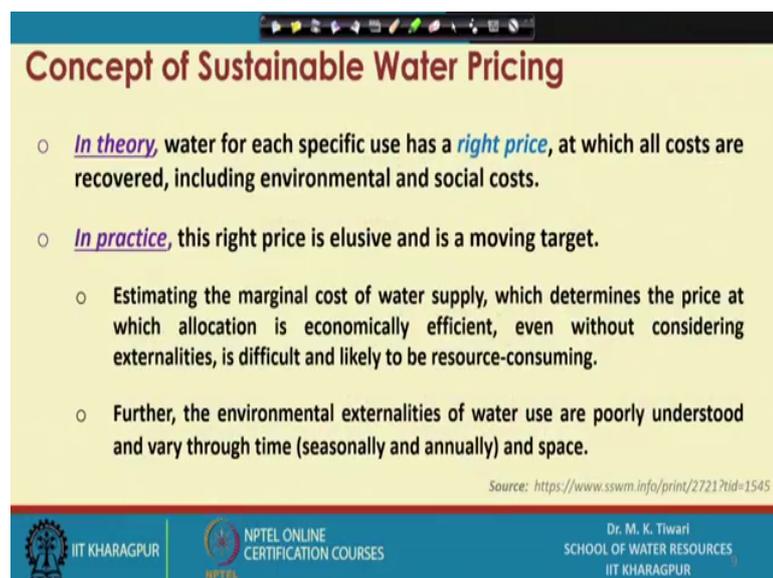


Water Economics and Governance
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Lecture - 22
Pricing Water: Setting Water Tariffs

Hello friends. So, in earlier session of this week we have been talking about the basic introduction of pricing water. Why water should be priced and what are the, how a sustainable water pricing system can help in order to improve the services and overall water facilities? We will continue from there and. So, when we are discussing the concept of sustainable water pricing.

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Concept of Sustainable Water Pricing

- *In theory*, water for each specific use has a *right price*, at which all costs are recovered, including environmental and social costs.
- *In practice*, this right price is elusive and is a moving target.
 - Estimating the marginal cost of water supply, which determines the price at which allocation is economically efficient, even without considering externalities, is difficult and likely to be resource-consuming.
 - Further, the environmental externalities of water use are poorly understood and vary through time (seasonally and annually) and space.

Source: <https://www.sswm.info/print/2721?tid=1545>

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There are two aspects in theory, we can say that water for each specific use has a right price at which all costs are recovered. Including the environmental and social cost. So, theoretically the price of water or a sustainable price of water should actually be the price at which the all cost involved in the water services are recovered. Now, take an example for agricultural water supply. So, the field, it is serving or the area it is going to be irrigate. So, per unit area irrigation charges should be that, it should be able to recover in a sustainable way, it is not recovered does not mean that you recover immediately, but over a design period of the infrastructure, over a design period of the canal, it should be

able to recover the entire investment operation and maintenance cost of the system including any additional, social and environmental cost.

So, that is what financial sustainability means that you in recover all the cost. So, theoretically that price is the right price for the irrigation water. Similarly, for a domestic water supply the investments incurred during the very much pumping of that water then making it, processing it, through a treatment facilities, making it potable then supplying it through the water distribution infrastructure, all this network pipings, all the investment. So, there is some capital investment plus there is operation and maintenance investment which considers the cost of operation and the human resources cost, maintenance cost. So, all these costs are there. So, the structure should be that in during the design period or for a given design period it should be able to recover the investment made, including the installation as well including the capital investment as well as the operation and maintenance or what we call that the recurring investment.

So, non-recurring and recurring both investment should be recovered from the tariffs over a period of time of course, it is not that I have invested let us say 20 crores in installing water supply system. So, I would need to recover that 20 corode from these many number of users and let us put a heavy amount that way that is not done. So, it could be done basically, there are models, we will talk about that. So, one can go for a connection fee from where which he aims to get more of the capital investment and the o annum for the from the regular water tariffs.

However, in practice, this right price is very elusive term and. In fact, is a moving target it is not a fixed, there is no as such fixed right, price for water services in practice, in theory of course, one can estimate that I have invested this much. These are my total investment, these are cost of environmental externalities. This is my overall investment. This is the rate of return that I need or this is the sort of bank rate, finance rate. So, all that in incorporating, everything one can set a, this is going to be the right price for my water charges, but in practically this, the term right price itself is a elusive in terms of water, why is that? Because the estimating the marginal cost of a water supply is very difficult. It determines the basically, the marginal price is or marginal cost to begin with, we will discuss this in a little more detail later on.

But just to since the term has come just in order to give you idea that, marginal cost is the cost of marginal cost is. In fact, the amount needed for adding one more unit of water production in terms of water. It is a common concept. So, in market, it is taking that producing one more unit of a particular product is the marginal cost for that product. Similarly, producing 1 unit of the water for it is designated use whatever could be the used, if it is a irrigation water. So, producing 1 unit or 1 meter cube of the irrigation water making available to agricultural fields, if it is a domestics of producing 1 meter cube of a water for domestic supply or for industrial supply that way.

So, producing 1 unit of product in this case, water extra 1 unit is called marginal cost. So, estimating generally the like fair pricing or the right pricing or the product pricing in the market is done based on the marginal cost aspect, which we will be discussing at the later stages. So, this marginal cost sort of is the price that allocation is economically efficient, even without considering externalities is very difficult and likely to be resource consuming. So, if you want to estimate what is going to be the marginal cost of producing 1 unit of water of course, we are just talking financially, if you include the environmental and social cost. It is going to be even more difficult, but financially you can do that, but still it is a lot more resource consuming needs, lot much of time and it is not that easy to estimate.

Because of the complexity of the nature and moreover, if you are going to include the environmental and social cost, because these environmental and social cost as well as benefits are mostly intangible, one cannot generally quantify it, how much it is or cannot be easily estimated or easily converted in numbers. So, when you do not have these cost in numbers, it becomes very difficult to estimate it. So, that is one aspect that the practical difficulty further the environmental externalities are very poorly understood and they vary through time. So, vary through time as well as in space. So, there is a seasonal variability like the price of water in a rainy season would likely to be different than the price of water in a dry season. Price of water in order of water, abundant reason is likely to be different than in the drier reason.

So, all this aspect in combination makes it very difficult to get to that right price of the water. So, how one can estimate or how one can get to that theoretical right price of water is very difficult and that is why in practice generally, the water pricing is not mostly based on that concept of the right price for pricing water.

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Essentialities for Water Pricing

✓ Mechanism if needed for:

- Quantifying uses ✓
- **Tariff Setting** ✓
- Billing ✓
- Collection ✓

Image Source:
<http://kalw.org/post/your-call-how-are-water-prices-set-california>

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We need a certain mechanism, what mechanism is needed is that, we need the; for basically, if we talk about the fair water pricing, where pricing is done in a fair way, we will, this will be more clear when we discuss the different models of water pricing.

But if one is willing to price water in a fair way, the first and foremost thing needed is that he should have a idea of uses. So, the uses must be quantified, one must have a mechanism of quantifying uses, because if one is not able to quantify the uses you will not be able to know that whosoever is consuming, how much and then how can you develop a sustainable pricing model? When you do not have an idea of the consumption pattern itself. So, in absence of the usage data your the pricing system could be simple, but cannot be sustainable.

So, in order to get to a fair pricing system one must have data of the water consumption. So, for example, in a domestic sector. So, how much water is being consumed from a household, a person may be consuming 15 kilo liter in a month another household may be consuming 30 kilo liter a month. Now, if I do not have this data that who's ever consuming how much, how can we charge him? How can we charge him in a fair manner? Of course, we can charge him and that is being done in a flat rate system, but that is not justifiable, that is not a fair way of charging the services, because when the consumption pattern is different, the charges will also be different.

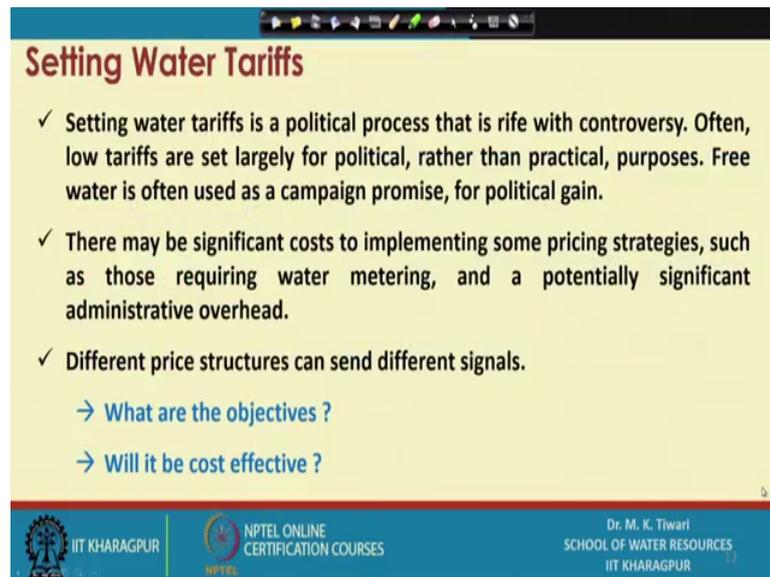
Then there is a concept of tariff setting, which is the most critical one, because quantifying uses we have a set approach, you put the water meters, you will be able to quantify the uses, there is no if and, but that is the only possible way to quantify uses, that connection has to be metered. So, if you meter the connections you are going to quantify the uses, the next thing in order to get a sort of sustainable pricing system or revenue generation system overall if we say. So, is tariff setting. **HOW** the tariffs are set. Now, this tariff setting is very critical that is what we have been discussing, but because there is no right price concept for or there is no practically right price concept for water. So, how do we set tariff that gives us a sustainable revenue?

It is done though, but there are different approaches and there are different aspects. So, that is how the tariff setting is done there are various criterias that are taken care of, then there is billing and collection which are again a straight forward system. So, you should have, once tariffs are set one should have a billing mechanism, that the consumption is properly build and a collection mechanism that they will the bills that are being sent. So, the revenue is being collected, the money is being collected against those bill in a fair or in an efficient manner. So, otherwise failure of last to failure of billing and connection collection system defy the entire purpose of water pricing.

We may have a good quantifying system. So, we can quantify the uses, we can develop a very nice tariff structure or tariff model or sustainable tariff model, but if our billing is not proper or if our collection is not proper, even if the billing is done, billing is relatively easy, one just need to send print and send a bill if you have all the precursors to this is ready so, but if the collection is not efficient if those bills are not collected, the money is not being collected properly. It defies the purpose of pricing water. So, these are straightforward simple, but a very important steps in the very important steps, in order to get a sustainable revenue for such systems.

So, moving ahead.

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Setting Water Tariffs

- ✓ Setting water tariffs is a political process that is rife with controversy. Often, low tariffs are set largely for political, rather than practical, purposes. Free water is often used as a campaign promise, for political gain.
- ✓ There may be significant costs to implementing some pricing strategies, such as those requiring water metering, and a potentially significant administrative overhead.
- ✓ Different price structures can send different signals.
 - What are the objectives ?
 - Will it be cost effective ?

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How do we set water tariffs? What are the basic objectives? What are the criteria that needs to be followed are of very high importance. So, setting water tariff in India and. In fact, in many other places is actually a political process and has somewhat pretty rife with the controversies, generally the very low tariffs are set largely for political rather than practical reasons, because politicians want to gain the vote, they want to have the boards, they want to have that political age or political gain, what we call. So, that way like we can take the example or clue from the Delhi elections. So, there was a campaign, drive were made that water will be made free.

So, water will be made free, it was made free for some first 20 liter consumptions to the metered consumers, but is that a sustainable approach? That is what we have been discussing in this course. So, far that at it is absolutely not a sustainable approach water, if you made water free, even to a certain degree of course, there are many pros and cons of it. There are social aspect and all that, but metered connection from well to do houses, the people, where they have a good capacity to pay for the water. The same people who basically spend thousands of rupees in all other activities are not paying for their basic water.

Of course, they if you see indirectly, if government is making certain things free or certain things subsidized from where that money is coming that money is again indirectly coming from the taxes, that we bear the product that we buy the service takes the product

taxes and all that the income tax the different kind of, all these different kind of taxes. So, there is that is the money that government gets from us and the same money is being routed from the government for the water services, also apart from all other services.

So, eventually when we say that we are getting water free, we are not paying it, the government is paying from it, for it, but the government is again getting money from us. So, the money which could have probably gone in other developmental work or other sort of quality of life improvement actions has now gone towards the feeding. The basic water supplies, which people can anyway pay off. So, that is the problem and that is sort of one aspect, which primarily governs the prices of water particularly in India in most of the states. So, the reason, because these prices are unsustainable is, because politicians or they are the key decision makers. So, those key decision makers or politicians are not willing to, let these prices increase and let the systems become self-sustainable in terms of financial aspects.

Because the water is such a basic essential commodity or essential need that rise in the prices of water could lead to the adverse effect in their political regime or in their political campaigns. So, that is why free water or this kind of thing is often used as a campaign promises for obvious political gains. There may be significant cost to implementing some pricing strategy, such as those require water metering and a potentially significant administrative overhead. So, that is another aspect for the, when we go on to the setting water tariff. We have just been talking about that the setting of water tariffs or setting of basically, when we say that the pricing water, the first step needs to basically, the quantifying the water consumption.

So, if we go on to the quantifying the water consumption from a household level, the there has to be a water meter installed at household levels. Now, installing that many water meters at each and every household is, will require huge amount of money , but eventually like we do it for electricity. So, electricity there are meters installed at each and every houses and we pay based on our consumptions. So, similar thing can be done and. In fact, is being done also many places. We are just talking about daily. So, that free scheme is up to 20 kilo liter, is only for the metered connection.

So, if you are having your household metered, then only all these quantification is possible whether this is scheme or any other scheme, but there are many other cities

which are now, basically towards installing water meter for consumption purpose. Although overall India if you see, we have probably over 90 percent the population or the 90 percent of the households are not connected or not in having the water meter installed, but this the metering status, is sort of increasing day by day now. So, that is another aspect then there are different price structures send different signals. So, what are the objective of the, what are the basic objective if you see? What are the basic objective of pricing, is one aspect and will it be going to cost effective is the another aspect which one needs to consider while setting the tariffs.

So, like earlier session, we are saying that the setting of water tariff serves a multiple purpose. It just, it is just not about the revenue recovery, it is about the sending signal for water conservation as well or it is, it should be considered as a tool of the demand management as well. So, what is the basic objective of pricing water? Whether it is to get some revenue for these services or it is to send a signal for water conservation or send a signal for reducing the demand is that is the basic objective. So, these kind of questions need to be considered before going into making a decision about what pricing structure or what prices are to be adopted for the water ok.

Similarly, whatever system we are going to set up for pricing water, is it going to be cost effective, because if you, for a small society, if you go on to let us say that will meter your consumption and everything. So, that needs too much of finance and putting that much of finance, just in order to pgrade your collection mechanism. How justifiable it is financially that also need to be seen; however, eventually that would be the only option, probably water tariffs need to be set from time to time.

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Setting Water Tariffs

Water tariffs need to be set, and from time to time, revisited and adapted.

- ✓ Tariffs generate revenues to recover specific costs (e.g. operation and maintenance costs)
- ✓ Tariffs generate funds for necessary infrastructure development and expansion.
- ✓ Tariffs send appropriate price signals to users about the relationship between water use and water scarcity
- ✓ Subsidising tariffs for low-income groups ensure that poor households also have sufficient and affordable water services.

Source: <https://www.sswm.info/print/2721?tid=1545>

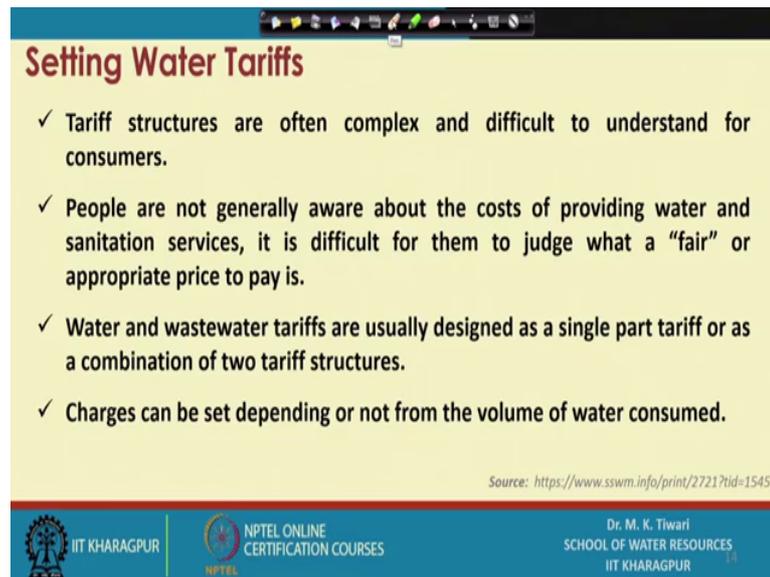
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And should be revisited and adapted it is not that once a water tariff is set. So, we set it for let us say very large period of time and people are paying the same amount for over the years and years and years that is again not going to be the sustainable.

Why? Because as we have been discussing that when we are talking about the right price of the water. So, you see that there are lot of factors that affect the price of water or the services of water. There are a lot of external and internal factors, which governs this and those factors are variable in nature. So, with change or with the variation in the nature of the cost being involved or the resource availability or the system, one should go for pricing, one should actually adapt these thing in the pricing structure as well. So, once a water price or water tariff is set ideally, it should be from time to time see that whether it is still justifiable or needs some further adaptation or revision.

So, that should, that thing should be considered the objective of set setting water tariffs could be the tariffs for generating revenues to recover the specific cost like just operation and maintenance cost. So, in India if you see the most of the cities, the price or the water tariffs that are set does not even recover this operation and maintenance cost. So, when ok.

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Setting Water Tariffs

- ✓ Tariff structures are often complex and difficult to understand for consumers.
- ✓ People are not generally aware about the costs of providing water and sanitation services, it is difficult for them to judge what a “fair” or appropriate price to pay is.
- ✓ Water and wastewater tariffs are usually designed as a single part tariff or as a combination of two tariff structures.
- ✓ Charges can be set depending or not from the volume of water consumed.

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So, this does not even recover this operation and maintenance cost. Now, apart from this there is a lot of expenditure towards the infrastructure development and which is the capital cost of the infrastructure.

So, that tariff should generate necessary fund for infrastructure development also or is that going to be borne by the government. So, all these objectives need to be set, while going for a tariff structure. So, whether the utility is going to charge for the infrastructure also from the consumers or it is going to be charged it is going to charge only the operation and maintenance cost. Now, for infrastructure again, because then there were time value of money will come, infrastructure is being spent today for a utility, which will going to, probably going to operate for next 25 - 30 years.

So, the consumers which are going to be benefited from the utility over a period of next 25 to 30 years. So, the infrastructure cost should be sort of proportionally distributed for that many time period, it should not be like if you are taking the connection. So, this is my price of the connection in order to recover that infrastructure cost that it is going to be huge and probably no one will take that can, that sort of connections. So, these objectives need to be considered then the tariffs should send the appropriate price signals about the relationship between water use and water scarcity.

That should also be ideally one of the objectives of setting up water tariffs, the price should signal that what is the status of water availability at that particular place or for

that particular community, if the water is in abundance. There is probably not much encouragement for water saving. So, the prices are can be kept more or less like uniform whatever you use, but if let us say the same place is when moving towards water scarcity or for example, seasonal purpose. In summer, when you have very less water. So, you one can actually increase the tariff. So, that people get a signal that, this is the time we should actually reduce or water consumption, because rates have gone up.

So, those kind of in corporations should be considered, while designing the water tariff structures then there at times it needs to be subsidized for low income groups ensuring that poor households could also have affordable water services. So, there is an approach that you spread the subsidy homogeneously, which is being done for example, in Delhi. So, who's ever whether you are a millionaire, but you will not be charged for first 20 kilo liter of water or the subsidies should go to the low income groups only. So, those kind of models need to be evaluated and need to be worked out.

Further the tariff structures are generally quite complex and difficult to understand for consumers, at times people may not generally aware about the cost of providing water and sanitation services. So, it is difficult for them to judge that what is going to be a right price or what is going to be a fair price, that basically should be paid for the water, then water and wastewater tariffs are designed, could be designed as a single part tariff or as a combination of two tariff structures and charges can be said depending based on the volume consumed or may not be based on the volume consumed. So, there is a flat model which exists, which does not consider the volume consumed for pricing water.

So, these are sort of some of the like points that needs to be taken care of while setting water tariffs and there are various structures for setting water tariffs, there are various approaches and various models what we can call for setting water tariffs and those models send different kind of signals also, different kind of pricing signals, they serve different objectives and serve different kind of signals to the consumers. So, we will be talking about those models in the next session.

Thank you.