Sustainable River Basin Management

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Module 3- 2

Lecture – 21

Part - 01

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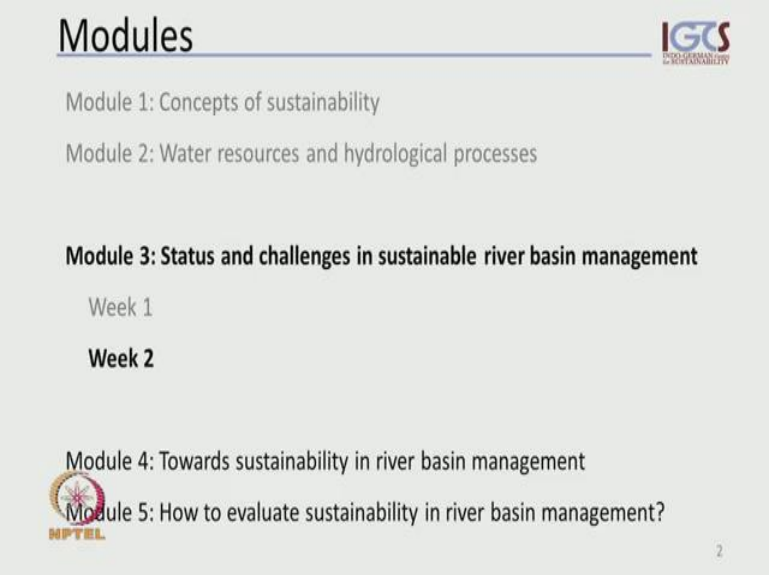

Welcome everybody back to Sustainable River Basin Management, module three-two, part-one. Let us recap on what we have been doing. We have completed module 1 and module 2 and we are now in module 3, which is dealing with status and challenges in sustainable river basin management of which we have completed week 1 and we are now moving into week 2.

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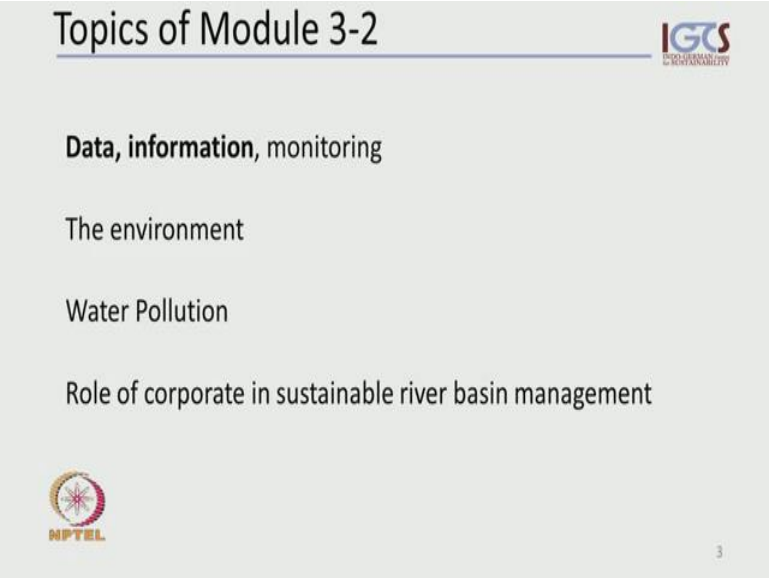

What I want to cover in this part of the module three are those subjects data information monitoring I wanted to speak to you about the environment, water pollution and the role of corporates in sustainable river basin management.

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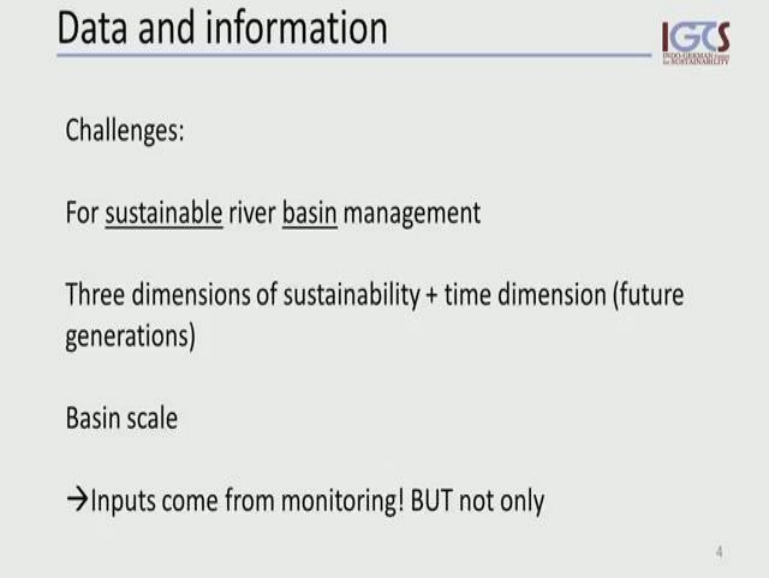

We start today with talking about data and information. What are the issues around this? The challenges arbitrary are requiring in data to manage river basins at, in a sustainable fashion. So, we have two complex components in it, one is the sustainability and the other one is the scale of it dealing with an entire river catchment. The three dimensions

of sustainability are very difficult to capture in the form of data plus the time dimension including forecast or predictions for future generations. All have to be included into the aspect of sustainability. So, that means, that the inputs not only come from monitoring, but only, but also from additional data sources, which I am going to discuss today with you.

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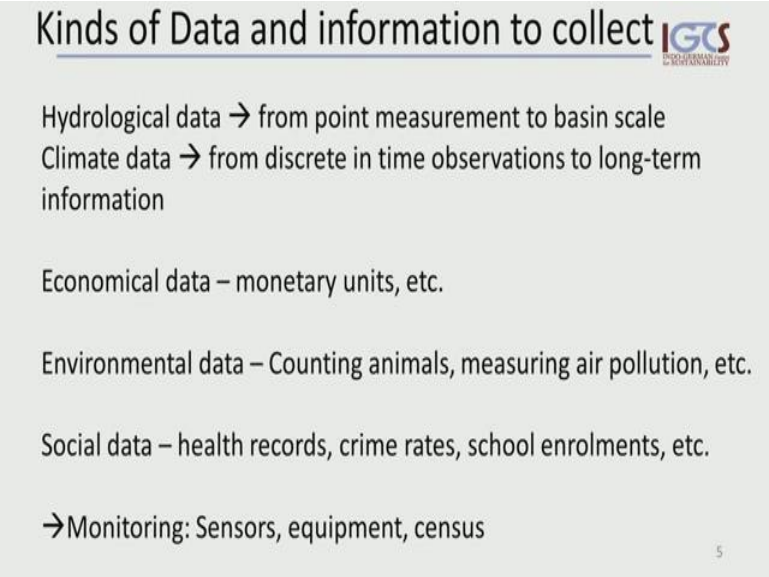

So, what are the kinds of data and information, which we need to collect if we want to manage, data basins, river basins in a sustainable context? We need to collect hydrological data. This is, the major challenges are to transform point source data into a basin scale into surfaces and to basin scale information. We need climate data, which has to be transformed from a discrete in time observations to long term information, which is a major subject, major science on its own. We need economical data, which we may be able to express in monetary units, but not only and we need environmental data, which could be something like counting animals or species, which could be measuring air pollution and so on. And we need social data and those social data could be the health records, could be for instance, crime rates, school enrollments and so on.

Those some of those data we can collect through monitoring. So, we can use sensors to measure something, we can use equipment, we can install equipment to measure and collect certain parameters or we could conduct census questionnaires and obtain our own data.

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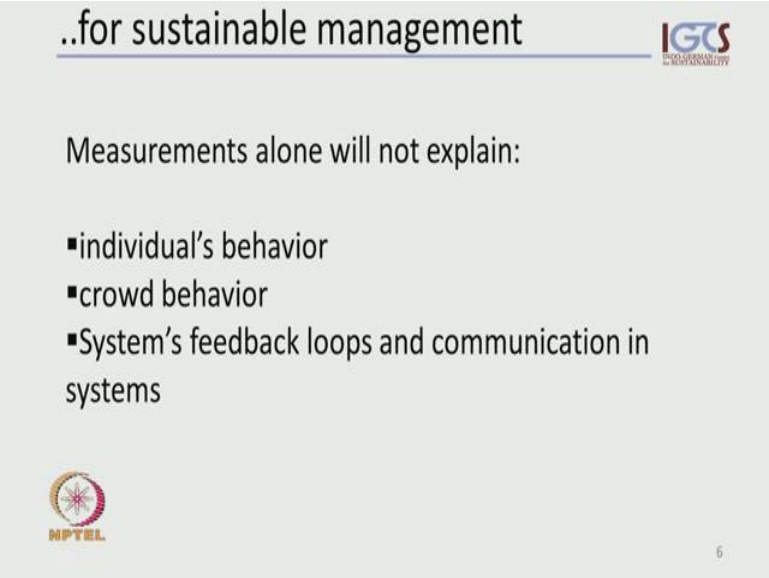

Now, for sustainable, sustainability issues and for sustainable management, this is not enough. So, those measurements alone will not explain, for instance, individual's behavior. They will not explain crowd behavior and they will also not explain to us the system's feedback loops and the communication, which takes place in a system or between systems.

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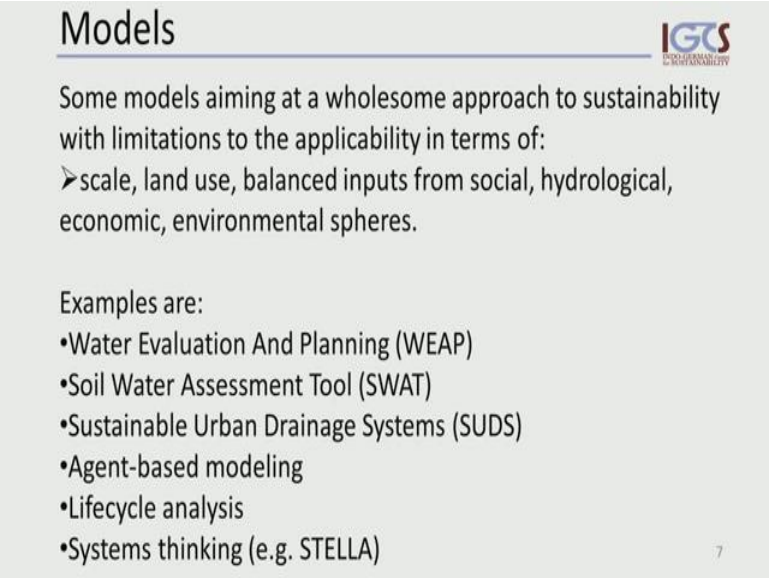

So, how do we deal with this? We have talked about hydrological models previously and there are a number of models aiming at more holistic, wholesome approach to

sustainability, but all of them have the limitations in terms of applicability and this is in terms of scale, in terms of land use, whether these models are able to capture aspects of a balanced, balanced inputs from social, from hydrological, economic environments or from the environmental spheres such from ecological spheres.

So, many of these models can handle one or the other or are strong in few of these components, but not able to capture all of these components equally. Examples of such quite useful modeling software is, I want to give you here. For instance, water evaluation and planning tool, the soil water and assessment tool called SWAT, the sustainable urban drainage systems tool, agent-based modeling, lifecycle analysis systems, thinking tools or software, for instance STELLA, which all are applied either at certain scales, like in urban environment or more rural environment, agricultural context or more social context. But many cannot actually answer or provide answers to all of these sustainability dimensions.

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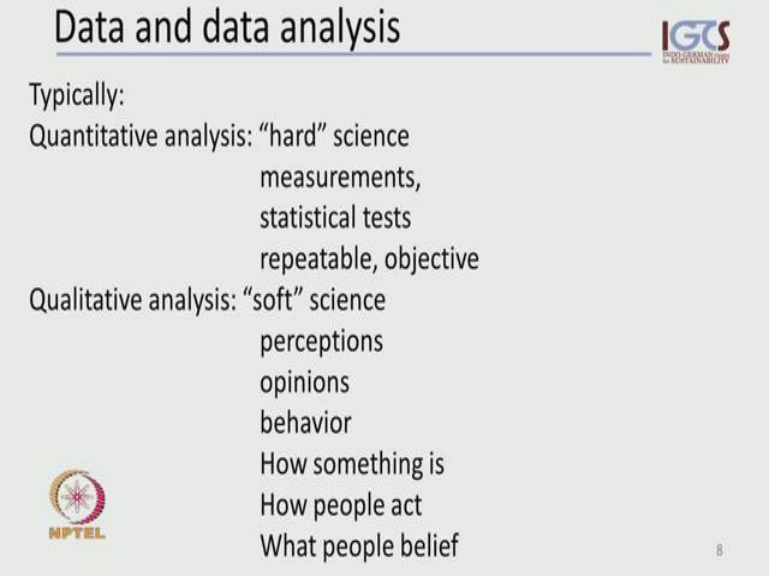

Now, let us look into the data and data analysis and typically we classify our approaches into two ways, one is quantitative analysis. We also usually said this equal to what we call hard science or the natural science. It is the measurement and allows us repeated measuring, measuring of one and the same parameters. We can apply a statistical test, it is supposed to be repeatable end objective. There are limitations to that as well, but this is what we generally assume. Whereas, the other side of the analysis called qualitative

analysis, which often is said equal to the term soft science, it works with perceptions works with opinions behavior, how something is, how people act, what people believe and those things are usually not repeatable.

It is context driven very much, it is, it depends ((Refer Slide Time: 07:21)) interview large coops or what the mix of people is. It was in such interviewed coup and so on. The outside circumstances play an important role influencing our outcomes of this. So, this is, very often very difficult to capture, very difficult to maintain against the typical approach of the hard science measurements, but this is what we have to build in when we want to understand where we can change something, influence something towards the sustainable river based management.

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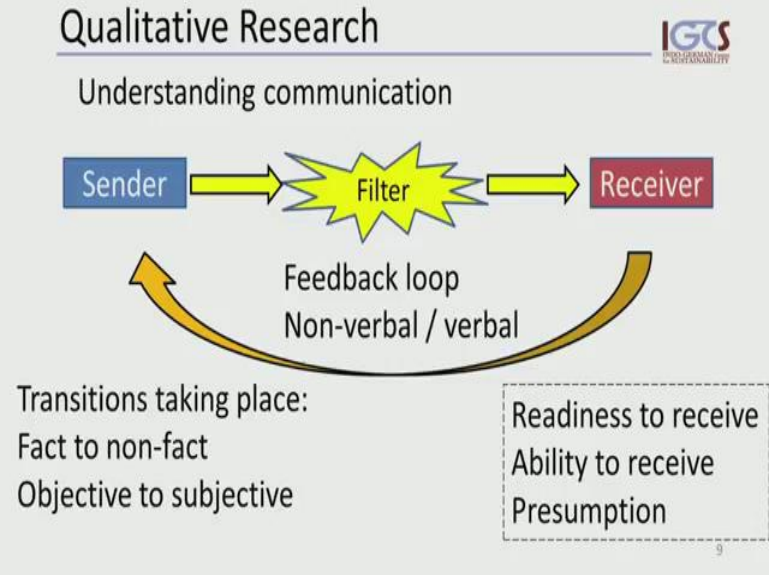

Now, let us look into these, the qualitative research and this is basically starting or departing from understanding communication. We usually, when we communicate there will be a sender, I am a sender right now, I am transmitting a message and there will be a receiver. You are, for instance, one receiver right now of the message that I am sending. So, and then, something else happens in between, which means, that the message that has been sent here will not reach exactly the same way as I have perceived it. It is the way I believe I am sending it, it will not be received in the same way. So, some transformation is taking place in between and I am just calling it a filter and this is very much depending on the readiness to receive it. First of all, the person here on this side has to be willing to

receive the message, must be available to receive the message. First of all, that receiver must also be in a position to receive.

I could speak in a language here that will not be understood on the other side and this, I could be speaking only English as the receiver is understanding English, but just the way I am speaking, scientific way or laymen's terminology may not enable the receiver to understand to actually receive my language. So, ability could also be because of different levels and literacy that the message will not be perceived actually by the receiver or the sender, made all the good attempts to transmit the message in the assumptions, which influence how the receiver is going to receive the message. The receiver has some knowledge already, the receiver has some cultural background, which influences how he or she is going to receive the message sent. This could be also driven by certain cultural aspects of what you assume for the other would be doing or what the message is until the message is sent this way.

The meaning of the message might be interpreted in a completely different way depending on may be the sender and the relationship between the sender and the receiver. So, this means, that there will be a feedback loop between the sender and the receiver and there will be also a loop from the receiver back to the sender and that feedback loop could be non-verbal, but it could also be verbal. So, if we would be in eye contact right now, you would be able to have a non-verbal communication, you could have a verbal communication by talking to each other, but I can also see how another person is reacting to a message that was sent in terms of non-verbal response. On the other side, the way I am sending a message, my non-verbal communication will also influence how this message is going to be received on the other side.

Now, this means that along this track, here a transition takes place and this is very often also including a transition from a fact to a non-fact communication. Not only a factual message could be sent here, but through these non-verbal communication patterns I am also able to translate at the same time a non-factual message which may change how this message is being received and vice versa and very often we change from the objective to a subjective transition and communication. So, this is very important when you collect qualitative data and when you analyze qualitative data. Let us look into this.

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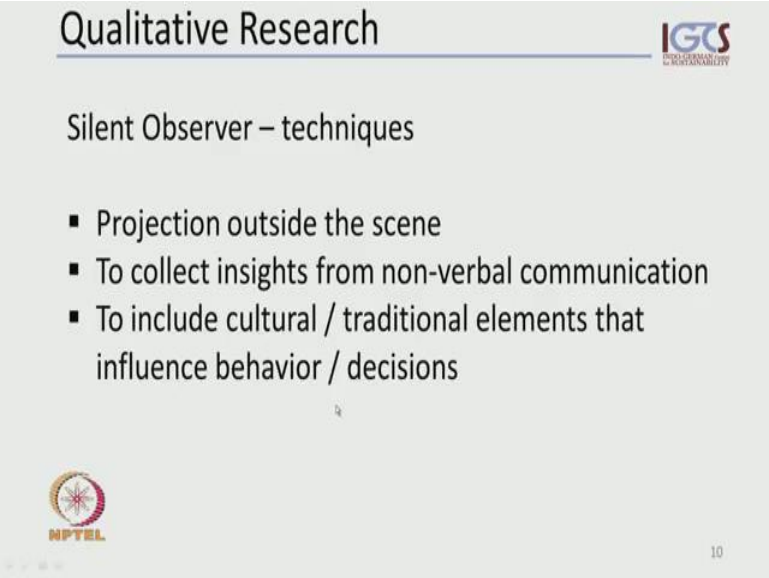

How could you avoid influencing what happens between another sending person or a group of people and the receiver? The technique is called silent observer that has been applied to understand and to capture what is going on between a sender and the receiver. This means, that as a silent observer you have to project your side, yourself outside the scene, which is often very difficult for researcher because you, very often, get torn into the situation. You get, you may become emotionally influenced or you have your own background, your own culture, assumptions bringing to the, to the stage already. So, that is something you should avoid by forcing yourself outside the scene.

This is used to collect insights from the non-verbal communication. It is including cultural and traditional elements that can be captured in that way. And understanding or capturing these cultural and traditional elements can help us understand how people behave, how we can influence behavior and how decisions come, come into being.

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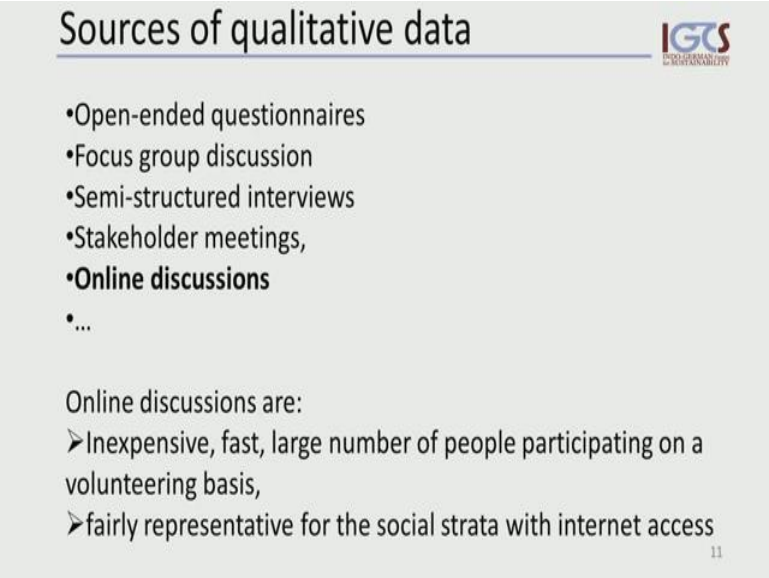

Now, what are sources of qualitative data? One would be open ended questionnaires. We could have a frame of issues that we want to investigate and we may just throw an open question into the space and see how the person or the group of people ask, respond to it. Or we could have a focused, focused group discussion where we have selected group of people with certain common properties, common knowledge, may be, or common stakes in certain issue, for instance, water allocation and bring those together and discuss an agreed issue that could be a focused group discussion.

We could also come as semi-structured interviews, that is, we have a frame, a structure of an interview, but we allow for the space of moving not from top to bottom of the interview, but to move through the interview in a in an informal way.

We could also have stake holder meeting, which could be structured or open ended and very interesting online discussions. And what is interesting in this online discussions as a source of qualitative data set is that they are inexpensive, they are fast to obtain, do not have to run five hundred interviews somewhere in the field or meet several types of different focus groups. We can have large number of people participating in this on a voluntary basis, which is very hard to achieve when we as researchers go out and try to meet and talk to people individually or bring large groups together for specific interviews.

So, that is a source that I want to discuss little bit on now because they are fairly representative for at least the social strata, which is internet, which has internet access, which is connected to these online sources. So, which is a wide group of the society in many countries.

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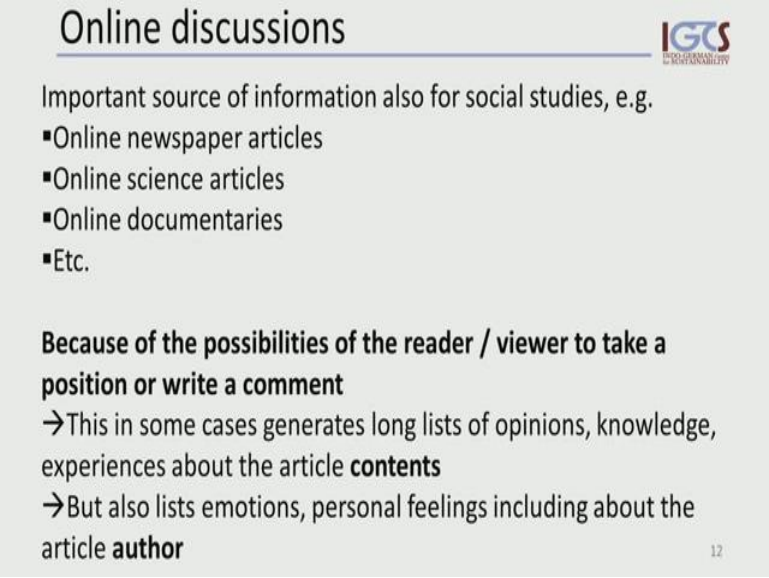

So, let us look into these online discussions. They, we know, that they are source of data, source of information for, from an economical point of view or from a, from an intelligence point of view. This has become very, very known right now, but they are also an important source of information for social studies, and you could look into online newspaper articles, could look into online science articles, online documentaries, movies, but documentaries and many other.

So, the interesting part to this is, you have on one side this issue, that is being brought up and discussed by an order or by a team of orders and we have as a reader the possibility to take a position and to write about the position to comment about this article. It, in many times generates long list of opinions. It also generates a lot of things together, a lot of knowledge, a lot of applied knowledge, a lot of experience about the contents of the article. But also, it brings together a lot of emotions or personal feelings including about the author of the article, but also from the society, from the people who comment about it. So, it reflects both sides on about the author, but also gives insights out of the society

as a whole. So, this is very informative and very inexpensive tools to obtain and make use in this sustainability context.

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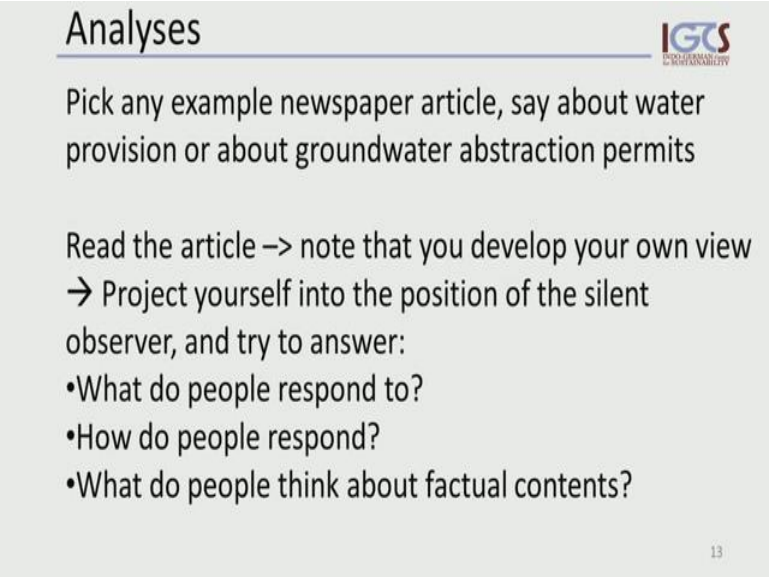

I want to show this now on just walking you through how you could go about this and obtain qualitative data. So, what you could do is, pick any example, newspaper article, which for instance, deals with the provision of water, water supply in a specific area or in general, in a, in a country. It could also be an article about groundwater abstraction permits or something about pollution, water pollution.

Just to stick to our topic of sustainable river base management, you should read that article and while you are reading, you should step out yourself and take notice of the fact, you are by reading this or developing your own view about the article, the contents or may be even about the author of that article.

Now, moving on, you should project yourself into the position of the silent observer and try to answer some questions like what do people respond to if the title of the article, the newspaper article and there is in certain objective that the author had been, he or she brought, she, both, the article, what do people respond to? How do people respond? Which way do they respond? Is it factual? Is it non-factual? Is it scientific? Is it non-scientific? Is it emotional, non-emotional and so on? And what do people think about the factual contents.

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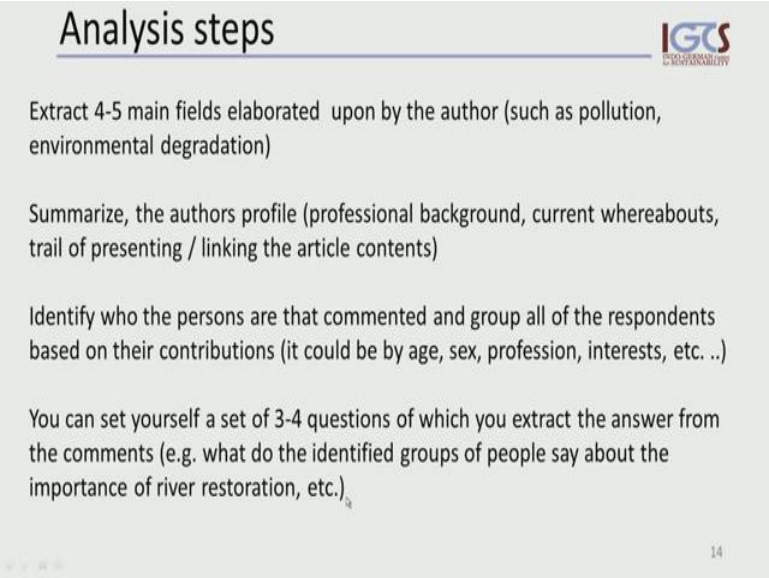

Now, the next step would be, that out of fields comments written by the readers, you can expect four or five main fields, which the author had in his mind or her mind when she or he wrote the article. And this, those fields could be something like, for instance, pollution or it could be something about environmental degradation, could also be about water pricing or whatever, the matter was discussed by the author.

You could from this summarize the author's profile. You could, from the information, it can, you can extract from the article itself and the background information given to the publication, get a professional background. You can know about the current whereabouts which institution or where such person is engaged right now. You can work out a line of presenting. You could see how this, how the contents link or linked within the article sometimes and then, you should, from the comments, that were posted by the readers, you should develop profiles of those commenting people. You can identify actually who those people are who commented. You can group them corresponding to the way they responded. You can derive from their messages, their comments, a lot of information. You can start from the age. They can, they can tell you whether they were women or men. You can even know about their professions, very often their interest, how they come to actually respond to this article and what their actual contribution to this whole discussion about the articles.

Then, from that the two profiles that you have developed, you can set yourself a set of questions and you should limit this very often. You can build many questions. You could think about question that work towards answering what you want to obtain for your specific research around sustainability and you can extract the answer from the comments. You can check and identify what the groups of people that you found actually say about, for instance, importance of river restoration or the importance of these environmental degradation issues that you identified earlier.

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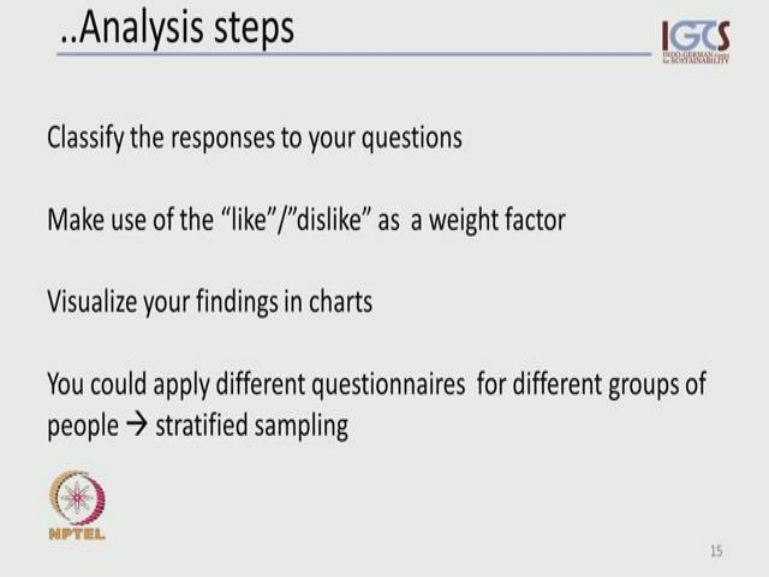

This you can trace and put into a classical analysis framework. You can classify the responses to your questions and statistically analyze them and you can, in addition, use the like and dislike function, that very often comes along with these posts, the comments, that you can make online and can use that as a, as a weight factor, how many people actually corresponded.

How this has been rated is been a larger population and then, you can visualize your findings in charts. For instance, you could in addition add complexity to it by designing different questionnaires or different groups of questions for different groups of people that you have in your stake holder group. We call that stratified sampling.

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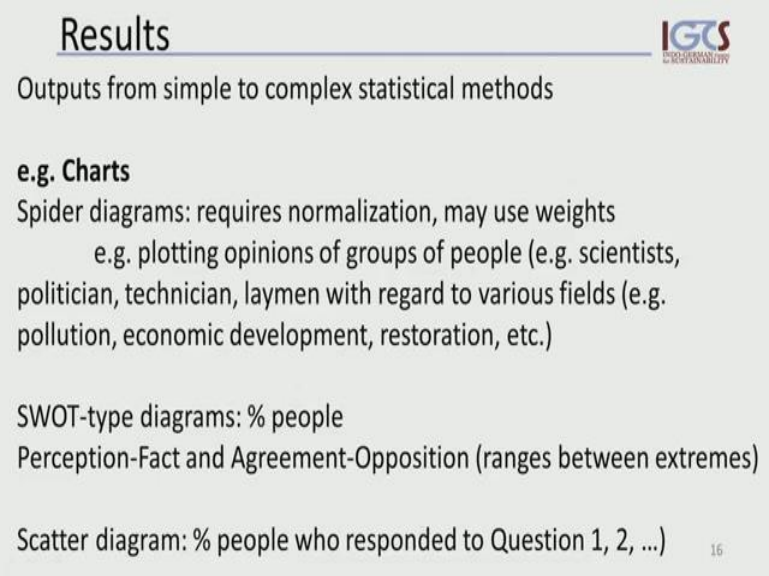

Now, the results of this can be ranging from very simple analysis to quite complex cluster analysis to complex statistical methods. You could also simply visualize this information then in charts and very practical in this context for qualitative data, spider diagrams, which would require a normalization and also very often it is useful to have to be able to include a weight. And as I mentioned, the like, dislike function could be used as a weight in this context. You could, for instance, plot opinions of groups of people. For example, you could have scientists, you could have politicians, technicians, laymen with regard to various fields and those fields could be, for instance, pollution or economic development, restoration and so on.

You can get very complex results out of that or you could take your statistical results into a SWOT type where you could, for instance, have the percentage of people or groups of commenters and you can put them in a, in a range, type of arrangement between extremes to or for extremes. For instance, the perception versus facts or the agreement versus opposition and so on. And it gives you a lot of insight of how people perceive something and you could also simply use a scatter diagram, which would give you response to who actually responded to your questions that you wanted to get answered, how did people actually respond to that. And in qualitative analysis, the non-response as well is response. It is a, it also transmits a certain message to other people respond to something or not.

Now, you can exercise this for yourself. It is not an assignment as such, but we can discuss it on the phone if you have more questions and I see you next time again.