Sustainable River Basin Management

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Module – 4 – 1

Lecture - 30

Part 5

Welcome everybody to sustainable river basin management; module 4- 1, part 5, last part of (refer Time: 00:18).

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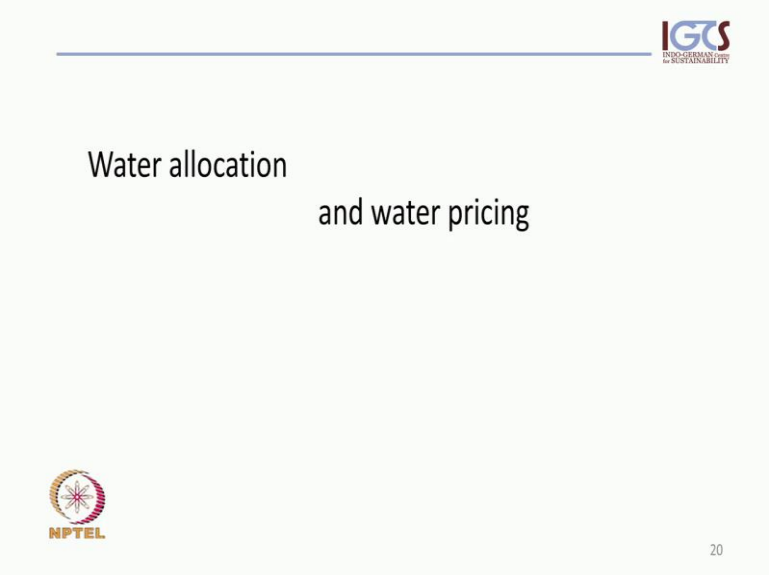

Now, we will continue on the subject, water allocation and water pricing.

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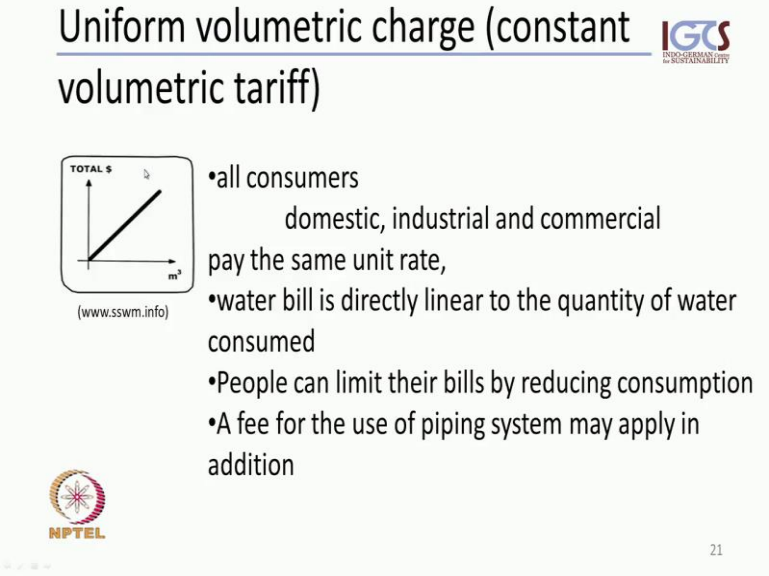

This time, let us talk about uniform volumetric charges or the same term is constant volumetric tariff. This means that we have here, our volumetric consumption in cubic meter and here, a price and this is a linear relationship here. It could be a steeper relationship or it could be a more flattened, but in any case, this is linear relationship here. This has all consumers, which means it could be a domestic or industrial or commercial users, are supposed to pay the same unit rate and the water bill is directly, linear to the quantity of the water consumed. This means that people can limit their water bills and reduce the cost by reducing consumption. Very often, there is a fee for the use of the piping system that can be applied or added to this; means that, because see that the lines would not start here (refer Time: 01:40), but it would start somewhere here at this line and then, be linear here.

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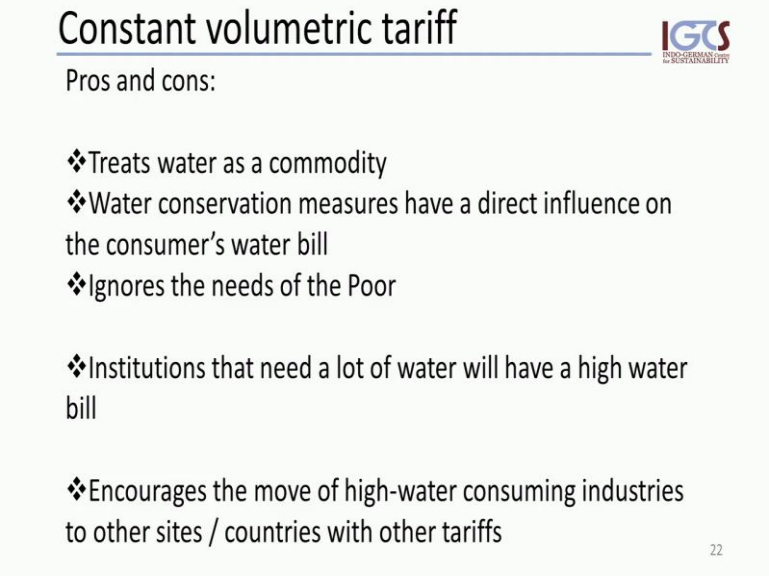

Now, what are the advantages or disadvantages of this system? In the first place, it treats water as a commodity. It treats water as a good and we have talked about this earlier that water is an economic goods; it is an economic asset of national interest. So, in this volumetric tariff constant, volumetric tariff, it is first time treated as such, accounted for fully. So, water conservation measures have a direct influence on the consumers' water bill, which is an invitation to each and everybody to try to save water. It however, ignores the needs of the poor. Those who cannot afford; they will have no alternative to cope with the water prices. So, institutions that need a lot of water will have accordingly, a very high water bill, which may not make it very attractive to be operating in such high price region. This, in some of the cases encourages, those institutions to move outside the country especially, those high water consuming industries, would leave the country and settle somewhere, where the tariffs are more in favorite and favor to these industries.

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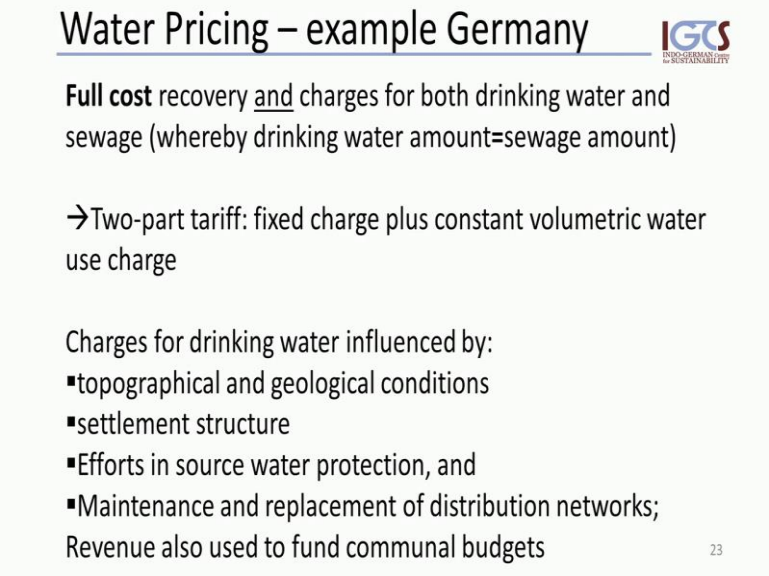

Now, let us look into the water pricing example of Germany. In the case of Germany, there is a policy of full cost recovery and it charges for both drinking water and sewage, whereby the drinking water amount is set equal to the amount of outgoing sewage and that is how, sewage will be measured indirectly, by metering the drinking water consumption. Now, how is this full cost recovery would be achieved; as a two part tariff. It consists of a fixed charge, plus the constant volumetric water use charge.

So, those charges for drinking water are influenced by topographical and geological conditions, where the water has to be taken from water reservoirs, ground water and so on; the settlement structures, the efforts in source water protection and the maintenance and replacement of distribution networks. Very often; however, we also see that the revenues produced or obtained by charging for drinking water also, used to fund communal budgets to top up the communal budgets. So, it is not simply, a full cost recovery, but very often, it is also a revenue generation, which is being achieved and wondered for.

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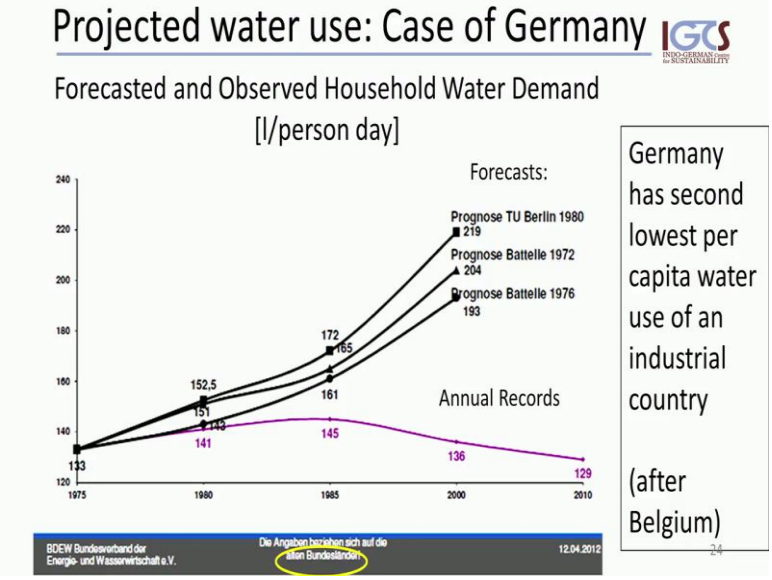

Now, let us look into the projected water use in the case of Germany. The forecasted and observed household water demand from the year 1975 to the year 2010 here; what we see is that the projections were all, forecasting a steep increase in the water consumption from the 1970s to today. Any of these research institutions or academic institutions actually, project a continuous steep increase in population number, and in that way, the increase in the household water demand, as living conditions continue to improve, as the stability, economic stability improve and this was the forecast.

What actually happened; this is showing as the actual observed household water demand. There was a tipping point in the year 1985 from which onwards, the amount of water used by a household, decreased continuously, and this is, this decrease is continuing till today. Now, Germany has the second lowest per capita use of an industrial country right now, just after Belgium. This is quite remarkable. We will look into this; why and how this happened and what the consequences are.

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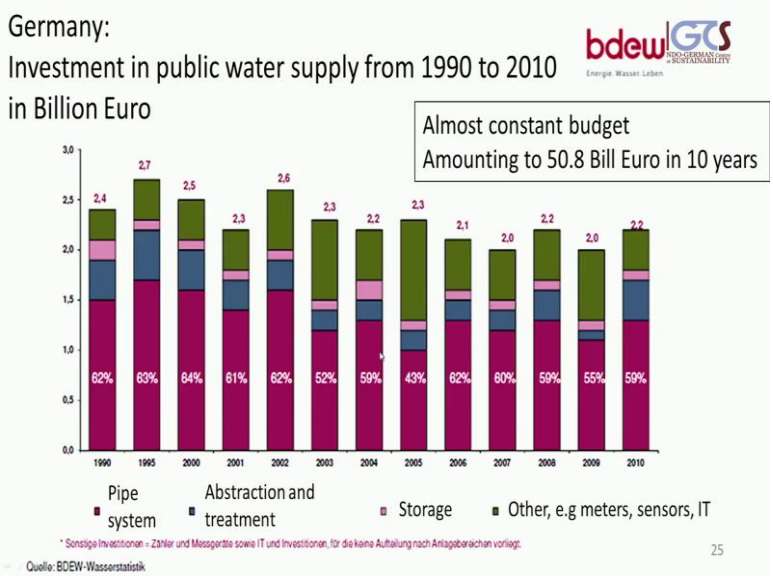

Now, Germany has invested into public water supply from the 1990s to 2010. Several billion Euros; this is a graph showing us expenditures in pipe system and water abstraction and treatment and storage facilities and then, in meters and sensors, monitoring system, IT technology and like. What you see is that this budget always, flutter a little bit; slightly decreases, but overall actually, kept just kept fairly constant. The priorities here, shift in change as political changes took place and also, some of the natural disasters like the flood; major flood events top the country, but what we can see that as a huge amount, being invested into the water sector over the last 10 years, which also corresponds to the fairly low amount of water that is being lost through the distribution.

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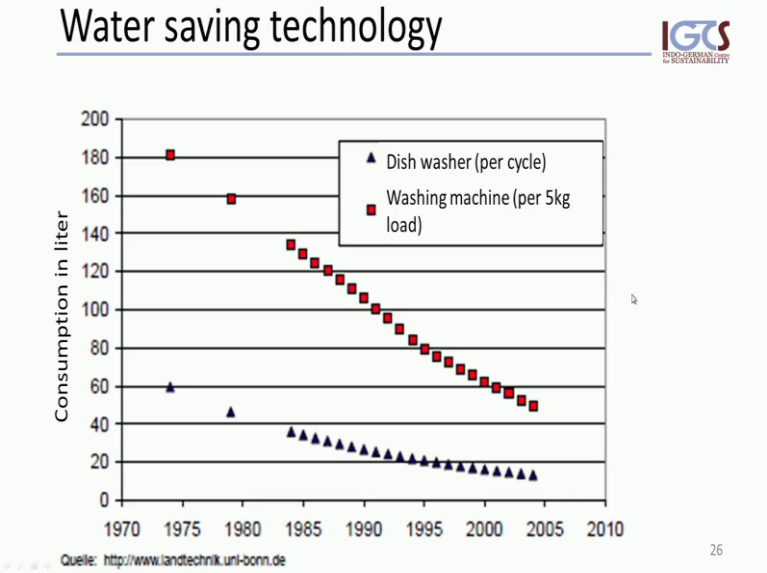

Now, this is one side; the other side is, but at the same time, water saving technology has become common use in most of the households in Germany nowadays. This is a graph that was produced by a local university in Germany, which shows us the year 1970 up to measure around 2005. Then the consumption in liter of these household devices; first a dish washer here, and see the rectangles here, are the shares of washing machine. What you can see is that actually, the consumption decreased by a factor of three in those years; o, at certain limit in reach up to which point, we can reduce water consumption of these devices to still be effective, but these changes being quite important and simply, as a technology move and a move in terms of efficiency, not only in water, but also for the ability by the households. So, it uses to have those devices and in that way, people can be much more sensitive to water consumption, as well as to prices in general, cost in general.

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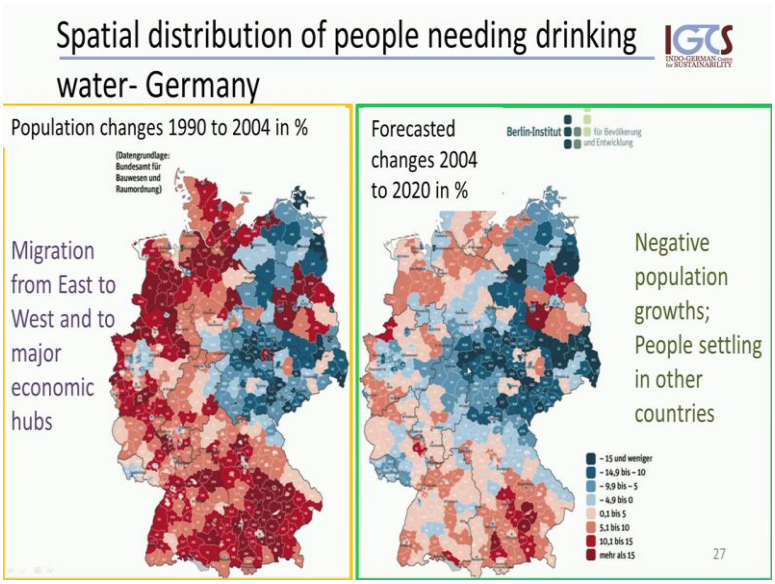

Now, this is one; the other one is the spatial distribution of the people, who need drinking water, and who depend on the infrastructure into which, the government has invested so much. Here, we have a map of Germany and we see population changes. This is population changes here; the scale from blue minus 15 percent to dark red, to more than 15 percent, above 15 percent. We see here a major crack, going through the country. The change monitored here from 1990 to 2004. We see here that we have major parts in east, which are blue and so a negative change and then, we have some major dark red areas in West Germany, where this increase, the population increase took place. So, what we see in those areas, the major move migration from east to west, and from any part of the Germany towards the industrial hubs or (refer Time: 11:24) around the ports and so on.

Now, when we look into the forecast of the changes, to be same between 2004 to 2020, then we still see those short division here, but actually expanding. The blue parts; blue, light blue and dark blue parts, which means the sharp decreases in population rate expand, and the boundaries or not as sharp anymore to say, in this first map here. What we see here is two things; one is negative population growth and we also, see that people actually, settling in other countries; people move, concentrate in some of very few industrial hubs or economic hubs, but there is also, a major component of the population actually, leaving this entire area and moving to other countries, may be in Europe or outside Europe. So, this has a major impact on the water infrastructure; infrastructure that is in place and has less people to serve.

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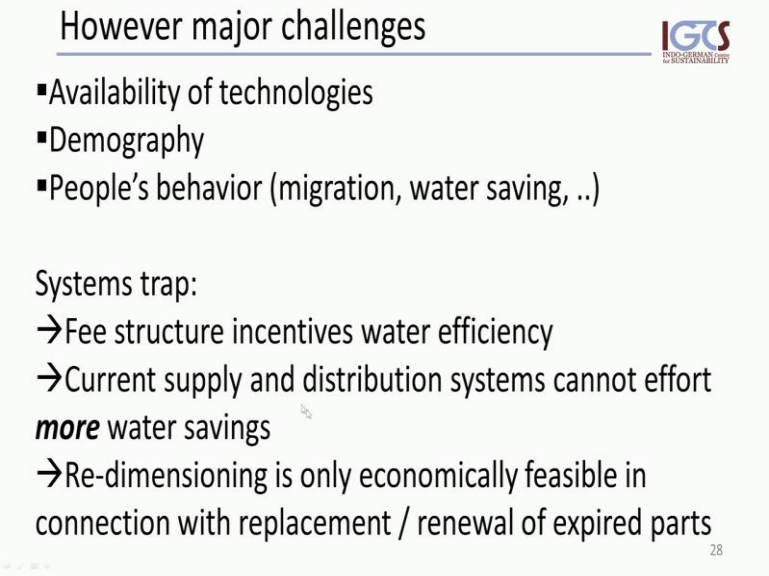

So, one hand side, you have the ability of technologies. On the other hand, you have demography's, the migration patterns, the negative population growth observed in Germany and then, we have people's behavior; the choices people make. Then they may migrate; they may surf water(refer Time: 13:10) save water; they may spend money in water saving technologies; they may save water as much as they can, where will not watering the gardens or washing their cars at home, things like that. So, what you see is something that we can call a systems trap.

This is on one hand side. The fee structure for water there has been an incentive for water efficiency; this is what was wanted very much, but the current supply and distribution systems cannot afford more water savings. This is the trapping which we are, right now, and redimensioning is only economically, feasible in conjunction with the replacement or renewable, renewal of expired parts. So, we cannot remove or decommission parts of our water supply infrastructure, unless it can be paid for; unless it pays for itself or it is economically feasible. So, this is actually, putting the water service providers into a position; they have to supply; even they have to flush the system to keep it functioning under good conditions, whereas on the consumer side, people are not ready to pay more or consume more water to maintain the system in proper function.

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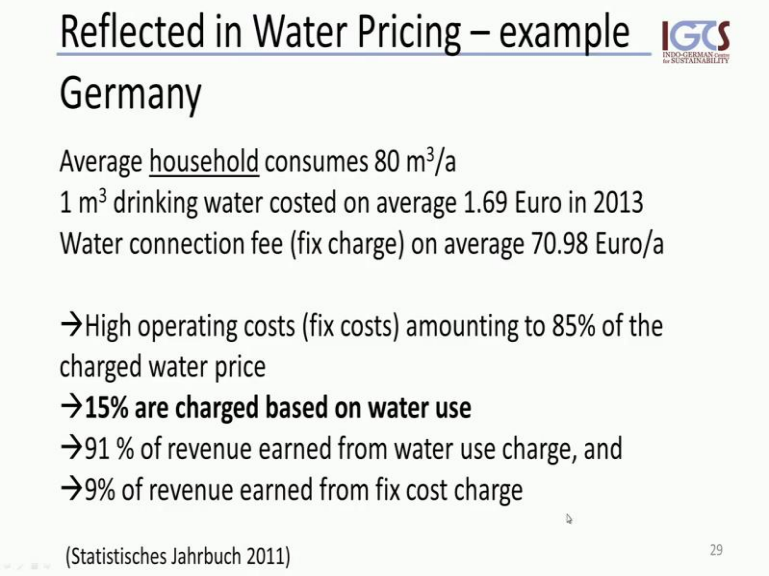

Now, what is reflected in the water pricing is that the average household in Germany consumes about 80 cubic meters per year; one cubic meter of drinking water costs that on an average about 1.69 Euro in 2013. Here, the water connection fee, which is a fixed charge, costed an average 70.98 Euros per year. So, there are very high operating costs, which is very high fixed costs, amounting to 85 percent of the charged water price and 15 percent are charged based on water use only.

So, the 15 percent is what is being influenced actively, by the active consumer whereas, the rest is imposed by the high operating costs, to maintain the structure of full cost recovery. Then we have the 91 percent of the revenue earned from water used charges on the other hand, and 9 percent of revenue earned from the fix cost charges. So, this shows a little bit of which, what problems, what the systems failures are, and where major restructuring has to take place in the near future to keep and cope with these changes.

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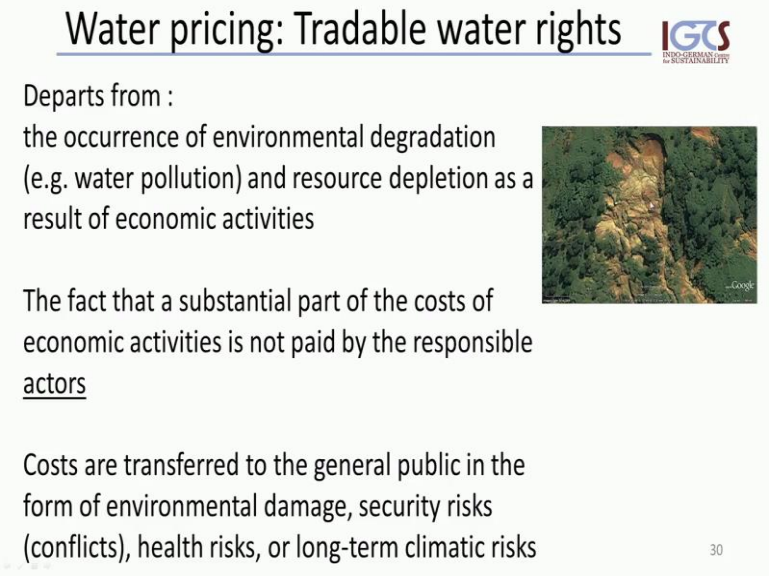

Now, let us step out of these tariffs and the water charges, and look into another type of water pricing, which I have mentioned in our introduction. Let us talk about tradable water rights. Where does it come from? It departs from the (refer Time: 16:45) environmental degradation is taking place, whenever we use water. There will be water pollution. There will be resource depletion taking place as a result of some economic activity. The fact that substantial part of the cost of the economic activities is not paid by the responsible actors, those who run the economic activities, brings two points together, which can be structured in a so called tradable water right.

Those costs cost by these economic activities right now, who impact on the environment are generally, transferred to the general public in the form of environmental damages in the extremes, in the form of security risks, such as conflicts, health risks or long term climate changes or climate risks. This is just an example of some mining going on, which has disrupted a large part of the surface here, remove fertile soils, removed forests here, and has polluted forests and entire river systems as an example, where some benefit from this mining activity and, are not taking care or not actually, charged for the pollution, because that pollution is being transferred from this side to somewhere; far away from these economic activities are going on. This is just one example. You could have taken any other example here.

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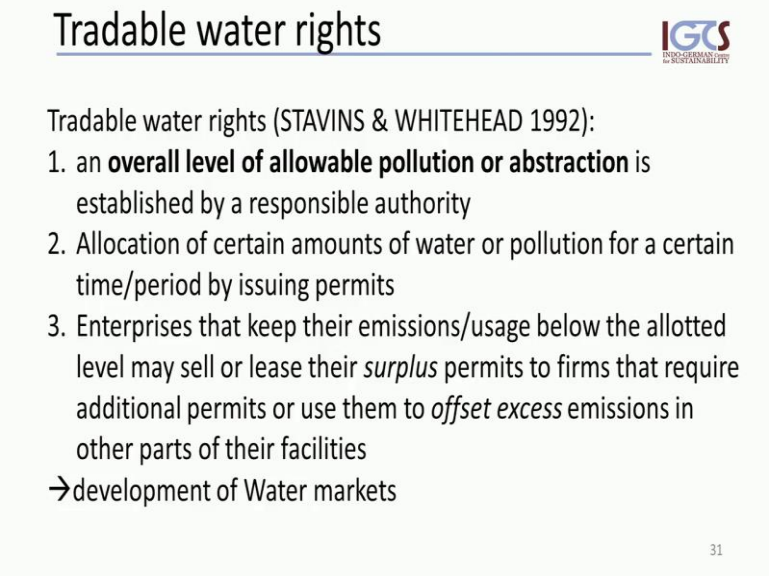

Now, the tradable water rights actually, starts from or take into account, an overall level of allowable pollution or abstraction; that is established by one responsible authority. This is the departing point. So, some point we have to, somebody has to define; what is the overall level; what is what can the word cope with, or what can the specific river basin cope with, and what is an allowable pollution, an allowable amount of abstraction.

You can see already, that this can be very less scientific discussion, and less science based and very much driven by interest groups, and very much driven also by political powers. This is also exactly, what we see in terms of the climate change discussions at the moment going on. So, the same problems apply to the case of water whereas, water can be, we can apply such a stream in just one catchment; we could apply that in larger catchment also, or we could try to apply something at a global scale as well. Then, there must be some responsible authority being set up, and it is accepted by all of these different parties apparently, involved in these water right trade.

Now, the allocation of certain amounts of water pollution for certain time and certain period, are conducted by issuing permits. So, this means you have to be a registered water user or a registered water polluter and for that, you receive a permit; you pay for that and you receive a permit that is valid for a certain time and a certain period, may be during a year. Then enterprises that keep their emissions or their water abstraction; their usage below the allotted level; they may sell or lease their surplus permits. So, it is a

market. It is an economical mechanism that allows trade of these permits, which can be sold to a firm that requires additional permits to pollute more water, or to abstract more water, or to use those as offset excess emissions in some other parts of their facilities. So, this is where, this economic cycle plucks in and where, also competition take place. Now, this creates the development of water markets; water markets, but also it creates a market of pollutants or pollution emissions that are traded essentially.

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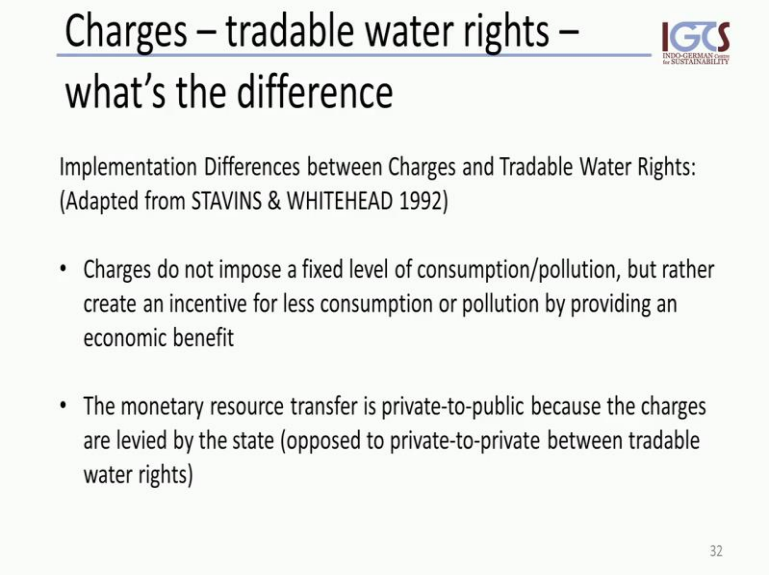

Now, you may now ask what is the difference between a charge or a tariff of the tradable water rights; there are differences. So, those charges do not impose a fixed level of consumption and pollution, but rather create an incentive for less consumption and less pollution by providing an economic benefit. We have seen examples just now whereas, on tradable water rights, you have a certain permit and if you do not use that permit, it is a waste of money in this case. You are registered, may be as a polluter whereas, you are not really polluting and you may be punished for not polluting or not using your permit, or you may be punished for not consuming, or not abstracting the amounts of water that you were allotted to.

So, it is not generating a positive economic outcome and positive economic benefit at a larger scale. So, the monetary resource transfer is private to public, because the charges are levied by the state. This is opposite to the private to private relationship between the tradable water rights. So, this also secure some transparency as what is assumed and

balance also, of social interest, over poverty alleviation interest also, social economic development interest of the country when charges are set up versus the private to private interest, which are purely profit oriented schemes.

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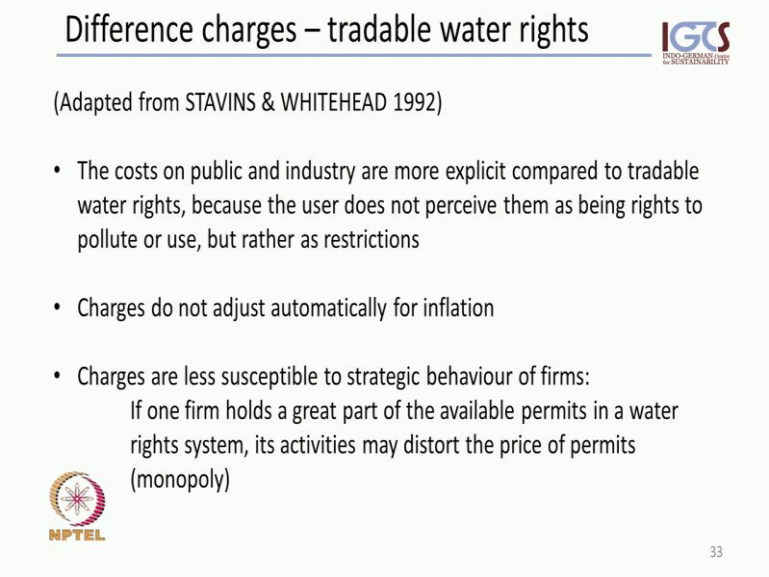

Now, the costs on public and industry are more explicit, compared to the tradable water rights. This is because the users do not perceive them as being rights, to pollute or use, but they rather, see this as a restriction. That is again, a different mechanism, which can be exercised a charge and emission of effluent, effluence or an emission or emissions; then, this is rather a restriction or enforcing of restrictions, rather than inviting somebody to use it up to the upper limit, that somebody has been allotted to. Also, the charges do not adjust automatically for inflation, and this may be a negative aspect in this case, because you remember that infrastructures, water services have to be funded and have to run economically.

There must be a possibility to invest in the maintenance and expansion and upgrading these infrastructures, which may not be given if some of the economic deflation, inflation processes are not accounted for in the charges. It does not happen automatically. The charges are less susceptible to strategic behavior of firms. So, if one firm holds a great part of available permits in a water right system, the activities distort the price of permits entirely.

It is a mono-polytization, which can easily happen in water trades, as you remember from our virtual water trade discussion; that is there are only a very few a hand full of corporate companies, dominating, controlling the entire water bottling business. So, imagine applying tradable water rights as the only mean of controlling water abstraction and water pollution. This can easily become a system that runs against, completely, against meaningful water management objectives, sustainable water management objectives.

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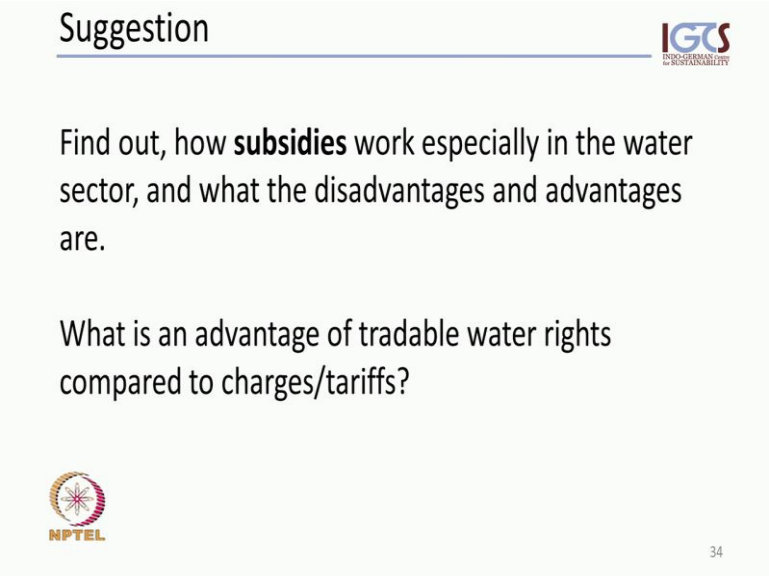

Now, before we conclude for today, I want to suggest to you to find out how subsidies work; especially, in the water sector, we have not talked about subsidies. There is a reason for why it did not underlined and especially, but you should find out about subsidies. What the disadvantages are and what advantages there are, and what may be our linkages between some other subsidies schemes, which influence the water sector. You could also find out little more about advantages and disadvantages of tradable water rights, as compared to the charges and the tariffs. We have mentioned many of the advantages for charges and tariffs, and you may discover more of the good points of tradable water rights and think, whether this could be the mechanism that should be extended more into, in our real water management operations.

With this, I thank you for your attention and I may see you next time again.