Sustainable and Affordable Sanitation Solutions for Small Towns
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Lecture – 20
Decentralized waste water treatment system plan for Apappuzha

Now, just quickly I am not going to the first few slides.

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This is all explaining the whole thing about Alleppey and make sure you are also seeing around Alleppey a beautiful place.

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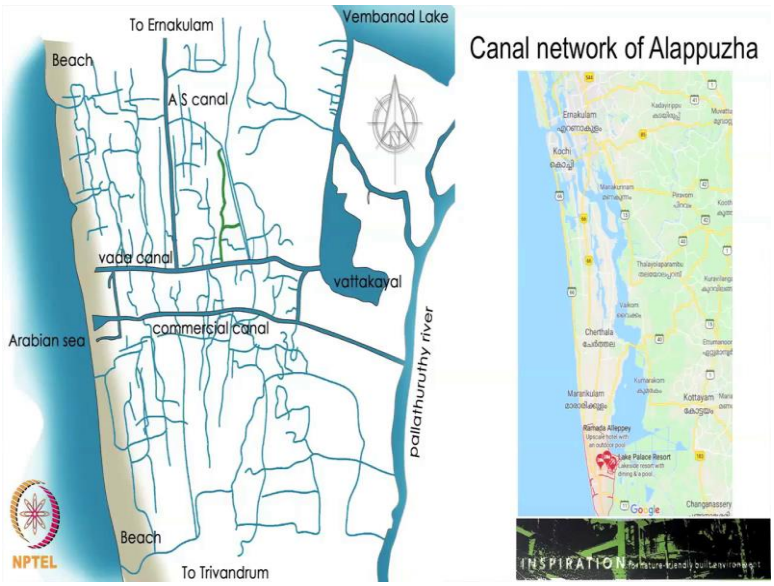

This is basically the canal network of Alleppey as you know Alleppey has the two main canals which is which is a water canal and commercial canal both of which are flowing actually from west to east. So, actually flow into the backwaters there has been attempts to kind of linkage to the sea, but they have not worked because of accretion of sand and you have those network of the smaller sub canals which actually drain into the main canal. So, that is the overall network of it.

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As you saw in the video this is a present scenario, but at the same time Alleppey also has a lot of. So, Alleppey lost its prominence as a port and that is when the canals started losing its importance also.

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But finally, now Alleppey has got gained prominence in tourism ah. So, that is the new economic main thrust in Alleppey beside coir and all that.

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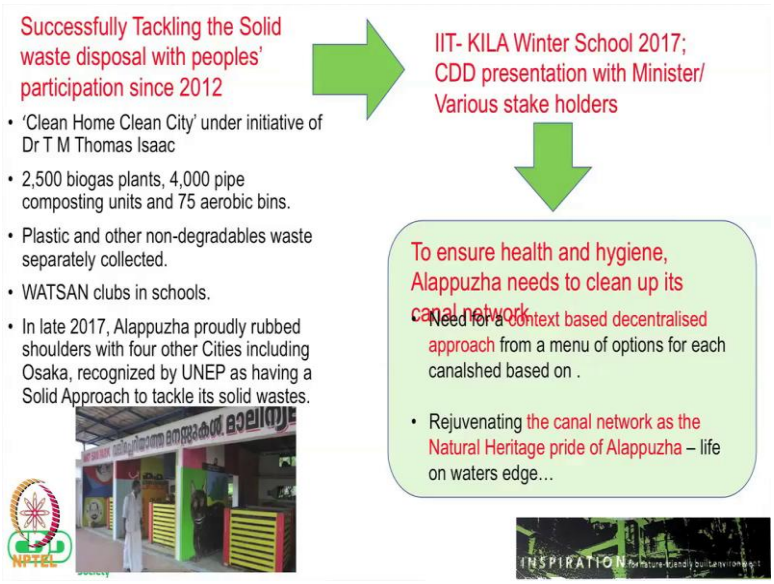

So, this as you know there was this major how this whole thing started was actually as a campaign to address the solid waste issue of Alleppey once that was tackled we moved

on into the into addressing the canal rejuvenation. So, basically it was decided that there has to be. So, the winter school which iit actually conducted in 2017 the main outcomes of it we when we analyzed we realized that one two things have been taken hand in hand one of course, we have to find out sustainable technical interventions are needed.

But the same time the other more most important factor that we realized is that right now the canals do not have any use in the everyday life of people earlier they use to be navigable canal. So, they had a purpose now nobody any purpose for the canal. So, that is why everyone kind of leaves it as leaves it as dumping places So, we said unless and until we kind of bringing some more activities towards canal banks.

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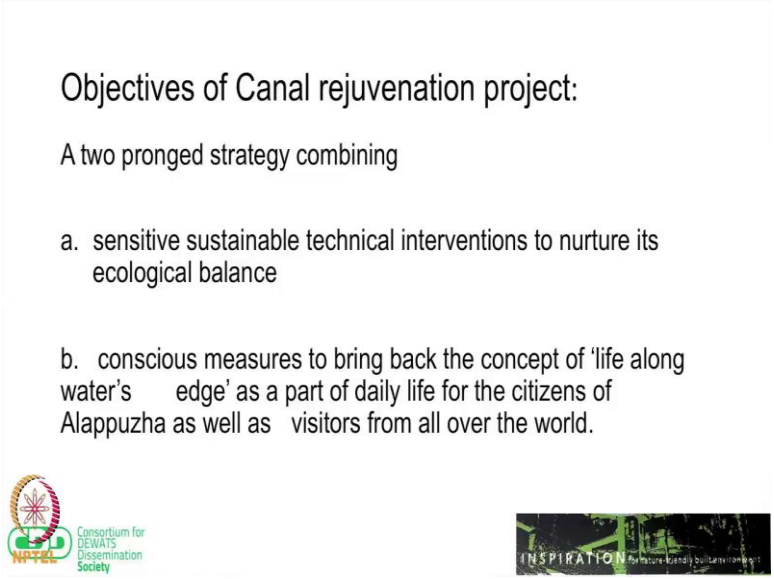

Or kind of make people feel happy about going near the canals and spending some time near it there will not be that sense of ownership to maintain it and keep it well. So, we thought both these things ah. So, bring back the concept of life along water search also should be part of this whole intervention is what we thought especially because Alleppey has the tourism thing

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And of course, as we said the main decisions were also that Alleppey does need a decentralized approach as i earlier said and the significant thing is that often when you talk about cleaning of the canals all the all these year what has been happening is that the main two canals get a lot of attention because thats why the tourist come and go and all that.

So, as you can also see there are there is beautification there is kind of embankments where there are there are kind of almost every year there is some kind of cleaning happening and all that, but what is happening is that unless and until you tackle the pollution in the smaller canals you cannot completely clean the main canals

So, that was one significant decision that we have taken and we have realized that if you have to kind of clean up the smaller canals it means addressing the liquid and solid waste together. And also address a strong water issue because ultimately all these canals has down water drains because specially in a place like Kerala we have 3,000 millimeters plus rain fall the phase of the canal in monsoons and during dry times are completely different actually. And of course, to make it sustainable we need to kind of building do the institution building and we have to get peoples participation etcetera.

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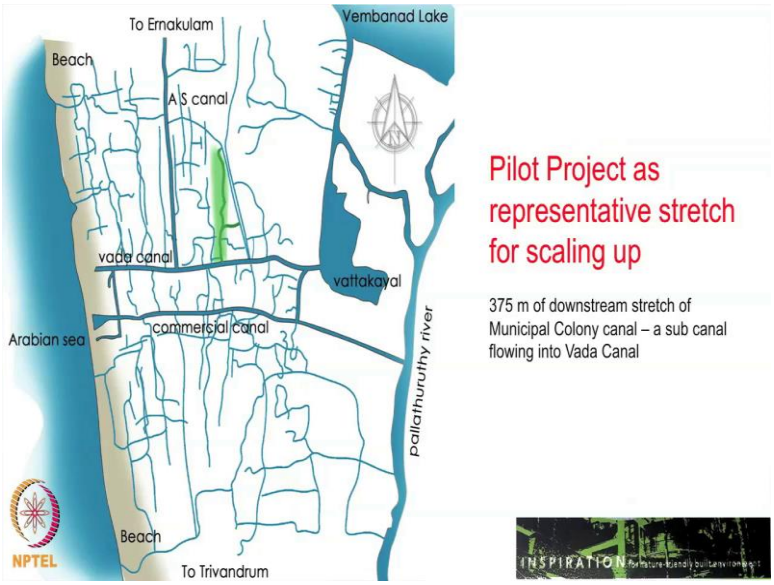

And so this is as we said it.

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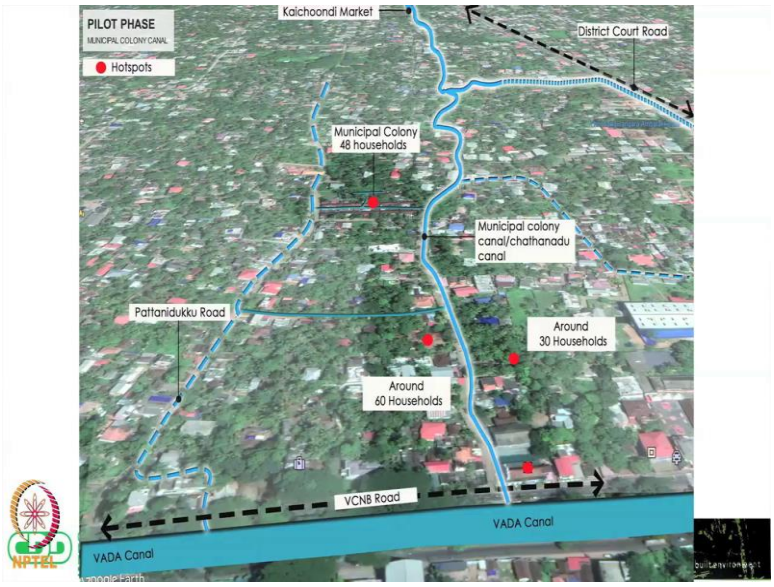

Actually houses about hundred houses there is small colony there are few private sector and institutions etcetera.

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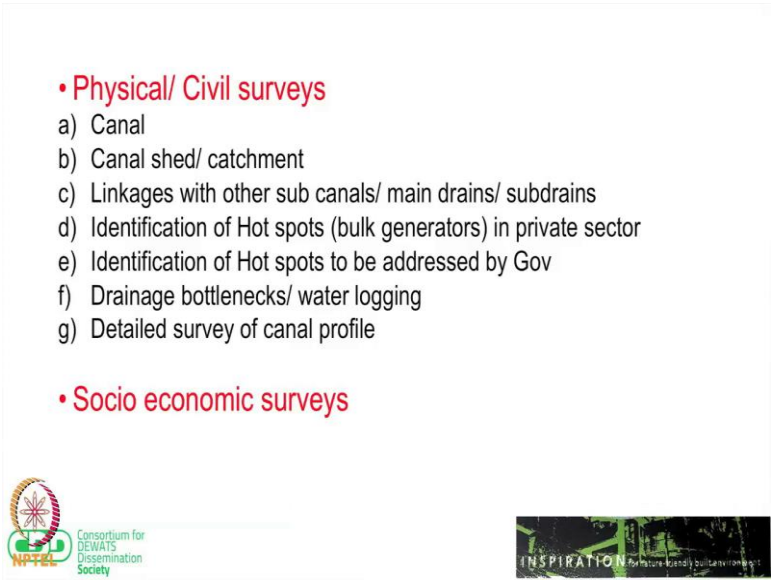

So, we did the whole lot of initial studies we did physical ways of the entire canal stretch try to find out what is the kind of activity that is happening in the catchment of the canals we did our water sampling and testing and all that we did socioeconomic surveys.

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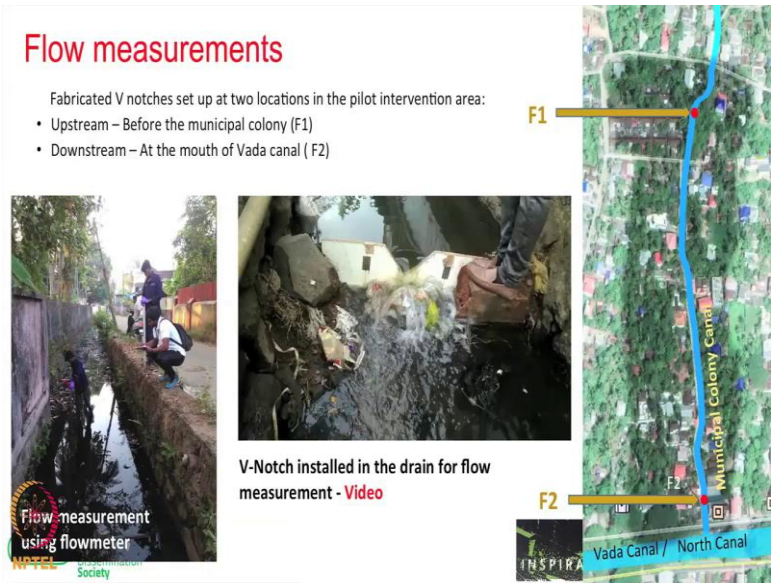

So, all that took these were all images of how we took the flow measurements and we take it at different times of the day different times of the week etcetera the quality also you have to actually take it at different times of the day different times of the week and analyze it during summer during non during the anytime etcetera

This process happen and we learned a lot by interacting with the local community also this is all that and if i take into an understanding the complete into conclusion that are the pilot phase that we took actually the total canal is about two kilometers we took only about five hundred meters of the last stretch of the canal. So, there about one and a half kilometers up stream which we have not touched as part of the pilot phase.

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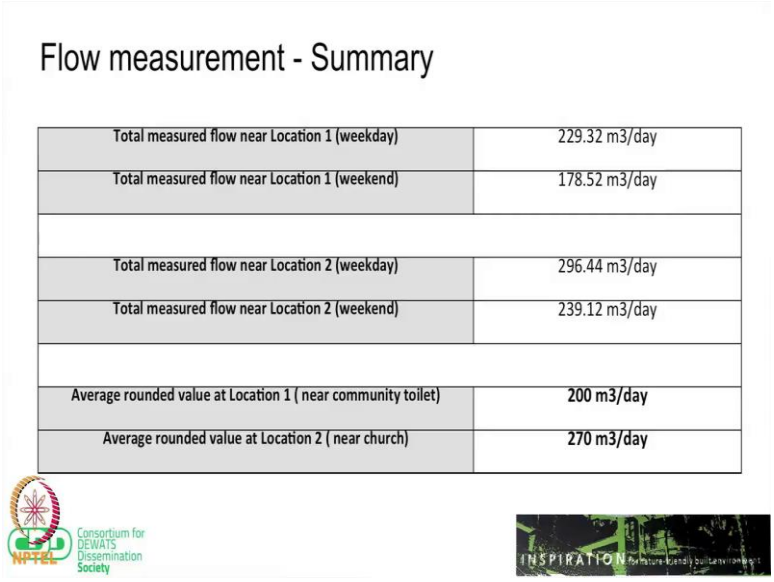

So, we realized that when it actually comes to a pilot phase there is about two hundred cubic meters of water and another seventy cubic meters gets added in our pilot area.

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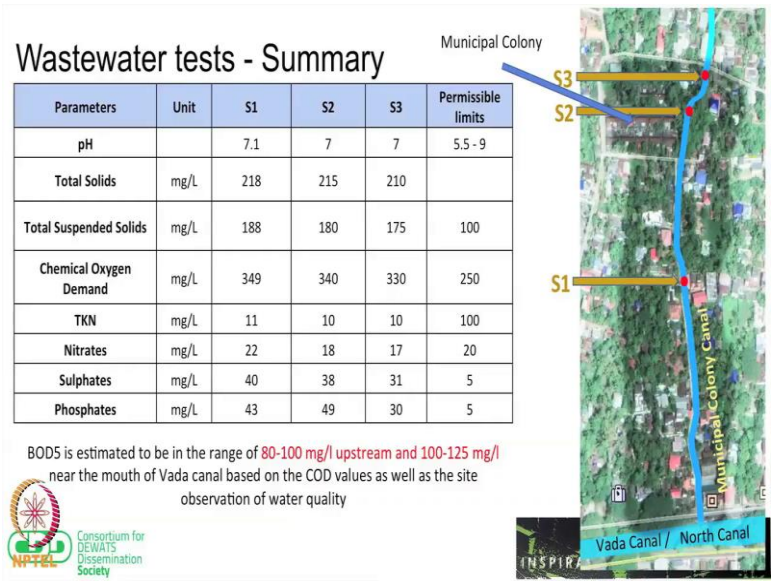

We also monitor all the waste water samples in different cases and all that and we came to certain values of bod COD. We also did the water the drinking water samples from both the municipal supply as well as we took a lot of water samples from open wells and bore wells and all that just to understand and its unfortunate that even the municipal supply water was found to be having ecoli and all that in many places which was I think that is another debate altogether

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So, then we then we actually listed out what are the kind of interventions that we need to do and we actually find out from listed out about eleven specific interventions that one needs to tackle and this we feel is probably a replicable thing for every canal that at least in Alleppey.

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So, we actually it split out like this one is of course, the works related to the cleaning because all these sub canals they have never been cleaned perhaps when years or decades. So, the first thing of course, is to clean the existing canal. So, there is a lot of solid waste accumulation in all these canals you have to de silt it a bit because there is a lot of silt that has also accumulated

Then the second aspect is to find out the liquid waste hot spots like you know there are what we mean by hot spots is bulk generators of waste water not just like a single house and all that like and you have these kind of hot spots in both the public realm as well as in the private sector. In the public realm it might be a market it might be an economically weaker section housing it might be an abattoir or it might be a government hospital or something like that which of course, has to be the responsibility of the civic administration to address it.

So, identifying hot spots liquid based hot spots in the public realm is one thing identifying liquid based hot spots in the private sector was the other thing because those you can actually get the pollution control board to place and enforce the norms because anyone anybody who is generating more than ten thousand liters of waters today expected to kind of set up their own treatment system which often doesnt happen, but that is a matter of policy.

Similarly, you have to identify hot spots of solid waste generation also. So, we sometimes in our own pilot area there was one catering company who was actually catering to about thousand people and all during their season. So, there is a whole lot of liquid waste as well as solid waste that they generate. So, you have to get hold of them and the same thing is there in a public realm also like for instance a market or an abattoir actually generates a bulk of solid waste also. So, you have to identify solid waste hot spots in the public sector also hot spots in the private sector

Then the 60 aspect of it is drainage hot spots because as we also understood when we were studying and what happens is that all these canals as i said were actually storm water drains at some point of time, but over the years unfortunately there has been a lot of indiscriminate encroachments there have been new drains which have been added up there have been drains which have closed there are and most of these are unfortunately very very badly designed or detail.

So, you might have a canal which is two meter wide at upstream when it comes to the middle its probably just become 60 centimeters and then it again widens out and all these things are unfortunately. So, much there; so what happens? So, that they create drainage bottlenecks. So, some areas perpetually become prone to flooding. So, whatever you are trying to do with your canal rejuvenation you have to attend to the drainage hot spots also

Then the seventh aspect is attaining to the household level waste water because as i said we realized that in Alleppey even to kind of combine a cluster of houses because generally in Kerala you have the system where everyone owns at least at least we are talking about middle class and upper middle class people may have at least three cents of land or four cents of land and they have their own house.

So, even if you are trying to combine about forty fifty houses by the time you kind of run the line and take it to a cluster level one thing is that you do not have the land to put up a treatment system there second thing is that even by then by the time you reach about hundred hundred and fifty meters you have to take your pipe down to one and a half meter below ground level where you are already hitting the water table

So, because very complicated to put a pump chamber there and pump it and then who maintains that pump and all these things becomes issue. So, we finally, decided that it

might be worthwhile exploring household level treatment systems for both black and grey water. So, this is one thing that we are right now racking our brains on how to actually approach it make it economically viable or to go for pre fabrication etcetera. So, that is happening. So, with all these interventions once all these seven initial aspects are taken care of at the source we feel that by the time the waste water reaches the main canal it would already have been treated to at least 70 percent is our our assumption actually.

So, then you only have to give the final treatment at the mouth of the bigger canals. So, we suggest that there can be like constructed wet lands and all that or even some in some cases you can think of having floating wet lands in the water itself which will just do the final treatment of water before it joins main water bed then together with it as i said we also have to bring in conscious measures to bring in that sense of ownership.

So, we said why we are actually tackling the rejuvenation of the canal let us bring in good lighting good access to it because often it is the older people or the children who have time to actually spend near the canals and very often these canals have steep steps and all going up. So, they have nice ramps and safe walkways along the main canal. So, that people are encouraged to kind of take that.

And even for tourist actually it was actually each of these stretches about three kilometers if you can create nice beautiful walkways along these canals and have shops on the sides of it, now that we are going to and you have to give good lighting good walk bridges and all that. So, bring in those kind of beautification and sense of ownership and the tenth aspect of it which is very important is to the peoples participation. So, one of the things that we as i said in the video also this campaign activities are also happening simultaneously as we are working on the technical interventions

So, we expect that canal committees will be kind of empowered to once the systems are done to kind of take care of it and kind of do the upkeep and maintenance of each of these interventions. And finally, along with this we are also trying to urge the government to kind of set up the first faecal sludge treatment plant. So, these are the eleven interventions that we are trying to work on the pilot phase and which we will be will be a kind of a replicable approach for each of the canals sheets.

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So, as I said the in the in terms of a canal level cleaning the first thing is this is how the canals were actually when we actually took over the pilot phase this mouth of the canal was choked with solid waste

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We actually decided that you have to do the cleaning before monsoons because that is the time when the flow in the canals is minimum, but you do not have storm water. So, many stretches of the canal were actually practically dry during the non monsoon time because they only had little bit of waste water flowing into it. So, some stretches we

could do it manually some stretches we used with small equipments running on the side of it in some areas we could actually use a small JCB to do the cleaning and de silting and the final mouth of the canal we actually used a little more sophisticated equipment to kind of water jet that can take all the main stunt remove it and all that.

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So, finally, the pre monsoons when we actually cleaned that whole stretch that itself you can that it makes a big difference because the flow improves the sense of when we have realized that once we have done it at least over the last 6 months after clean or 6 months at least we would say there has been at least a 65 to 70 percent awareness created. I cannot say that people have totally stopped dumping wastes there are still pockets where people come and throw, but it has come down considerably because people feel that there is something going to happen here.

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Then the second thing is as was said in the video once it is cleaned we have decided that we put the screens at every 250 meters approximately.

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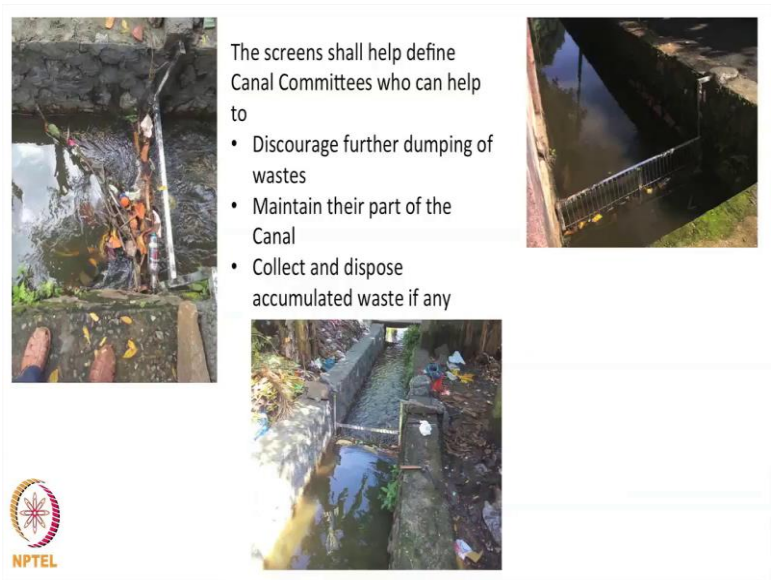

And define a canal committee which will be the people who are actually staying the 250 meters. So, these actually become like an area I mean defining their area of intervention plus it also helps to kind of trap any trash that comes it. So, only that stretch they will have to take care of and we are also going to put a CCTV cameras at each of these

screen. So, that you get to know whether it is somebody who is kind of dumping it into it or whatever like that. So, that is one more intervention that we are doing

So, you can see with the first screen when the monsoons came you can see the trash kind of collecting here. So, which have to be just removed then as was said we there is also this issue that we did that often what happens that with the road and then the canal just dipping down. So, even if your canal is clean if there was trash put on the road once there is with just.

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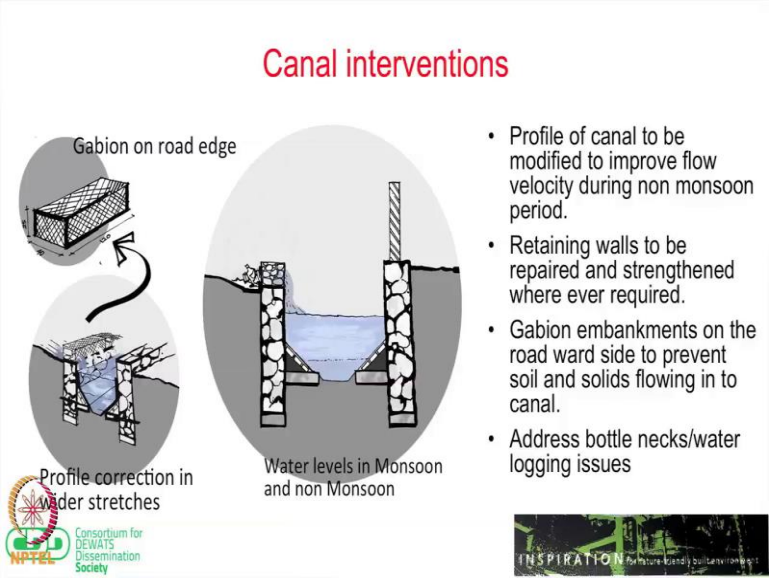

Some sweeping or something all the waste can go into it. So, we are suggesting thinking of putting these gabions which are like open jointed stone works. So, these are like open jointed stone works which would permit the water to flow through, but the solids will be left in the roads

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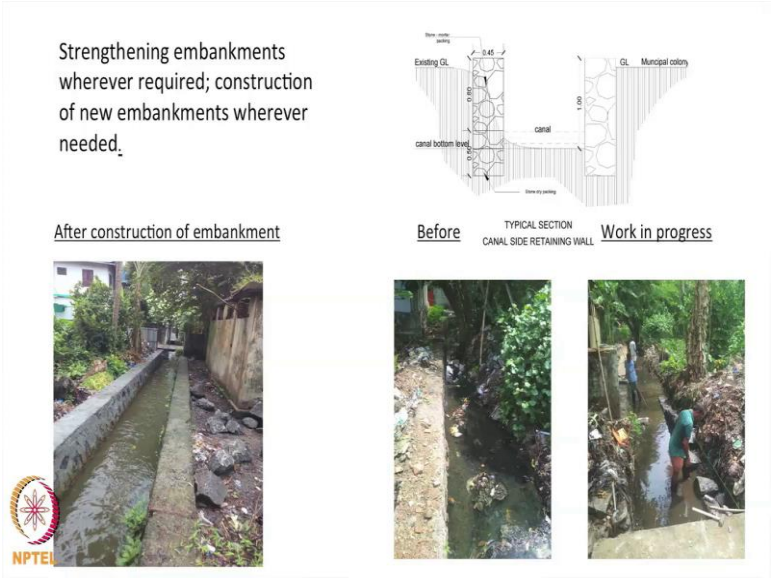

Then there is a thing of embankments some of the embankments that have been broken and all that.

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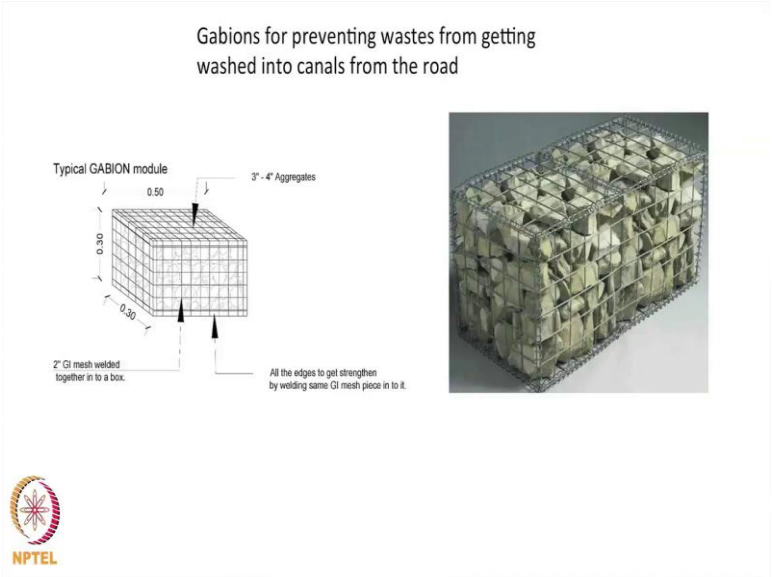

So, we kind of repaint and strengthen at the embankments wherever it was in there. So, those were the kind of multiple interventions at the canal level then the public sector hot spot that we have which you will again be seeing is we had one colony of about fifty two houses what happened was that initially when this colony this colony is about 30 years old or something

So, when it was initially built they were not provided any toilets. So, there was a community toilet that they were using, but as you know people nobody likes like really using a community toilet. So, over the years almost 30 of them or 30 or more of them had built some kind of toilet in their house, but of course, these are all people who have just about two cents of land.

So, the house and the toilet is like really small and they do not have any kind of treatment system they are just given each pits and often and they do not have piped water supply. So, they were kind of putting a small bore well near it. So, it was all like completely unhygienic set up as particularly during the monsoons

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So, we thought that if we have to kind of address their issue we have to first give them also proper toilets. So, the project is actually we are them new toilets for at least thirty five of them who do not have any kind of toilets very toilets that in poor condition some of them have reasonably good toilet.

So, we thought that we will maintain it will just pipe it out and we realized that it is not possible to just give a toilet around because your bathing water and your washing water and your kitchen waste water are also important quantums of waste water all that was just going to a common drain. So, we thought let us pipe that also.

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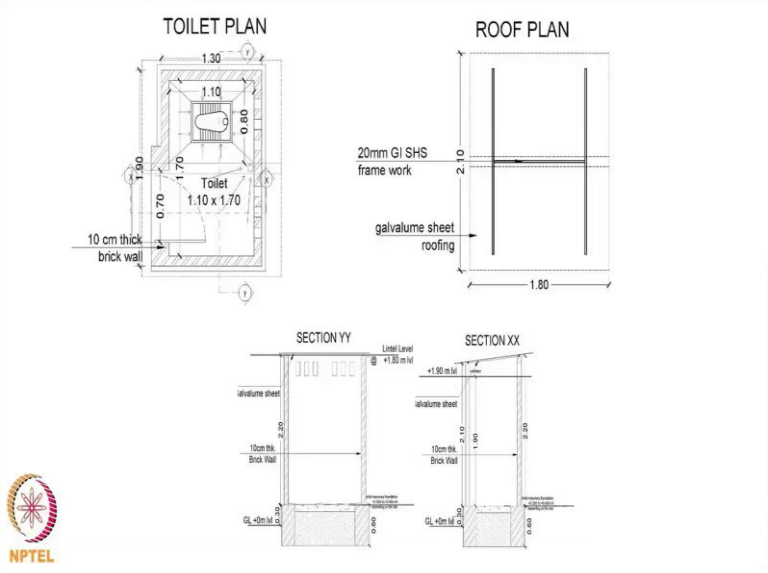

So, this is the work on the toilets we actually these are the kind of houses that we had.

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So, we gave them small toilet facilities these are all completed now. So, they have nice neat looking toilets.

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And a bathing space for each of them this was an open drain into which they were kind of letting off all their waste water

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So, and in some of the existing toilets we just upgraded it for them because there was no space otherwise. So, this was just improvements to that.

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And we also gave each of the house for small space where they could actually wash their cloths and wash the kitchen water and kitchen vessels and all that and pipe that. So, once that is done from every house there is a manhole into which only a waste water goes and we suggested that at the mouth of this manhole where it joins a main line we are going to give a grating. So, that if there is any solid waste like somebody is kind of dumping then that gets trap at their own house. So, if there is something problematic you have to take care of it at your own house level because the moment it gets into the main line then nobody who is going to take care of it

So, after each of these houses. So, each of these house will have a manhole like this with a grating and from there it goes to a common main line and we intend to completely do away with that open drain and pave the whole area. So, there will be only storm water that is going to it and it becomes completely a clean space

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And at the and then we have we plan to provide them a DEWATS system which we treat about fifteen thousand liters of water that work is happening. So, this is a construction of the DEWATS in progress now it is almost done this was just taken couple of days back. So, it is a DEWATS system and then we are deciding that one once all this is done then the community toilet ah no longer has any function.

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So, we found that it is a fairly good building actually. So, we suggested that why not convert that space into a small reading room or something like that for the students

because it becomes a usable space rather than it is getting banged and then it is not used off

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Then we again this is for the private sector hot spots we said that let it be policed and set up.

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The drainage hot spots to be attended as I said.

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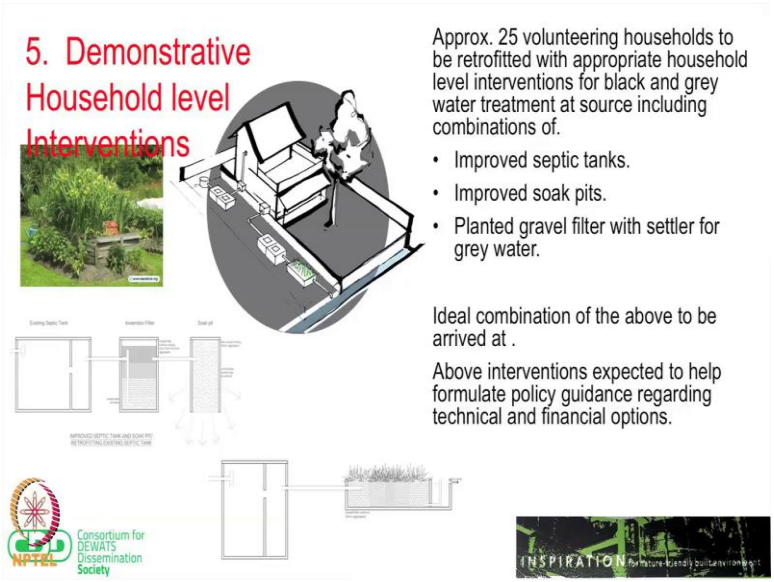

The demonstrative single house hold interventions which I have giving right.

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Now, the fine tuning of the solid waste management is happening through the canal the campaign and we are getting the canal committees to take responsibilities of improving the solid waste management systems. We will also be now getting once all these things are done.

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We will be getting into setting up this constructed wet lands at the mouth of the main canal.

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These are images which we have shown you earlier.

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The overall beautifications we are also trying to bring in a lot of gravity on the walls which will give positive messages on the whole concept of decentralization etcetera good writing.

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And all that the faecal sludge treatment plant as I said ah.

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The these were some of the meetings we had for formation of the canal committees.

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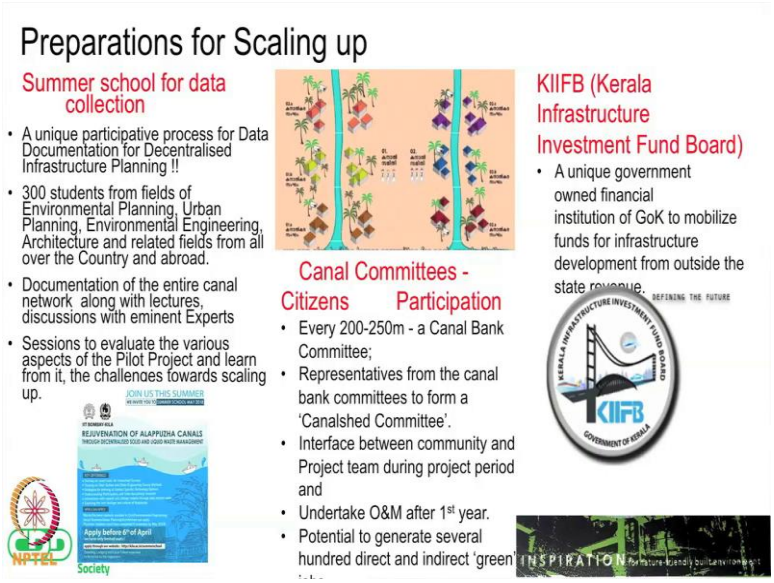

So, there was a minister himself he then kind of motivated and I think three of the committees have already been formed now and slowly we are expecting them to get more active into taking ownership of the canals

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So, eventually we feel that if this kind of a system happens then by say 2020 we feel that Alleppey would have cleaned all its seventeen canal sheds, 250 kilometers of the subcanals and all that and we would we can set up in position all the treatment systems that into a building level and also bring in a lot of vibrancy on the edge of the waters putting a lot of art etcetera etcetera and if it works for Alleppey then we feel it can work for any of the if there are any number of small towns which are on the banks of the Vembanad lake. So, the ultimate vision is that.

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If you can adopt we can show good demonstration in Alleppey then it can kind of take to. So, many of the other small towns also and we can hope that whole of Vembanad lake eco system can be improved eventually thanks.

Hope you enjoyed the lectures. So, what did we learn this week we looked at different models of centralized and decentralized based water treatment systems while professor Kalbar deliberated upon the conventional model, architect Latha explained the process of planning and execution of a DEWATS system let us run through the interventions which were proposed as well as their current status

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The community toilet in the colony which cater to the need of the fifty households was converted into a library cum reading room and individual toilets were constructed for each of the households.

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A proper connected system was also established to transport the waste water generated in each of the households to the DEWATS plant

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The DEWATS plant was designed and constructed by inspiration Kochi.

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And consortium for DEWATS dissemination CDD Bangalore

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In addition to these measures its important to ensure that the sub canal remains clean to trap the solid waste which find its way to the sub canal screens were placed at regular intervals in the canal additionally ten CCTV cameras were also placed along the sub canal to monitor the same and to identify people who were disposing of solid waste to the canal and consequently polluting it.

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The walls adjoining the sub canals were cleaned and painted upon thus creating an aesthetic environment around the canals

This may deter potential polluters from dumping the waste into the canals these interventions have not only managed to mitigate the problem of liquid waste management operates and maintenance of each DEWATS system as well as upkeep and management of the public library can provide employment to local people

Ultimately its also important to note that this project is not only improving the quality of water in the canals and managing the different waste streams generated in the town it can also be instrumental in generating jobs and create opportunities for the youth to get involved in planning their towns more on this will be covered in the next weeks lecture.