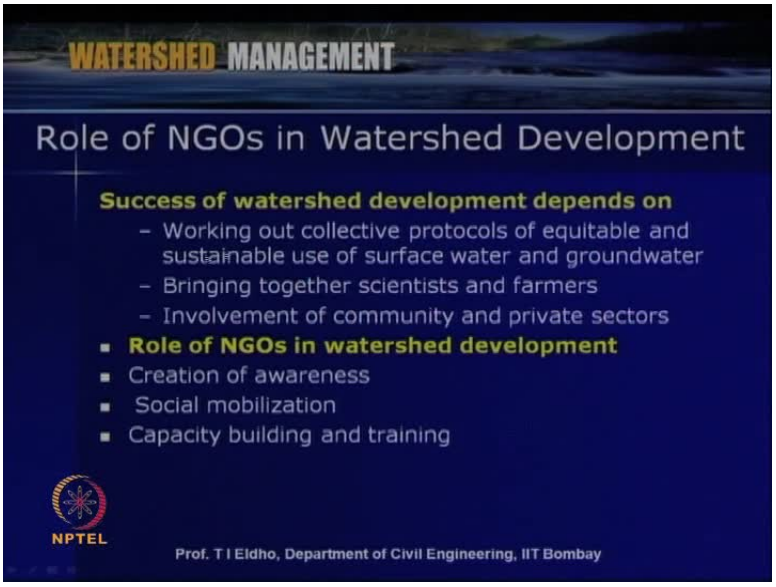

We will discuss about the role of NGO's in watershed developments. The success of watershed developments depends on working out collective protocols of equitable and sustainable use of surface water and groundwater. We have to develop protocols for equitable distribution, equitable sustainable use as far as surface water and groundwater are concerned. Bringing together scientists economies and farmers, so that way NGO's can help. Then we have involvement of community and private sectors like private landowners and NGO's can bring all this together.

Role of NGO's in watershed development is very important. It can be either pre-project or planning stage or implementation, maintenance stage. In all stages, NGO's can play major role. It can be for creation of awareness, social mobilization, capacity building and training. As we have seen in many of the case studies, which we have discussed in the previous lectures, so that way NGO's have a major role to play in watershed management in all stages.

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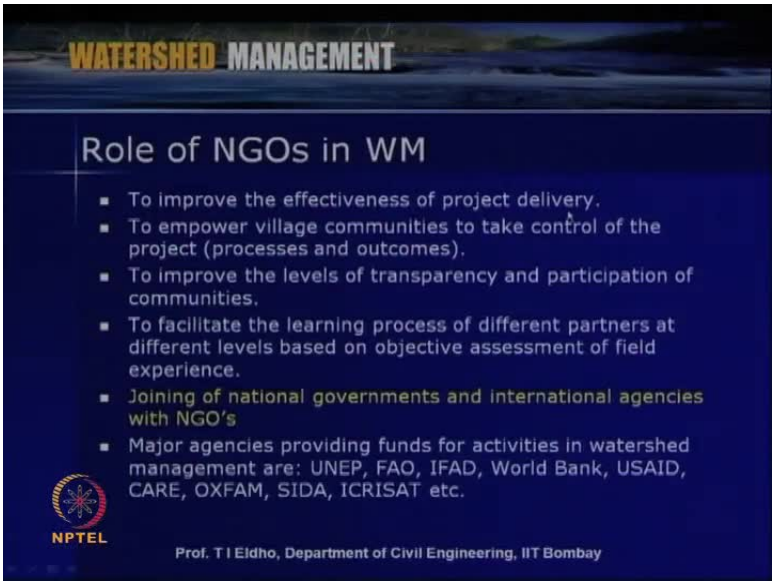

NGO's roles can be used to improve the effectiveness of project delivery. To empower village communities to take control of the project like process and outcomes. To improve the level of transparency and participation of communities and to facilitate the learning process of different partners at different levels based on objective assessment of field experience. NGO's can join the government sector or international agencies, so that they can play major role in getting the funds from the government or from various international agencies and utilization of that fund particular watershed management plans or in particular areas.

There are varipous agencies, who funds for watershed related projects like United Nations Environment Programme, Food and Agriculture Organization, IFAD, World Bank, USAID, CARE, OXFAM, SIDA, ICRISAT etc. So, we can see that if you look into various developed countries like India and other countries, we can see that number of NGO's working in this area are doing a very positive role. They are very actively

involved in the watershed management plans. They are bringing funds from various agencies in watershed development projects and are getting involved with the people in the planning stage to implementation and maintenance of that particular project in particular area, so that way there is a big role to play by NGO's in the watershed management plans.

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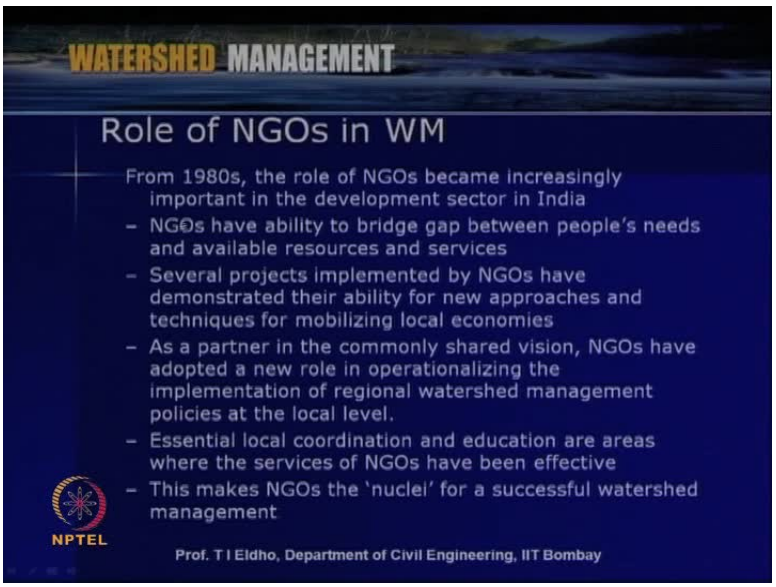

If you look into the history of the watershed management developments in India from 1980's, the role of NGO's became increasingly important in the development sector in India. So, in last 30-40 years, we can see that many number of NGO's are working this area. As demonstrated, NGO's have the ability to bridge gap between people's needs and available resources and services. Several projects implemented by NGO's have demonstrated their ability for new approaches and techniques for mobilizing local economies.

We can see that in many locations, many agencies like ICRISAT, Grameen Vikas, Panchayath, So like that various NGO's have played a major role in the watershed development plans, watershed management plans. As a partner in the commonly shared vision, NGO's have adopted a new role in operationalizing the implementation of regional watershed management policies at the local level.

If the central government or state governments plans, NGO's play a major role in modifying those plans and also implementing this type of plans at local level. So, the NGO's role are essential in local coordination and education. This makes NGO's the nuclei of a successful watershed management plans. If we critically analyze various watershed management plans going at various locations in India or other countries, we can see that NGO's are playing a major role. They are the nuclei of successful watershed management plans. So, what we were discussing is about the private sector participation and the role of NGO's in the watershed development plans and watershed management plans.

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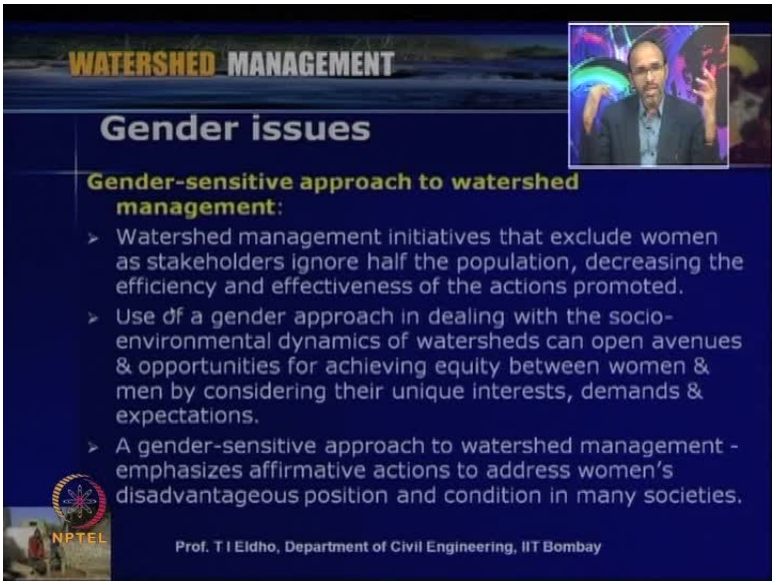

Another issue, what I want to discuss here is gender issues. In most of the watershed management plans of the last few decades, the role of human has become a very active. so, gender sensitive approach is very much essential in watershed management plans. Watershed management initiatives that exclude women as stakeholders ignore half the population, thereby decreasing the efficiency and effectiveness of actions promoted. Use of a gender approach in dealing with the socio- environmental dynamics of watershed can open avenues and opportunities for achieving equity between women and men by considering their unique interest demands and expectations.

A gender-sensitive approach to watershed management emphasizes affirmative actions to address women disadvantageous positions and conditions in many societies. So, we can

see that women are taking household purposes and they are bringing water. They are very much actively involved in farming and all other activities, so that way, we have to consider the role of women in the watershed management plans.

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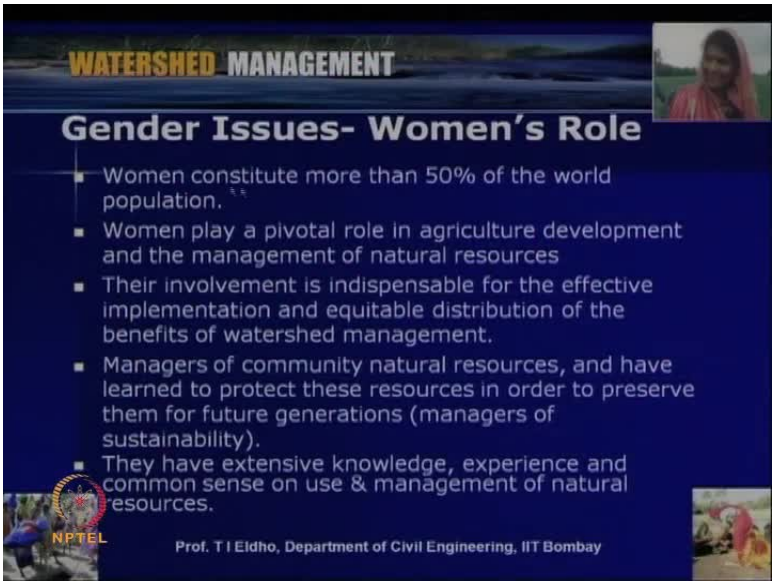

The women constitute more than 50 percent of the world population. Women play a pivotal role in agriculture development and the management of natural resources, as I already mentioned. Their involvement is indispensable for the effective implementation and equitable distribution of the benefits of watershed management. We should get their opinion in the planning stage itself and then they should also be involved in execution, implementation and maintenance.

Managers of community natural resources and they have learnt to protect these resources, in order to preserve them for future generations. When women are there in these schemes, we can see that most of the projects become more sustainable. They have extensive knowledge experience and common sense in use and management of natural resource like water, land and various issues.

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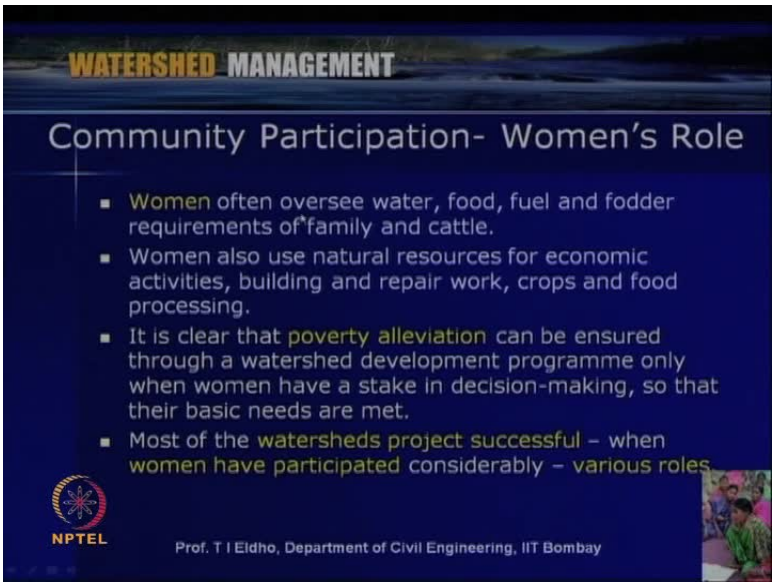

Women often oversee water, food, fuel and fodder requirements of the family and cattle. It is always essential to take care of their viewpoints. So, women also use natural resources for economic activities, building and repair work, crops and food processing. We can see that women role is very important in watershed development plans.

It is clear that poverty alleviation can be ensured through a watershed development program, only when women have a stake in decision making, so that their basic needs are met. They can have better control in the watershed development projects, its maintenance and its sustainability.

So, most of the watershed projects, which were successful and if you critically analyze, we can see that when women have participated considerably and then their opinions were taken care. They were there in the implementation and the maintenance, most of these projects are very much successful, So that way we can see that women participation is very important in the watershed development projects.

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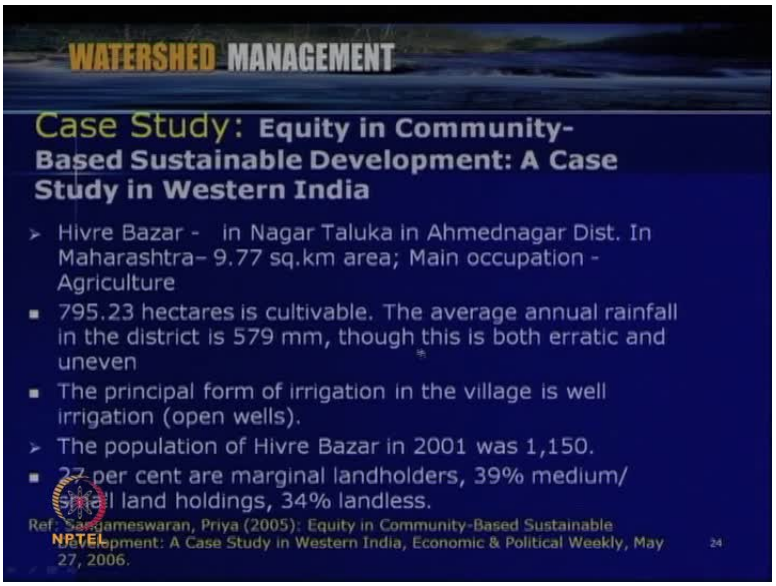

Before closing, let us go through a case study. This is the equity in community based sustainable development- a case study in western India. The case study here is Hivre bazaar in Nagar taluka in Ahmednagar district in Maharashtra, India. The watershed area is about 9.77 square kilometer and main occupation of the people in this area is agriculture. Out of these 977 hectares, 795 hectares is cultivable. The average annual rainfall in the area is only 579 millimeter, so that way this is semiarid region. Available rainfall is through erratic way and uneven distribution.

The principle form of irrigation the village is well irrigation; open wells are dug well. The population in 2001 was about 1150. As far as land distribution is concerned, 27 percent are margin land holders, 39 percent are medium or small land holding and about 130 percent landless in this watershed area. So, the details are taken from this paper by Priya, which is published in economic and political weekly in 2006.

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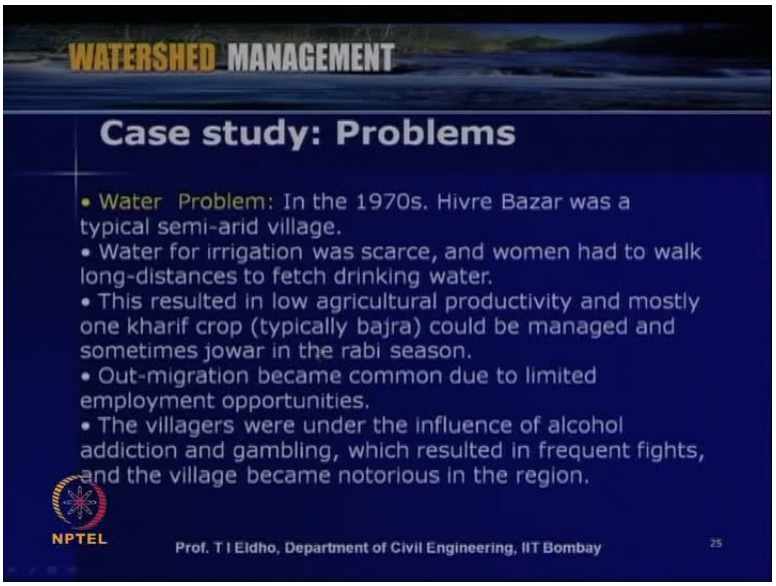

What are the problems of this watershed? Some of the important problems, I have listed here: In 1970's, this particular watershed… the economical activities or the agriculture activities are very low. As I mentioned, it was a semiarid area; water for irrigation was scarce and women have to walk long distance to fetch drinking water. So, this resulted in low agricultural productivity and most like one kharif crop, typically bajra could be managed and sometimes jowar in the Rabi season.

Mainly, only one crop was used to be there before these watershed projects are implemented. So, people used to go out for job, since there were no sufficient employment opportunities within the area. The villages were under the influence of alcohol addiction and gambling, which resulted in frequent fights and the village became notorious in the region in 1970's.

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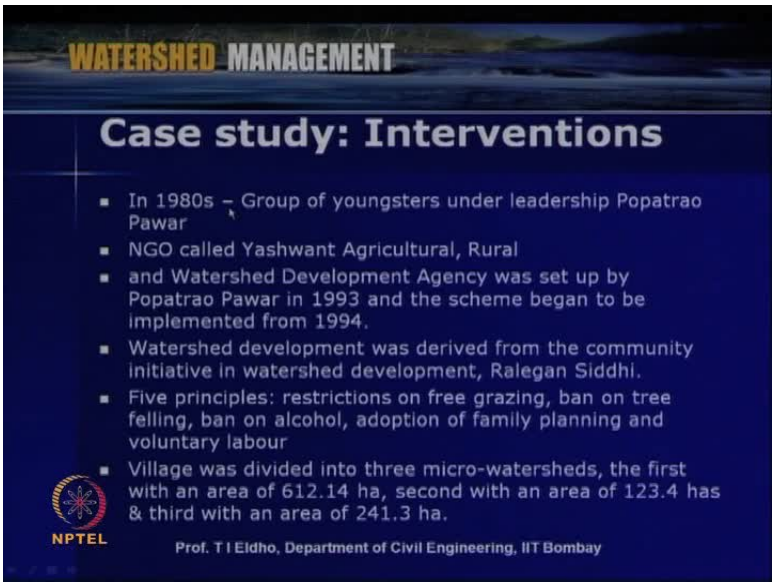

In 1980's, a group of youngsters under the leadership of Popatrao Pawar came together and they formed an NGO called Yashwanth agricultural rural and watershed development agency. This was set up in 1993 and a scheme began to implement from 1994. So, the watershed development was derived from the community initiative in watershed development at Ralegan siddhi.

In the implementation of this project, they were keeping five important principles as far as the watershed development intervention is concerned. Restriction on free grazing; free grazing was not allowed. Ban on tree felling, so tree felling was totally banned, ban on alcohol, adoption family planning and then voluntary labour for the implementation of various projects. These were the unique feature. So, this particular watershed implementation or watershed project village was divided into three micro watershed. The first is about 612 hectares, second is about 123 hectares and third is with 241 hectares.

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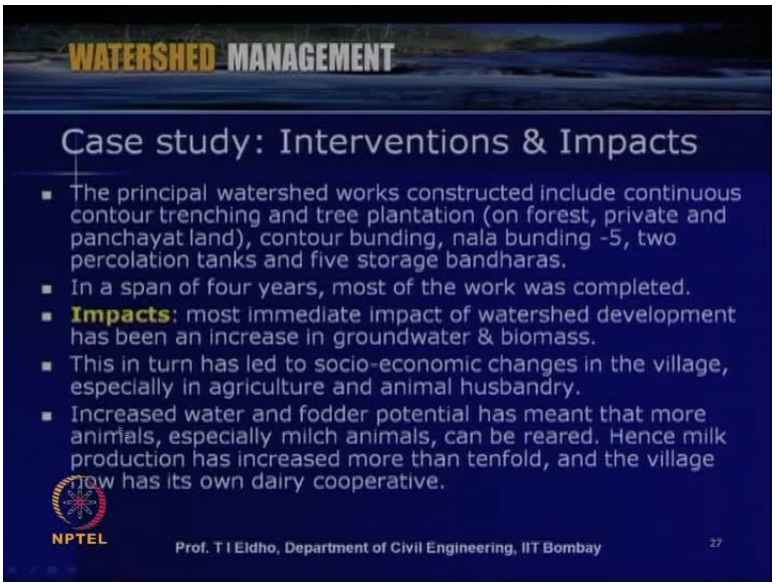

Various interventions were done. The principle watershed work constructed includes continuous contour trenching, tree plantation, contour bunding, nala bunding. Five important nala bundings have been done; two percolation tanks and five storage bandharas were constructed in this particular watershed. So, this work was done in a span of about 4 years by this NGO, under the leadership of Popatrao.

What are the effects of this? When it was studied, the impacts were analyzed at the beginning of 2000, so there was a huge change. What has taken place within these watersheds? We can see that the availability and fodder potential has increased drastically, especially Milch animals like Cows and Buffalos. The people started owning and the milk production has increased more than tenfold in the area. Now, village has its own dairy cooperative, so that were the important impacts.

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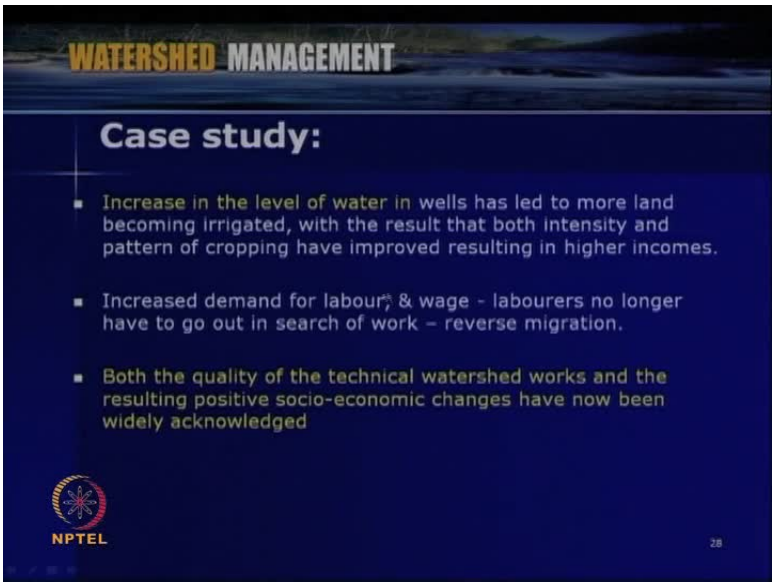

Increase in the level of water in the wells led to more land becoming irrigated, with the result that both intensity and pattern of cropping have change resulting in higher incomes. So, instead of one crop, people have started two crops and as sufficient water was available to the people. There was a lot of employment, increased demand for labour and wage labour, no longer have to go outside to other places in search of work. So, reverse migration started with all these initiatives. Both the quality of the technical watershed works and the resulting positive self-socio-economic changes have now been widely acknowledged, all over the world in this particular role model like Ralegan siddhi.

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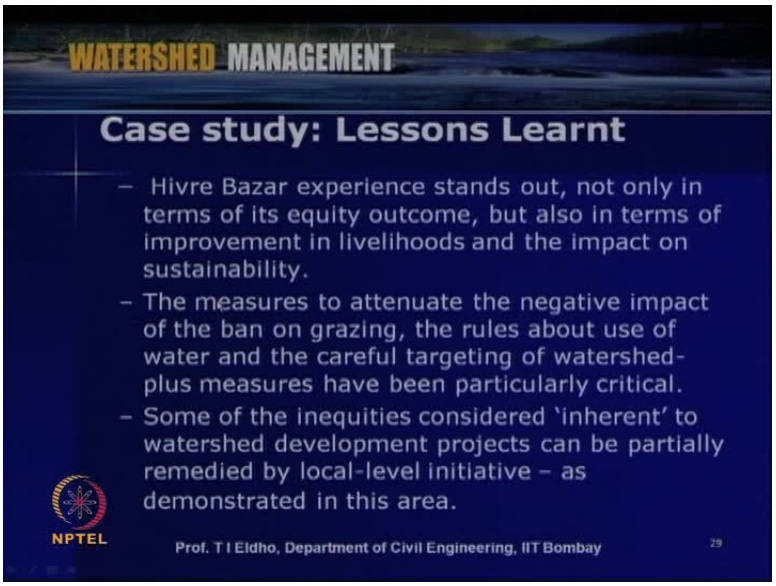

Some of the important lessons learnt based upon the this study: Hivre bazaar experience stands out not only in terms of its equity outcome, but also in terms of improvement in livelihoods and the impact on the sustainability. The measure to attenuate the negative impact of the ban on grazing, the rules about use of water and the careful targeting of watershed plus measures have been particularly critical in this particular watershed.

Some of the inequities considered inherent to watershed development projects can be partially remedied by local-level initiative - as demonstrated in this area. So, local problems were sorted out locally. When people came together as an NGO, the projects were implemented, so that way we can see the success of this particular project by considering the social impact, social effects, economical aspects and the environmental aspects.

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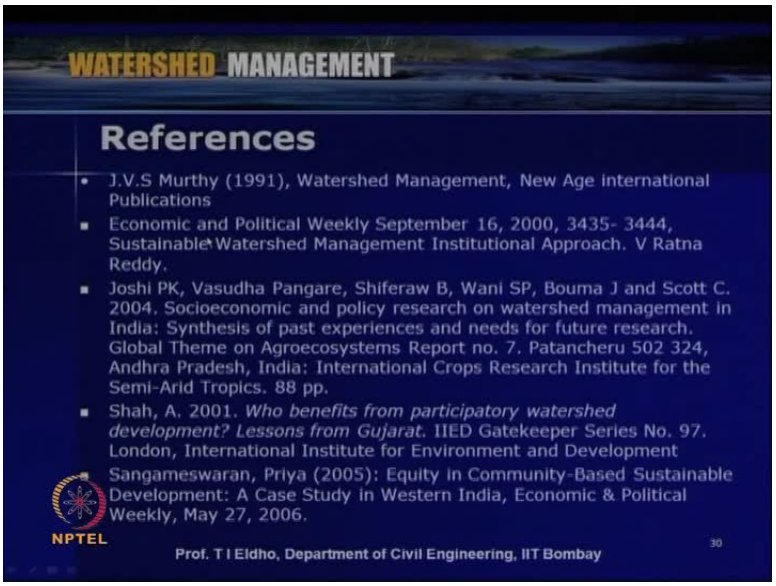

These are some of the important references used for today's lecture.

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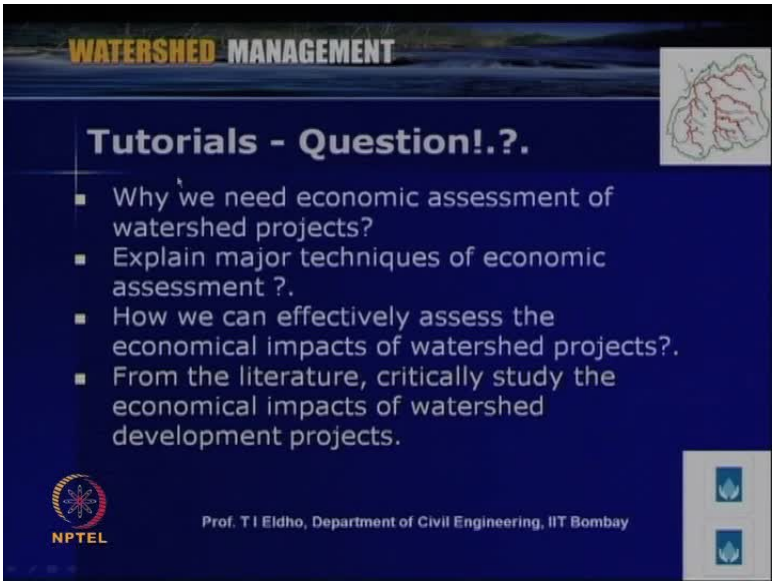

Finally, few tutorial questions - why we need an economic assessment of watershed projects? Explain major techniques of economic assessment. How we can effectively assess the economic impacts of watershed projects? From the literature, critically study the economical impacts of watershed development projects.

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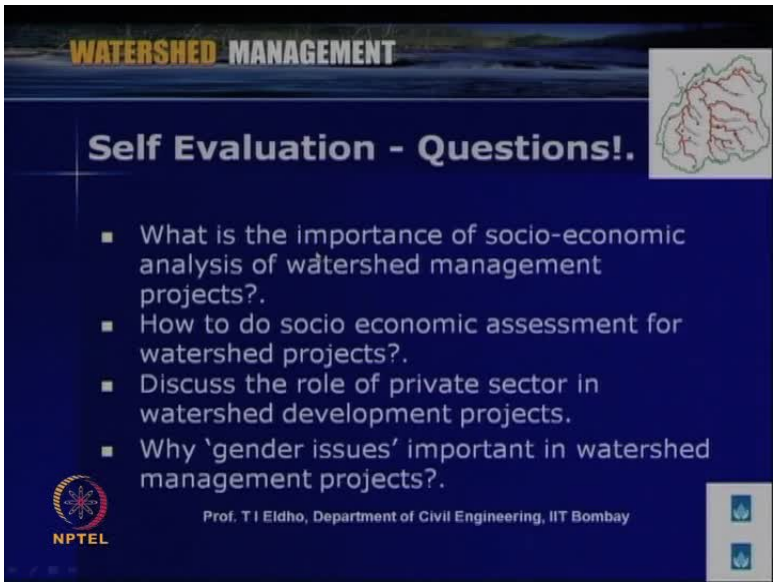

Few self-evaluation questions, what is the importance of socio-economic analysis of watershed management projects? How to do socio-economic assessment for watershed projects? Discuss the role of private sector in watershed development projects. Why gender issues, important in watershed management projects?

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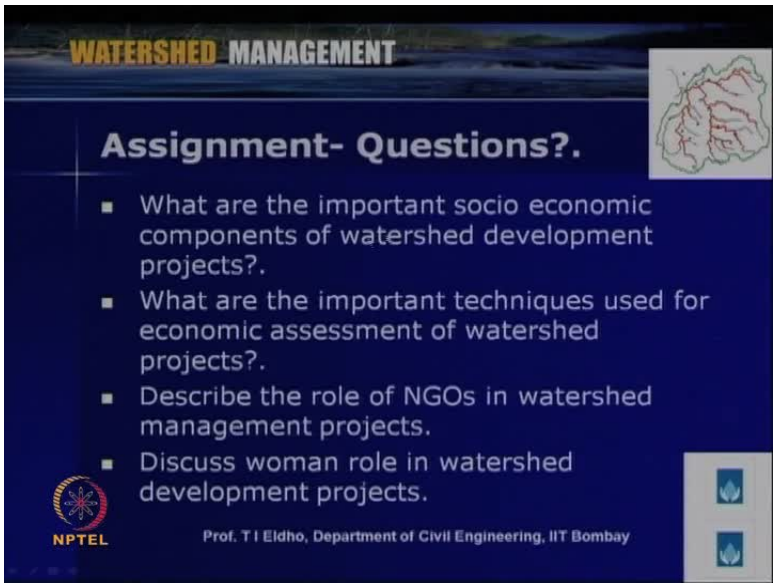

What are the important socio-economic components of watershed development projects? What are the important techniques used for economic assessment of watershed projects? Describe the role of NGO's in watershed management projects. Discuss women role in

watershed development projects. So. all these questions you can answer by going through today's lecture.

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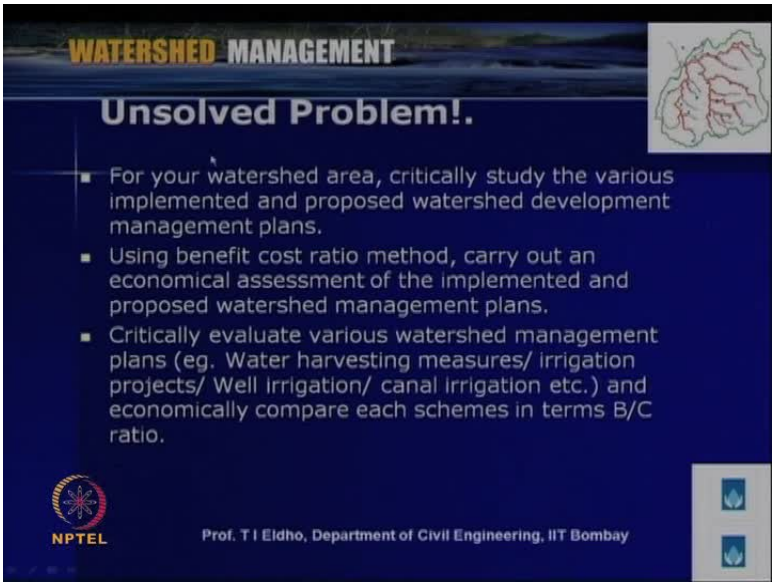

Finally, one unsolved problem - for your watershed area, critically study the various implemented and proposed watershed development management plans. Using benefit cost ratio method, carry out an economical assessment of the implemented and proposed watershed management plans. Critically evaluate various watershed management plans like water harvesting measures or irrigation projects or well irrigation or canal irrigation etc and economically compare each scheme in terms of benefit cost ratio. So, this also you can try to do by going through today's lecture.

Today, what we discussed was the social aspects, economical aspects, gender issues and role of NGO's in watershed development plans. Further, we will discuss the integrated development, water legislation and policies for watershed management plans in the next lecture. Thank you very much.