Water Economics and Governance
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Lecture – 29
Conflicts in Water Pricing (Contd.)

Hello friends, so we will continue our discussions on to the conflict in water pricing for the other type of conflicts which are faced while pricing water.

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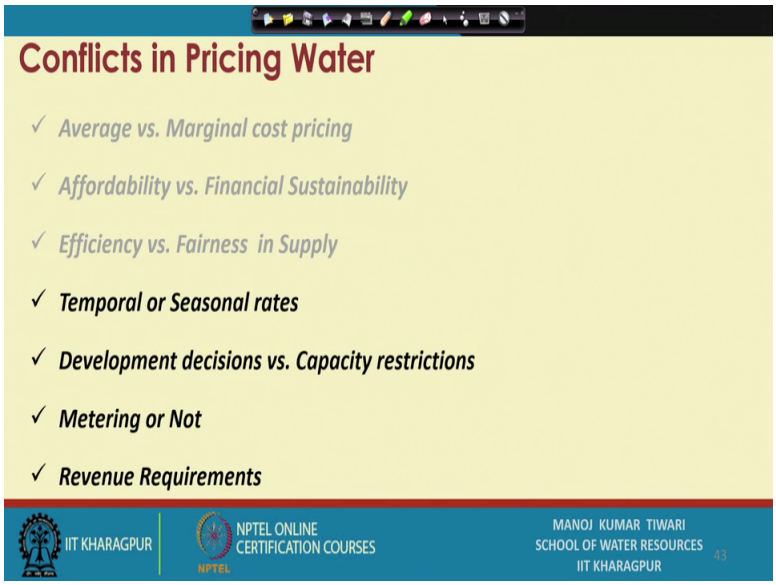

Earlier, 2 sessions we talked about the average versus marginal cost pricing conflicts which one is to be preferred, then affordability and financial sustainability criteria and efficiency and fairness criteria's in water supply, particularly with the framework of urban water supply.

However, the like if you see a broader picture in fact, the other applications like when we talk about the cross subsidies that usually come from the industrial sector, the subsidies are much larger on to the agricultural consumption of water. So, the subsidy cross subsidies can also be that way that coming from one sector and going to the other sector.

However, in broad picture if you see, at times one can see that even if the subsidies that are being given to the agricultural sector is benefiting overall society in terms of the lower values of the food products because the water is subsidized, so the food products

that are grown could be sold at a relatively cheaper prices, otherwise the cost of food or cost of drains or cost of that material which is being grown by the farmers is probably going to be higher.

So, those kind of cross subsidies aspects are there and we have had discussion onto that in the earlier session. So, we will talk about the other conflicts including the rest of the 4 that you are seeing on your slide temporal and seasonal rates, development decisions were said capacity restrictions, about the metering whether it should be metered or not and some aspects about the day when you requirement.

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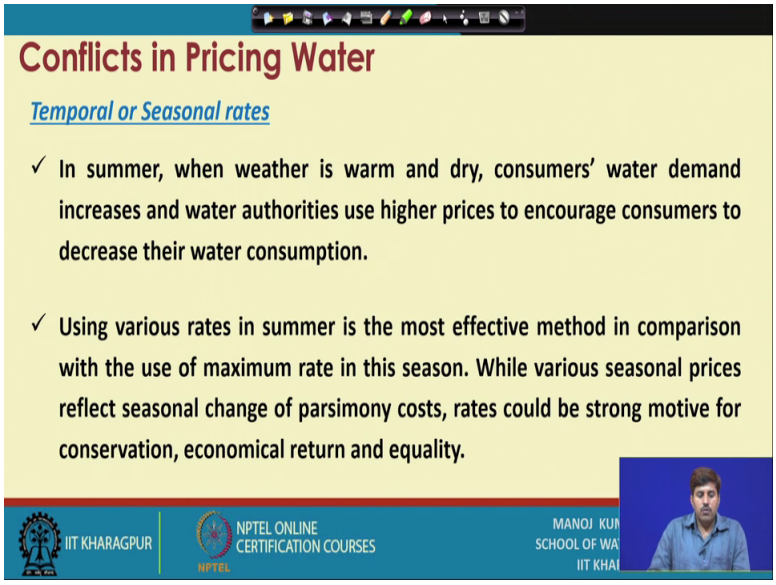

To start with there is a conflict on to the pricing water at temporal and seasonal rates. So, remember when we were discussing the pricing structures we did talk about the seasonal pricing structure, where you pay customer pay different tariff, different rate of unit water in different seasons. So, that kind of pricing structure should we adopt that or not those kind of conflicts also appear. So, in summer when water is warm and dry, the demand is obviously, going to be increased and water authorities can use or may use higher prices to encourage consumers to decrease their water consumption or at least not to go for the wasteful uses of water.

In the particularly, when there is a lien patch when there is a least amount of water available in the resources. So, using various rates in summer is the most effective method in comparison to the use of the maximum rate in season, that way. So, while various

seasonal prices reflect seasonal changes of the cost rates could be strong motive for conservations, economical return as well as the quality.

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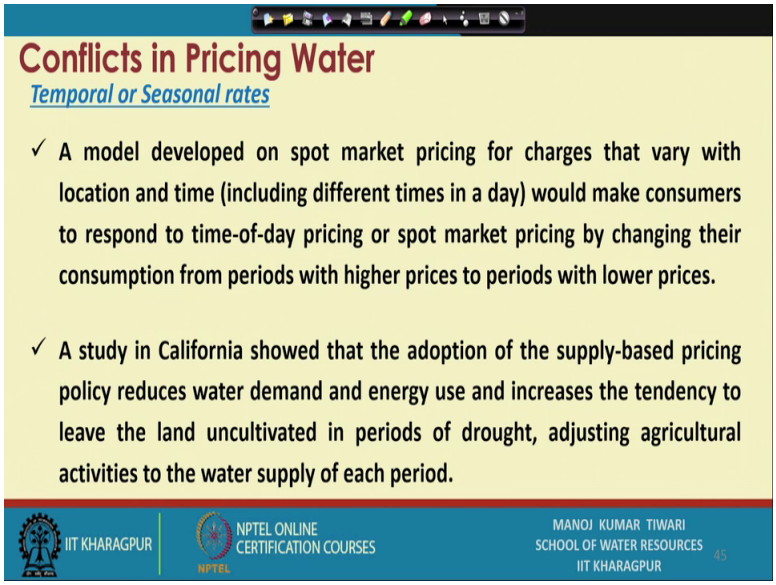

A model developed on spot market pricing which is shorter run marginal cost. So, short run marginal cost pricing based model charges that vary with the location and time, so at that particularly specific time, including a different times in a day. So, that kind of system can be developed, but it is going to be way too complicated and that would make consumers to respond time of day pricing or spot market pricing by changing their consumptions from period with higher prices to period with lower prices.

For example, when the generally the water consumption is very high in the morning hours. So, if you want to reduce water consumption in morning, a higher tariff structure could be set for morning hours and a lower tariff structure could be said for the afternoon or night uses. So, morning and evening probably when the uses are little higher can be set enough with the higher tariff structures, while the off periods can be set on up with a lower tariff structures.

Like, many times we get offers from telecommunication companies, phone companies, mobile companies that you use mobile in day hours will be charged at this rate, while night calls will be charged at a reduced rate or free rate. So, those kind of policy could be basically bought into the water sector as well. So, user in that case would be basically

responding the time of day pricing or spot market pricing by changing their consumption pattern from period with higher prices to the period with lower prices.

So, if the demand is very high in the morning, if you charge morning waters at high prices many people are at least those who stay in the household may shift, so there are some of the activities like may they take bath in the afternoon or in the late morning hours when the prices are reduced. So, that will reduce the burden on the utility also of supplying what too much water or very high pressure water in the morning hours and that way sort of controlling the consumption pattern.

A study in California showed that the adaptation of supply based pricing policy reduces water demand and energy use and increases the tendency to leave the land uncultivated in the period of draught, adjusting agricultural activities in the water supply in each period. So, that is on us again for a seasonal price study.

So, for agricultural sector let us say you say that, the price says for the summer is going to be way too high. So, people may leave their land uncultivated in the summer and they may rather go for more cultivation cycles or look for the cultivating or look for the using agricultural land when the water prices are reduced. So, those kind of options could actually save the demand of water, reduce the demand of water in the lien patches.

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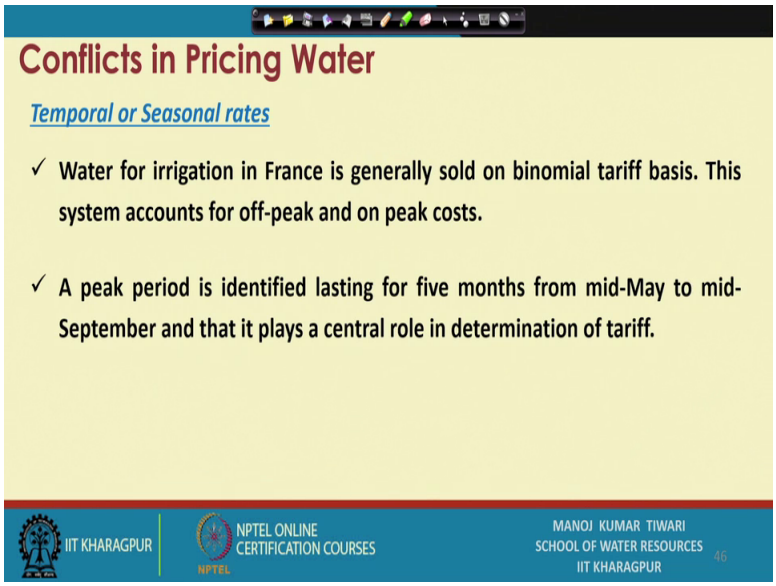

In a basically study in France the water for irrigation is generally sold on binomial tariff basis. So, there are 2 different tariffs, the system accounts for off peak and on peak cost. So, a peak period is identified lasting for 5 months from mid May to mid September and that it pays a central role in determination of tariffs. So, a peak period has a different tariff and an off peak period has a different tariff in the study.

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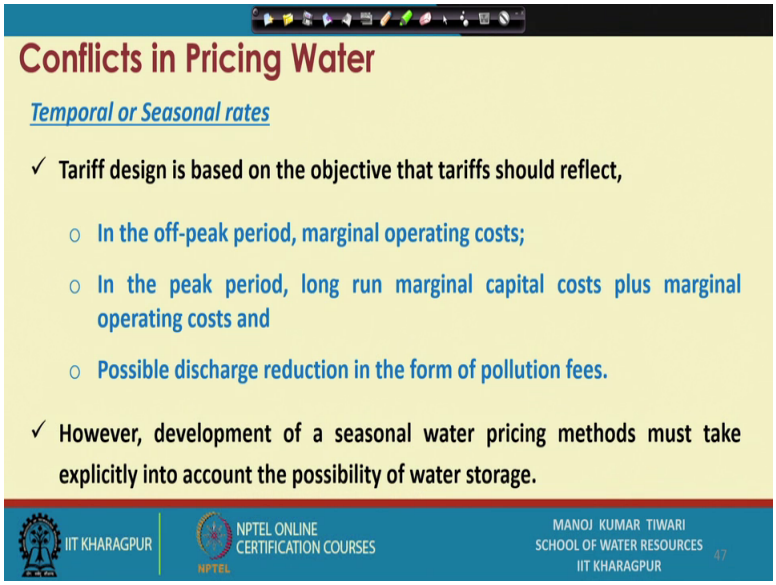

The tariff design particularly the temporal or seasonal tariff design is based on the objective that tariff should reflect in the off peak period, marginal operating cost. So, the at least the minimum operating costs should be recovered during the off peak period, while in the peak period it should also have a long run marginal cost component plus marginal operating cost as well.

So, there is basically marginal operating cost and long run marginal cost which encompasses the utilities prospective of getting water from the further sources because when in off peak period, in a peak season when demand is too high, let us say you are withdrawing water from a river and the flow in the river itself is very low, so either it is going to basically add in some sort of stress on to the river, the minimum environmental flow of river could not be maintained if you withdraw greater extents of water.

So, in order to basically manage that you should include a long run marginal capital cost as well, so that what if you need to install a further capacity or bring water from some

additional places. So, all those additional installation would basically need cost and that can be generated by the higher putting, higher tariffs in the peak period.

Further, there is a pollution fee can also be included which sort of compensates for the possible discharge reduction in the form of pollution. So, those kind of fee could also be included and in combination a tariff structure could be defined. So, in the off peak season may be charged at a marginal cost and in a peak season may charge at a additional cost. Again, with this model as well all the concepts of cross subsidies and other aspects could be bought in.

However, development of a seasonal water pricing method must explicitly take into account the possibility of water storage, that can be one aspect which needs to be very much taken care of because what happens if you charge water at higher tariffs in some season or in some phases, the people may store water when it is at lower price and use it when it is charged at a higher price. So, those kind of possibilities particularly when the variation are diurnal like as we were discussing earlier that you may have a higher tariff in the day times and then higher tariff in the morning hours and then lower tariffs for the rest of day or afternoon or night. So, people in that case may actually store water in the night and then use again in the day hour.

So, although if even if they are storing water in the night period. So, they are basically storing it in a lower demand phase. So, still it is better than that, but in order to like meet the criteria or meet the objective of the seasonal rates or temporal rates, one should see that whatever consumption is being made during the peak period is to be paid during the peak rates and the larger storage particularly let us say for agricultural storage or making some reservoir or those kind of things. So, that sort of larger storage in the off peak season is also should be penalized and should be discouraged.

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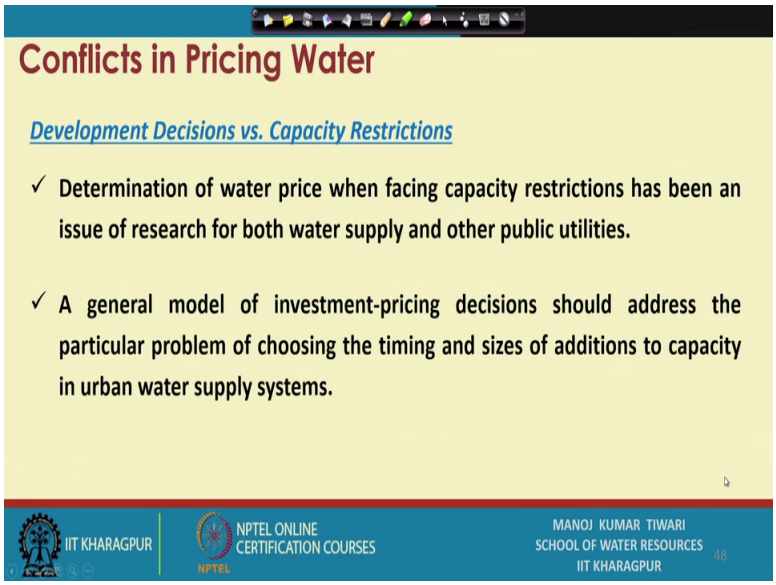

Then, there is another conflict which basically goes towards whether the while pricing the agency or the utility should go for development decisions or capacity restrictions. So, the determination of water price when facing capacity restriction has been an issue of research for both water supply researchers as well as the other public utilities.

A general model of investment pricing decision should address the particular problem of choosing the time and size of additions to capacity. So, when and how much capacity enhancement is to be made needs to be basically decided and accordingly investment pricing is done.

So, particularly when we are talking about let us say long run marginal cost. So, long run marginal cost, include all these aspects; that down if you are installing a water utility today. So, you can plan phase wise expansion that I install a capacity with 100 MLD, let us say at this time and then although my demand is 60 MLD, I am expecting that in the next 5 year or in the next 10 years this 50 MLD is going to go around 100 or 110 MLD. So, at the end by around 10 year, 10th year, I should plan the next phase of expansion of my utility.

Now, once it is planned that after 10 year the utility is to be expended for let us say another 50 MLD. So, how much cost is going to come for that expansion will actually be included in the long run marginal cost of the utility. So, this kind of investment pricing decisions needs to be taken and should be addressed, while deciding the tariff.

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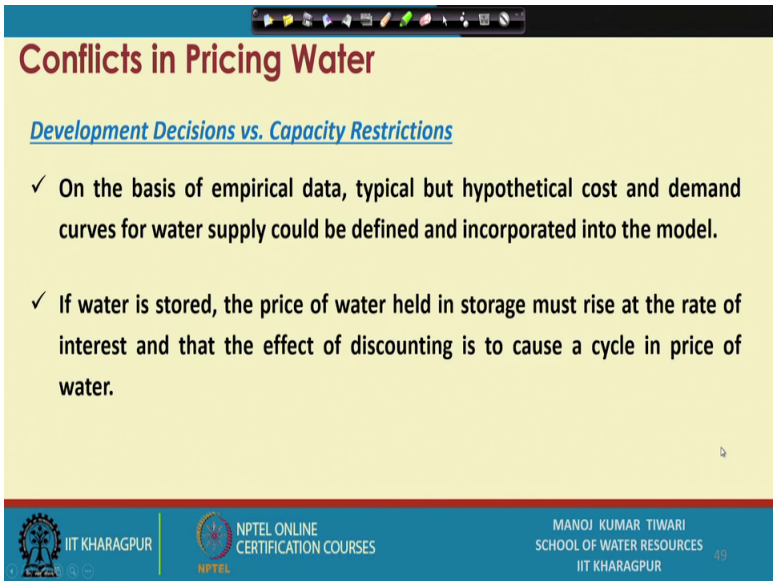

On the basis of empirical data, typically but hypothetical cost and sort of demand curves for water supply could be defined and incorporated into the model. So, one can basically define a hypothetical population growth, a hypothetical demand pattern that how the demand is changing, per capital demand is changing and what is going to be my approximate cost at the when I am planning to basically enhance the capacity. So, what is going to be the hypothetical cost because the cost for the next, after 10 year is going is very difficult to predict precisely. So, that is again going to be a hypothetical cost.

So, what is going to be the cost? What are going to be the demand curve? What is going to be the population curve? So, all these input data, all this empirical data or input data needs to be taken care and analyzed properly. If water is stored, the price of water held in the storage should rise at a rate of the interest that typically bank and or other financial agencies charge and that the effect of discounting in to a basically cause a cycle in the price of water. So, that needs to be considered.

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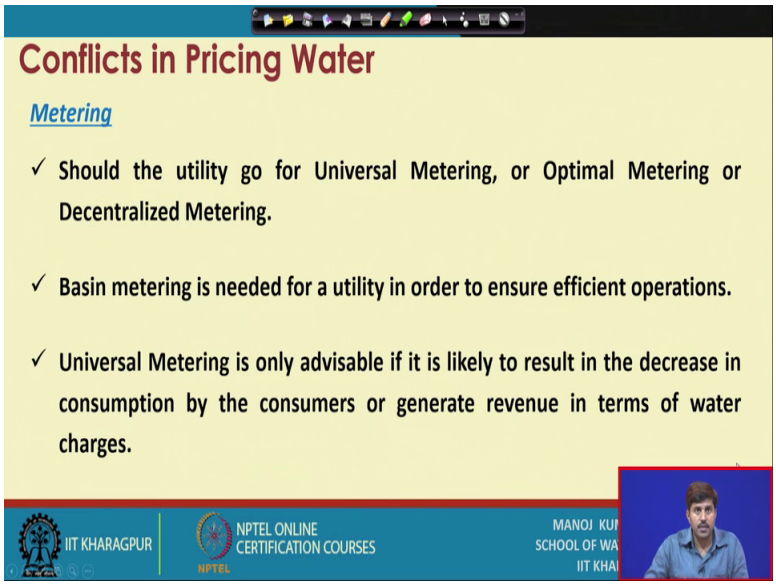

Well, then a decision needs to be taken about the metering as well. So, should the utility go for universal metering or optimal metering or decentralized metering? So, if you recall the discussions done in week 4, we did talk about the different aspects of metering and the, what are they like no metering case, then universal metering case, then optimal metering or decentralized metering cases.

Now, of course, the universal metering is going to cost the most because each and every household is going to be the metered, while no metering at all is going to be the very detrimental because the utility will not be able to operate efficiently. The basic metering will be needed for utility in order to ensure the efficient operations, otherwise utility will not have an idea of how much water is going in which area and all these aspects. So, a pricing structure without basic metering is particularly of no use, one has to go for flat pricing model and then they are all basically conflicts and all other things mostly goes off.

So, the basic metering is a must that is a must then after when you have to have meter at least some connection then your choice comes between whether to go for metering all connections or optimally metered connections based on the social advantages or decentralized metering for the utilities cost recovery purpose. So, universal metering, which is the most costly would only be advisable if it is likely to result in decrease in the

consumption by the customer or generate revenue in terms of water charges, that is the 2 basic objective of metering the customers.

So, when the customer is metered and charged based on their consumptions they can actually manage their demand in a better way and can reduce the wasteful uses. So, one advantage is that by controlling the uses, the metering can actually lead to the environmental benefits, can lead to the reduction in the water wastage and can work in favor of water conservation.

While, the other advantage is that with the metering and with an idea of consumption the utility can charge the consumers based on their uses and can actually run in the economically or financially efficient way. So, this objective has to be fulfilled for universal metering, if utility is planning to go for universal metering, the utility must ensure that yes my these basic objectives are being fulfilled at least if not fully, at least one of these is definitely going to get fulfilled, then there is a point of metering.

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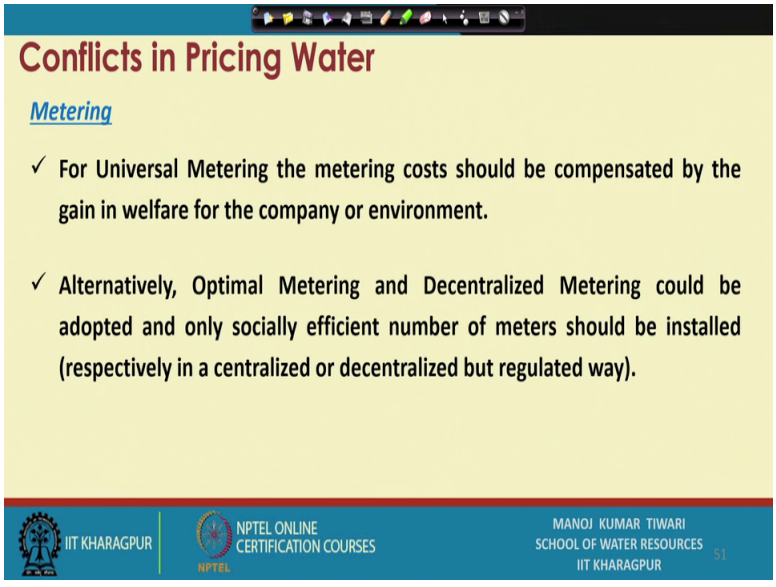

The universal metering, for the universal metering the metering cost should be compensated by the gain in welfare for the company or the environment, whatever welfare gain in terms of either financial recovery or in terms of environmental benefits is to be considered. The other point is that, there is if it is not happening the utility should alternatively look for the option of optimal metering and decentralized metering, which

can be done at a lower cost and could be adopted and only socially efficient number of meters could be installed respectively in centralized or decentralized, but regulated way.

So, even the optimal metering or decentralized metering will fulfill some basic essential requirements of the metering because metering is not just done for the purpose of generating revenue, it also gives an idea of the losses in a particular section that how much water is being pumped from the storage reservoir and how much water is being, is actually reaching at the customer end.

So, in the gap between the 2 will give you an idea of the water losses and as we are discussing the optimization of water losses should be one of the prime aims of the utility and for that purpose at least the basic either optimal or decentralized metering is needed. So, those kind of metering or if it is universal metering of course, it can be analyzed in a much better way that with sections and where the losses are occurring. However, it will again turn to be a very extensive analysis, but it is possible at least because the data will be available.

On the other hand, such objectives can be fulfilled by the optimal metering or decentralized metering as well, where all the consumers are not metered and meters are only installed at key identified key locations, identified key consumers where in the sector one needs to charge at a higher tariff rates or one need to charge, one need to be charging based on the consumption or all other like loss management, the pressure management, the flow management of the utility is required. So, then the optimal metering or decentralized metering could probably serve the purpose.

So, what kind of metering is needed is another conflict. However, of course, if the cost is to be managed the universal metering is no doubt going to give you the most advantage as it can give you the data of the consumption from each and every household. So, that is the best, it can be giving the losses to the more precise or more localized fashion, the losses water losses or leakage idea or theft idea can be taken from the more precise location.

So, there is no doubt that universal metering is the best, but at this same time it needs too much of expenditure and whether that expenditure is returning in terms of either utility benefits or social benefits only then it makes sense, otherwise the expenditure could be avoided.

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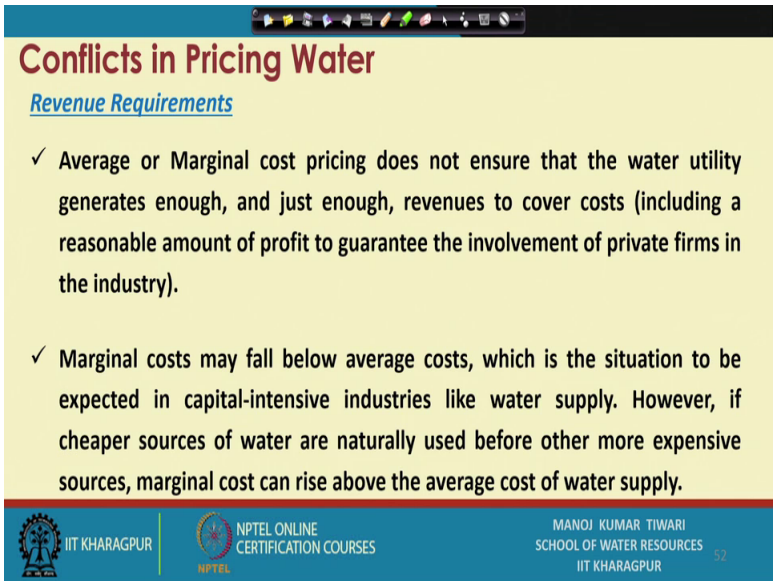

The other conflict that, utilities has to consider at times is how to manage the revenue requirements? Which is again based on the costing, so average or marginal cost pricing does not ensure that what a utility generates enough and just enough.

So, the revenue to cover the cost including a sort of a reasonable amount of profit to guarantee the involvement of private form in the history would be needed, in the industry would be needed. The when we try to say that the utility needs efficient operation and at we have been discussing earlier this week that of the 3 component the owner is likely to be the government because water resources cannot be owned by the private companies generally.

So, owner is a government, it could be given on lease and all that that is other aspect, but eventually owner owning of water resources if it is with government that is the best case scenario. Then, there is an operator which could be either public or private. So, the operator could be private party also and if a private party is coming into the operation of course, they need some investment, some sort of return onto their investments.

So, they need some at least basic minimum profit. So, that the private parties are interested in that, otherwise it is again going to lie with the public sector only, which can actually take it as there are no profit no cost basis or alternatively can lend off to a private company to operate under sort of pre defined or pre agreed notional or minimal amount of profit. So, those profit margins and all that also included into the cost that

needs to be covered and that either average or marginal cost pricing system as we discussed earlier is to be employed.

Now, marginal cost may fail below average cost at times, so that is the point that particularly when you see that you are drawing water from a relatively difficult source and there are likely to be other alternate source available. So, in that case your marginal cost could go marginal cost could actually go lower than the average cost. For example, if you are drawing water in let us say summer phase or this thing and you are incorporating long run marginal cost.

So, in the monsoon period or another period when water availability is going to be a plenty, in the average cost for that particular season is going to be high, but if you are in going to include long run marginal cost it may actually go below the average cost as well at times.

So, then there can be a problem of such scale and which is the sort of situation expected in capital intensive industries like water supply. However, if cheaper sources of water are naturally used before other expensive sources, marginal cost will obviously, rise above the average cost of water supply and that utility will be in the financially good shape.

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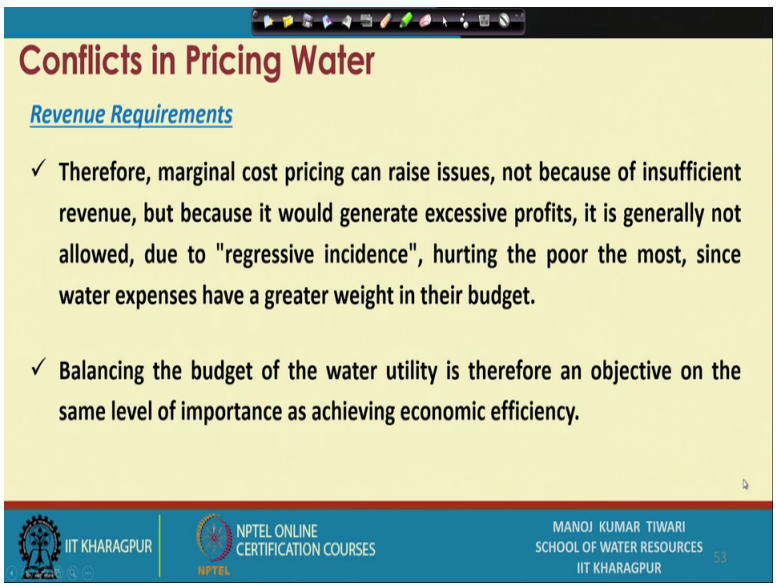

So, marginal cost pricing can sort of raise issues not because of insufficient revenue, but because of it would generate excessive profit also at times, when your marginal cost is too high it is generally not allowed due to regressive incidents.

So, too much of profit generation is not allowed in water sector because water is a natural commodity by itself and the government should actually made water available with no profit. Only, so utility is operational this thing, operational expenses and a marginal profit can be considered, but extensive profit or excessive profit on water supplies is not something that is taken well by the society, primarily because it hurts the poor the most and since water expenses have a greater weight in their budget.

So, balancing the budget of water utility is therefore, an objective on this same level of importance as achieving the economic efficiency and that is to be basically considered in the revenue requirement analysis.

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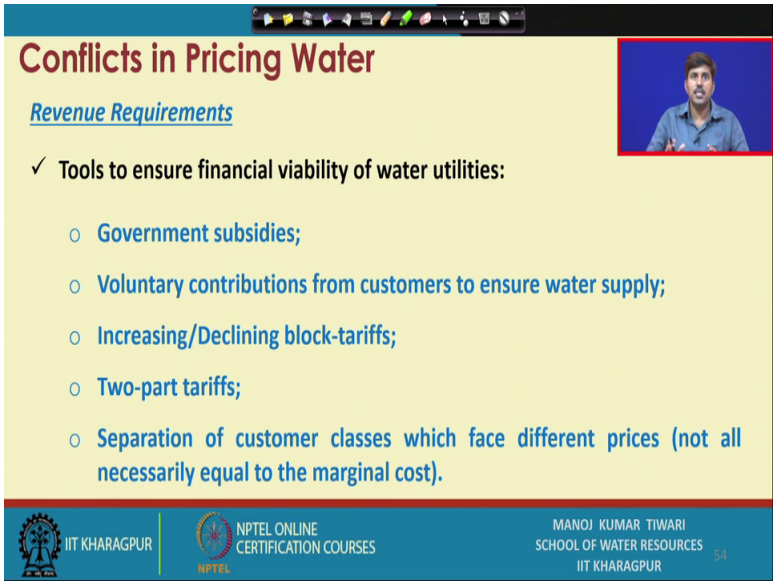

The tools for ensuring the financial viability of water utilities would involve the government subsidies, the voluntary contribution from the customers to ensure water supply, then could be done through increasing block tariffs of course, decreasing block tariffs will not help here or could be done a 2 part tariff, where one basic part is taken for the infrastructure development and other while the other part is used for the recovery of recurring expenses. The separation of customer classes which face different prices can

also be done which is like in the case when not all the customers face equal marginal cost.

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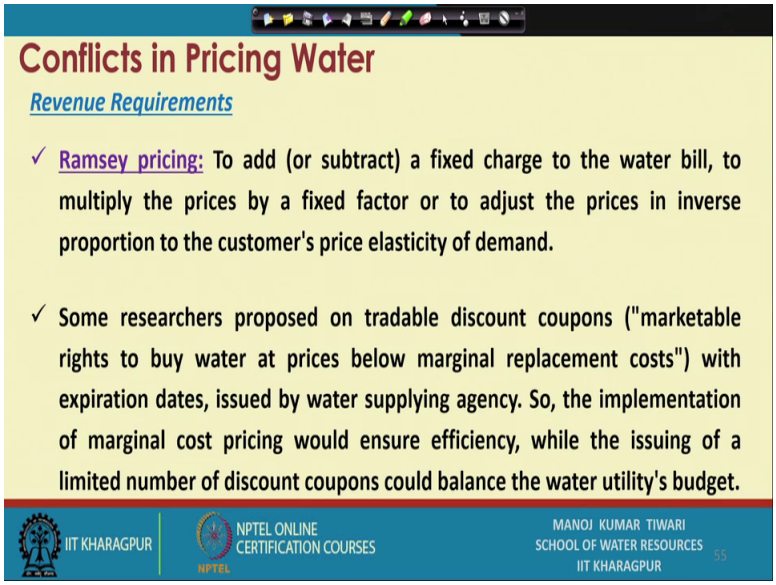

There is a ramp say pricing theory, which basically says to add or subtract a fixed charge to the water bill to or to multiply the price by a fixed factor or to address the prices in inverse proportion to the customers price elasticity on demand.

So, based on the price elasticity on the demand a fixed charge can be added or can be of like price can be multiplied by a fixed number or can be adjusted in a inverse proportion to the price elasticity demand. Some researchers proposed tradable discount coupons, so that is like marketable rights to buy water at a price below marginal replacement cost. So, those kind of coupons with proper expiry date can be given by the water supplying agency of course, to the lower income group people to the needy people. So, that implementation of marginal cost pricing can ensure efficiency.

So, water is priced at a marginal cost, but a few discount coupons can be given to the limited number of people in order to balance the water utilities budget and at the time ensure affordability to the low income group people. So, that is how actually the revenue requirement could be managed. All these different aspects are like choices between the decision makings or the conflicts while making decision regarding the water prices are to be studied thoroughly, are to be discussed, it is good to discuss with all these

stakeholders in presence of independent regulator as we said in the beginning session of this week.

So, in the presence of an independent regulator if all these different points are discussed are relatively conclusive framework, a conclusive price structure, a sustainable and affordable price structure could be drawn for water utilities, which would eventually help the sustainable operation of the water supply utilities.

Similar, practices could be adopted for others water consumption sectors including agriculture and industrial of course, industrial there is not much of all these subsidy aspects and these because you can charge water directly or impose some cross subsidy on the industry by quantifying the gap between the revenue generation and actual cost in the domestic sector. So, with this we end this session here and we will discuss further in the next session.

Thank you.