Auroville Today

JUNE – JULY 2015, No.311–312

Auroville's monthly news magazine since 1988

The water challenge

Varuna, the Vedic god of oceans and rivers. Painting by Marina Kovalyova, a guest from Kazakhstan, on the wall of the Auroville Water Service

Alan Rusbridger, the retiring editor of *The Guardian* newspaper, recently wrote an article on climate change. One of the things he noted was that newspapers don't always cover the most important topics because "they may be occurring too slowly or invisibly for the impatient tick-tock of the newsroom".

But there is more to it than that. Even when there is a general awareness of a looming problem, we often manage to shut it out or go into denial and continue with business as usual. The Auroville water story may be an example of this. We've all heard, or think we have heard, that there may be an imminent crisis concerning water availability in our area because of over-extraction. Yet we blithely continue to plan for a city of 50,000 people, to construct new settlements and projects, and to use huge amounts to irrigate the Matrimandir gardens as if there is nothing to worry about. In fact, a study done in 2004 estimated that Aurovilians use at least 180 litres per person per day and, in one community, it is over 300 litres per person per day. Toby, of Water Service, says that the daily average consumption is closer to 250 litres per day. Compare this to India, where the per capita water usage is estimated to be around 135 litres per day, or even the U.K., where the per capita consumption is only 150 litres per day.

In fact, the situation in and around Auroville has been classified as "critical" by the Central Ground Water Board in relation to the exhaustion of groundwater resources.

Our blinkeredness regarding the urgency of the water situation is shared by the larger India. A recent joint Danish and American study says there will be no drinking water in India by 2040 if consumption of water continues at the current pace. Yet Tamil Nadu, for example, where in certain areas water-tables are falling catastrophically and the groundwater situation is considered among the worst in the country, continues providing free electricity to farmers to irrigate or, rather, over-irrigate their fields with precious groundwater (and 90% of water use in India is for irrigation.) Over-extraction of groundwater is a natural consequence.

Like climate change, the challenge is huge. The United Nations warns that water use worldwide is growing at twice the rate of population growth. Unless this trend is reversed, two-thirds of the global population will face water "stress" by 2025. And India is one of the countries that will be most critically affected.

Finding ways of sustainably managing water in Auroville and in the bioregion is the greatest challenge that Auroville is facing on the physical plane. Why? Because we are not just dealing with vast numbers of people, or with a very precious resource, or with the complexities of hydro-geology. We are also dealing with mindsets that, after centuries of subsistence living, have come to equate progress and freedom with the abundant use of natural resources.

The bioregion, the world, needs an example that another way is possible. Auroville needs to provide a living example of how diverse individuals can transcend their possessiveness about their "personal" water supply and come together to collectively manage limited water resources in a sustainable and, yes, joyous way.

Are we ready?

In this special 10-page issue we examine some of the issues that influence how well Auroville and the larger bioregion will be able to rise to the water challenge.

Alan

Dear Aurovilians,

It has been my privilege to work, for the past 4 years, as a consultant on the Green Belt plan for Auroville. During this time, I have come to know many of you, and to find a great deal of value in the effort you have undertaken to create this community aimed at forming a higher consciousness.

Recently, I participated in the Retreat at the Unity Pavilion, first with regard to the Bioregion, and then on the question of governance. On the issue of governance, I felt somewhat an outsider, since it is your world and your lives that are under discussion, and I left part way through the day feeling that I should not overly impose my views on the group.

However, after a sleepless night, I believe that there is an absolutely urgent message that I would like to convey to you in the hope that it will resonate with you as well.

In developing the Green Belt Development Plan, which was forwarded to L'Avenir in May of 2013, we had concluded that water was the critical element for organizing the interaction with the bioregion. Studies carried out by Water Harvest had shown that the underlying aquifers (the Kaluveli and the Ousteri) were being depleted by over-pumping. Auroville shares these aquifers with some 700,000 people, mostly living in villages and supporting themselves with farming and village crafts.

The aquifers serve the entire region – they cannot be protected over a small portion of the basin – it is all or not at all. Either we all have water or none of us will have it.

Unfortunately, we know that the coastal aquifer is already becoming saline and that villagers in Bommayarpalayam and PillaiChavadi have already had to abandon using certain wells. The geology of the region is such that the same will happen to the two main aquifers, Kaluveli and Ousteri, if the pumping rate continues to exceed the rate of replenishment.

We know that one of the primary causes of over-pumping is the ill-conceived policy of providing free electricity to farmers to help boost their production. It provided them with no incentive to save water or to turn off their pumps when not needed. Political reality says that it would be impossible to undo this policy without severe repercussions, so another way must be found to conserve water.

Our plan urged that Auroville take the lead in helping to form a regional water compact that would ensure that each village and community within the bioregion gets a fair share of this common resource. I would add to this suggestion that it be reinforced by sharing Auroville's accumulated knowledge in farming and water management in agriculture.

The effort to accomplish this challenge will meet all the goals and principles that have been discussed in the Retreat – and will require growth in all the areas that the Mother put forward as the basis for this grand experiment in human development: Goodness, Courage, Progress, Receptivity, Aspiration, Perseverance, Gratitude, Humility, Sincerity, Peace, Equality and Generosity.

If they fail, the aquifers will take thousands of years to be restored. Desalinization cannot supply enough water at an affordable cost for agriculture. And if only Auroville has a safe water supply, it will have no choice but to share it with the rest of the region.

This cooperative approach is the only possible sustainable vision for the region, and for Auroville.

David Stein

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The water challenge: Auroville and the bioregion

Tom worked for many years in Auroville Water Service and later set up Harvest, an Auroville data collection and water management organization that did much work in the bioregion. Giulio is a geo-archaeologist with field experience in different areas of the world.

Auroville Today asked them to comment upon the urgent challenges Auroville and the bioregion are facing in terms of water resources and what can be done about them.

Auroville Today: Recently, David Stein, the planner who drew up the Greenbelt Plan for Auroville, said unless something dramatic is done in ten years the whole bioregion will turn saline. Do you share his prognosis?

Giulio: I don't know if David is right about the time frame, but the situation is very serious.

Tom: As far as I know, most of the wells of the villages along this coast are saline, and they are having to pump their water from wells inland. In the west of Auroville, and in villages like Rayapettai and Ottai, many wells that are tapping into the third aquifer have water that is above the level that is considered drinkable. This is not because of seawater intrusion but because of minerals dissolved in the water. So, effectively, we have already lost one aquifer and are over-pumping the rest.

What are the solutions?

Giulio: Firstly, we have to understand what is under our feet, the geology of this area. The basement of our geological strata here is granite. On top of that, layers of sediment have been laid down over millions of years. We don't have much variety of sediments. We have a mixture of limestone, sandstone and some clays, and that is it.

Tom: If we look at the Auroville plateau, at the surface it is 80 – 90% Cuddalore sandstone, which allows water percolation. If you go to the west you are on Manaveli clay, which can be quite impervious. When you go below the sandstone or clay you get limestone. This has another potential for water. But if you go deeper, you hit the black stuff which is Ottai clay, and there is no usable water here.

Giulio: In our area the sediments are relatively young, which means they still contain something organic that is decomposing. That is why we have, for example, the smell of hydrogen sulphide in the water of some of our deeper wells. There is also a lot of calcium in our wells.

In other regions like Europe, limestone strata can stretch for hundreds of kilometers, which means that there is plentiful water underground. But here the situation is totally different. Our aquifers are limited in size and we have pockets, which are probably not interconnected, where water can collect.

What are the implications of this for water management in the region?

Tom: It means there is not one single solution for our water future in Auroville and the bioregion. For when you speak of water, Auroville cannot be separated from the bioregion. We have to deal with the entire bioregion.

Giulio: Water management has to be based on the geology. Where the surface layer is clay, which is relatively impermeable, you should hold and store the water on the surface. This is why the 'erys' system of surface tanks was built on clay hundreds of years ago in this area. The problem, however, of storing water on the surface is evaporation and the possibility of pollution due to human activities.

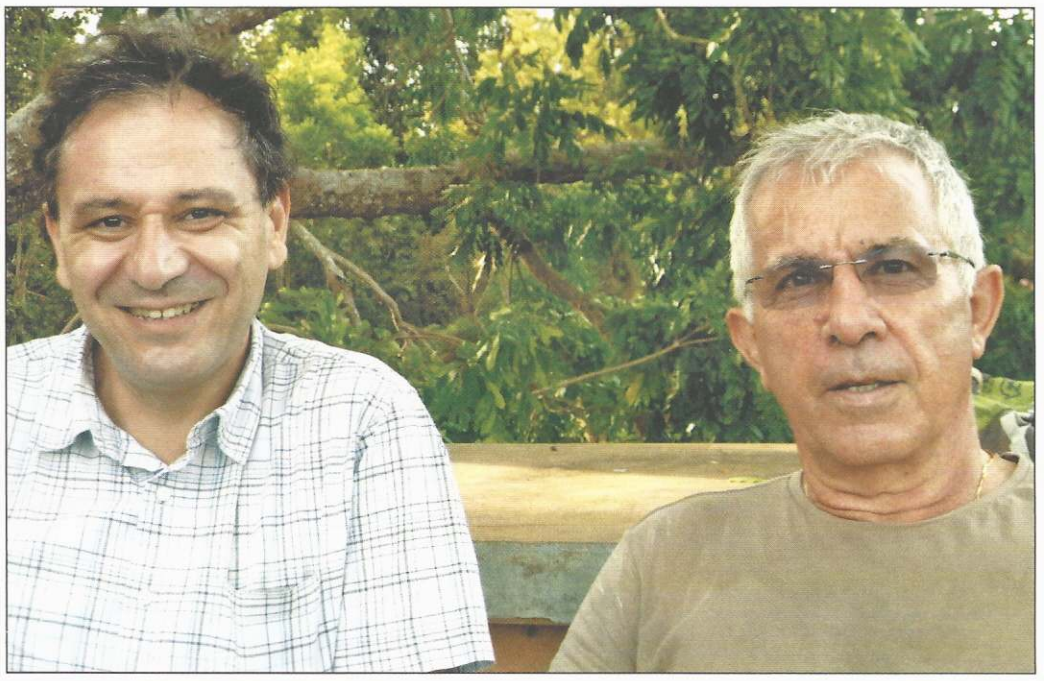
Where the surface layer is porous, it makes sense to infiltrate the water. Where we have permeable areas we have to find the natural pockets, basins, underground and recharge them so that water can be stored there. To do this, we have to know how much can be stored in a particular pocket, and how much water can be extracted. If we extract too much water, the formation will collapse and we will lose that storage capacity.

So we cannot focus on just one approach to harvesting water but we have to look at all the parameters.

The bioregion is large with hundreds of thousands of inhabitants. Do you have enough data to be able to plan a water management system for the entire bioregion?

Tom: In the time of Harvest we had this kind of information and it was updated every month. Unfortunately, there is now a gap of seven or eight years in the records because Harvest closed down and this work was discontinued. We still have a strong database, but now we have to update it. We have to recheck wells and I would like to drill a few test wells in strategic areas to get a very precise confirmation of the lithography.

Today we have fantastic tools of information. When you drill you can collect samples and identify the nature of the rock you are passing through, and with GPS you can know the exact altitude of the wellhead, and from that you know the altitude of the geology below. Another fantastic tool is GIS which allows you to correlate all the information acquired using GPS. This allows you to start modelling the interface between two formations, and it can tell you where the favourable underground pockets are.



Giulio (left) and Tom

Giulio: My feeling is that first we should find a way of effectively managing our water resources here in Auroville and then this model can be exported into the bioregion, taking into account the local parameters.

What is the present water management situation in Auroville?

Tom: What we have today is local, makeshift solutions. One major attempt to manage distribution on a larger scale is the 'elephant' water tower. Another experiment is what happens in Auromodele. There water is pumped, stored, distributed, individually metered, and everybody pays their bill at the end of the month. It works, but in terms of developing a collective water consciousness in the community, it is not so interesting.

But we also have a situation where a number of previously individual water systems are now turning into neighbourhood systems where, unlike the 'elephant' distribution model which some people resent because they feel they have no say, people manage their own water situation.

Is this the direction we should increasingly be taking?

Giulio: In the long-term there has to be some degree of centralization. The water resources beneath our feet are not distributed equally, so the people in water-scarce locations have to be linked to water sources in other locations. But you cannot build such a system overnight, so let's start with interlinking communities, neighbourhoods.

So how do you approach setting up an effective water management system for Auroville?

Giulio: Firstly, we have to have all the relevant data, records. Once these are analysed and modeled, they can be translated into a map. Once you have a map you can plan. You can know which wells need to be used or dug, how much storage is necessary and you can plan an efficient distribution and water catchment system. Ultimately, whether you need a fully centralised or decentralised system should only be determined by the data, not on the basis of politics or of somebody's ability to pay for their water.

Once such a water management system is working effectively, meaning that the overall water balance is positive, that the recharge is greater than what you are taking out, you can use this as a model for the larger bioregion, adjusting it for local parameters.

To create a positive balance means that the amount of water that is extracted may have to be limited?

Tom: Probably, and this is what many countries are doing when they are in critical water shortage zones. For example, the farmers are given an annual quota, and if they exceed the quota their wells are sealed.

Giulio: You need drastic measures in situations like this, which are not so different from ours. But to be able to implement this, you need two things. Firstly, a team of technically skilled people who know what should be done and, secondly, a team of political people who are ready to implement what the technical people are saying. These two things have to go together. Otherwise, nothing will happen.

In other words, this is a governance as well as a technical issue?

Tom: Exactly. But I think the experience gained in neighbourhood systems will pave the way for this kind of thing. Before then, I am afraid we will still have to experience many conflicts around water in Auroville because of people's ignorance and wrong attitudes. The problem is that people have grown used to certain resources, like water, being readily available and so they exploit them unconsciously and resist any attempt to manage them. People do not realise that in perhaps ten years water in this area may be very expensive in terms of energy or money; that we are enjoying the golden days now.

For example, our third aquifer, the Vanur aquifer, is now severely damaged. Independent studies show there is already some seawater intrusion, and if we keep over-pumping it, salinity will increase and could spread throughout the aquifer. This is why we tell people not to drill any longer into this aquifer, but it still happens that Aurovilians disregard this and drill deeper to access it. In terms of the present water situation, this is criminal. It is threatening the entire system because once this aquifer is salinated, it cannot be reversed. We are talking of a supply that nature laid down patiently over millions of years that we and others in the bioregion are destroying in a matter of twenty years.

Giulio: People cannot be allowed to spoil the whole system just because they are lazy or do not care. Once you have a model that predicts how much water you will use in a year, and you realize that you will be strongly in minus, then people have to make sacrifices because it is a matter of survival.

Tom: On a more positive note, I think the neighbourhood systems will gradually concentrate people's attention and develop their consciousness, regarding water. I saw this happen recently in an Auroville community. They had been experiencing many water problems but discovered it was their fault: their whole water system was a mess. Now they have started to regulate themselves. So something is changing regarding Aurovilians' consciousness about water.

But what about changing the water consciousness and behaviour of people who live in the larger bioregion?

Giulio: We need to put all our energies into finding ways of providing enough water for people's needs. At the same time, we have to start a campaign to change people's attitudes to water in the larger bioregion. The combination of these gives you a water management system. If we do not go for both of these things the system will fail, that is for sure.

Tom: What is important now is helping people open their minds so that they understand the present situation. If we come with our models and try to impose them, this will not work. But it is also clear that we have a limited amount of water here and we cannot go on wasting it. This is why we must invest in the bioregion in terms of education, projects, and helping people use water in a conscious way.

But it seems that the local people did have good water management systems in the past. Is that knowledge completely lost?

Tom: They had very good water management systems, but these broke down under British rule. In the last 50 years tube well technology has also changed everything in terms of water management in bioregion.

Giulio: That old water management knowledge is not completely lost and the tanks are still there, although they are in a bad shape. Your local farmer knows a lot of things but not the scientific explanations, so now it's just a matter of combining what they know with some scientific knowledge. This information can be presented in simple modules. The first module would deal with where the water is coming from; this is meteorology. The second module is how the water is stored; geology. Thirdly, how is it going to be used so that the entire ecosystem remains balanced? This is management.

Tom: At the same time, we may also discover that our neighbours will show us the direction we need to take. They have a history of famine and drought, so maybe they will show us how to handle the present challenge. This would be most welcome.

Giulio: When we talk about education it is not one-way but an exchange of experience. We have much to learn from them, too.

Tom: Tamil people are very touched by theatre forms, poetry, because their culture is like that. Therefore, it is important to present information within a frame that is appealing to them. Also, you have to relate it to their lives. For example, if you talk about wastewater systems, you could take them to the closest drain where water is flowing and show them a thin film on the wall. Then you explain this is bacteria feeding on the wastewater and we want to cultivate it so we can clean the water. This is a very practical approach.

Actually, you are not just talking about giving information. You are talking about changing mindsets.

Giulio: Exactly, this is the most important thing. But this can only happen if people realise why you are telling them these things. They must not feel that you are talking down to them, but that we are all in this together; that it is not 'us' and 'them'. And it shouldn't be forgotten that Aurovilians also have a lot to learn in this respect.

Tom: We had some experience working with the villages some years ago when we set up Water Users Associations in the local villages. We were running programmes of tank rehabilitation for the Government, and it was our condition that the people constitute themselves into these Associations. We opened bank accounts for them and they were the signatories of the rehabilitation proposals sent to the Government. In other words, they were repairing their own tanks: we were only giving engineering and technical support. This is crucial. The local population has to take back the responsibility for managing its water resources.

These Associations are now defunct. However, they are still registered and can be revived. Now we need to provide some new kind of motivation for them to come together because tank rehabilitation is no longer on the agenda of the government agencies.

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Battling the water crisis

Toby, former director of a public water company supplying water to a province of The Netherlands, is executive of the Auroville Water Service. Here he talks about the water situation in Auroville and the bioregion and what can be done about it.

Auroville Today: Are Auroville and the bioregion facing a water crisis?

Yes. We are missing important data so we don't know exactly which areas are affected the most, but even with the rough data we have, we know that this region is way out of balance: far more water is being extracted than is being recharged.

Why are we missing this crucial data?

Water Harvest was keeping records of wells in the bioregion and Auroville for a number of years. This programme was supported by external donors, but after 2008 they stopped funding it. Their argument was that India is rich enough to support this kind of programme. So, regretfully, I had to stop the data collection. Now Tom and others are starting it up again.

How long will it take to get the data you need?

About 2 -3 years, because you have to document the annual cycle of rain, which varies year by year, and deduct from that the amount of water that is being extracted from the different borewells.

Presumably until you have the data you cannot adequately plan a water management system. But does this mean we can do nothing in the interim?

You don't always need all the data to find out what the problem is and to start doing things. I don't need data at the moment to construct tanks to harvest rainwater. We could already have developed a rainwater catchment plan for Auroville as we know how much rain is falling annually and we know what we need to do to catch it. Unfortunately, we have not done this.

The other thing we can start doing immediately is replacing the underground water supply pipes and generally upgrading the water infrastructure in our communities.

At present, we lose between 20% – 50% of the water through leakages in the pipes, so changing the pipes would immediately make a huge difference. We have added 30% more connections to the big 'elephant' tank in the last 3 years, but overall we give less water today because we have changed the pipes and eliminated the leaks.

Looking at the supply side, where do you think that our water will come from in the future?

We have three main sources. We have rainwater, groundwater and seawater. Recycled wastewater is also an important resource we should make more use of in the future. For rainwater we need to develop rainwater harvesting on a large scale. The study that Gilles Boulicot made for the Matrimandir area is excellent and its principles can definitely be applied elsewhere.

For groundwater, once we have the necessary data we can do artificial recharge and normal recharge of the aquifers. Desalinated water will start on a relatively low scale but this can be increased over time.

Toby

So the people involved with water management need to sit round a table and look at these different possibilities – groundwater, rainwater and desalination – and see if they can find a way of balancing these different inputs. I think if we can decide upon this and draw up a comprehensive plan, we can solve our water management problem.

The last time we spoke you wanted to prioritise the supply of desalinated water over other sources.

I have changed my mind somewhat because, after reading Gilles' report, I can see that rainwater harvesting also has a lot of potential. Personally, I don't think we should develop just one resource; we shouldn't put all our eggs in one basket. The challenge is to find the right balance between the different resources and then to decide what each should be used for. I don't think, for example, we should use desalinated water for agriculture. It should be used for home use.

Are you still in favour of a centralised water distribution system for Auroville?

Very much so. The present situation in Auroville is far from optimal. We have 154 borewells and we have as many systems as we have borewells. Some people have access to plentiful water, some have very little; some get good quality water, some poor; some pay a lot for their water, some pay very little. These differences are unacceptable. Water is a basic necessity, so we should have a water supply where everybody gets good quality water, and if something goes wrong there should be a service available that puts it right.

The only way to ensure this is a centralised system. It will take time, but I feel very committed to achieving this. Now we are focusing on putting in a ring of pipes along the Crown Road so that, in the future, we can connect as many parts of the city as possible from this ring. Once the system is established, the inputs – from groundwater, rainwater or desalinated water – can be inserted into this system anywhere as long as the pressure is the same. We don't have to have different pipe systems for different sources.

What about the greenbelt? Will this also be connected to this central water distribution system?

Yes. If we cannot reach certain communities at first, for some time they will have to take care of themselves. But as soon as we can connect them we have to connect them because, again, it is a matter of everybody having equitable access to good quality water.

I think that when we have an idea of where we want to extract in the long-term, the next question is how many wells we need. We have over 150 borewells in Auroville at present, and the sinking of wells is totally unregulated. In certain parts of Europe, you need an Environmental Impact Assessment before you can sink a well. You are told that if you sink a well, you have to ensure the recharge is so much and you are not allowed to extract more than a certain amount of water. So I think we need to start looking at regulating the drilling of wells in Auroville, not only to limit extraction but also to ensure the quality of the water.

Given the urgency of the situation, would you favour a total ban on digging new wells in Auroville? Or on drilling into the deeper aquifer?

No, you can't do that. When, as happened recently at Transition School, you have a situation where there is no water and no possibility of connecting to an existing source, you have to drill a new well, and it has to be deep if it is to serve a larger area. In this case, it meant drilling into the third aquifer as the second aquifer could not provide sufficient water. The recently established Water Group need to look into solving this 'grey-area' and they will. But there are many more grey areas which have to be looked into also.

Are differences among the members of the Auroville Water Group also impacting the way we respond to the present crisis?

Yes. We can't agree upon the necessity to regulate the digging of wells. This is not even a topic of discussion at present.

But if you all have access to the same data, would that not be sufficient to come up with a unified solution?

No. There are many different ways of responding. Even if all the data is put on the table, we could still come up with three different solutions. Our decisions are not just influenced by technicalities like cost but also by what people believe in, their preferences. These are the challenges but I am committed to finding an agreement we can all live with.

Even if we came up with a perfect solution for water management in Auroville, we would continue to be heavily dependent upon what is happening in the larger bioregion where huge amounts of water are being extracted for agriculture. What can be done about this?

There are more than 6000 wells in the bioregion, with half of them going deeper than 140 metres into the third aquifer. They are pumping vast amounts of water, and the digging of wells is totally unregulated. In other words, it is a mess.

When Water Harvest ran programmes for local farmers, Harvest set up Water Users Associations, introduced drip irrigation and organic dry land farming, and helped set up a distribution and marketing system. We saw that after a few years it was a success, and something like 60% less water was being used by these farmers.

But we were dealing with only 154 farmers and there are many more in the bioregion. We must get all of them to the same point. For this, you need a programme running for at least 4 – 5 years because it doesn't just involve changes in farming methods. It also involves education, social organization, and setting up new distribution and marketing chains. Once the markets are established, there is a higher likelihood that the new practices will be maintained.

I'm convinced that changing to organic, dry land farming and drip irrigation is the way forward in terms of water conservation and guaranteeing a livelihood for the local farmers. On the supply side, we need to do much more about rainwater catchment in the bioregion, and perhaps some desalination has to be factored in.

The problem is not just the scale we need to work on. We also lack sufficient people with the skills to run such programmes, maintaining the infrastructure is a big challenge, and there is insufficient funding. This is why the Water Associations became dormant.

Have the farmers who were in this programme continued to use the new farming and water-conservation practices?

We have not checked, but it would definitely be good to find out and to revive these Associations.

Surely, in the end, it is the Government that could make the biggest difference. If the State decided that the farmers had to start paying for the electricity that runs their pumps, wouldn't that make a big difference to how much water is extracted and wasted?

Absolutely. At present, electricity is free and the cost of pumps is heavily subsidised. But this is the situation because a huge proportion of voters are farmers. Which political party will risk losing this large vote bank by charging the farmers for the electricity they use?

In fact, the people who work for the government are very aware of the situation, and they have good ideas about the way ahead. The problem, as always, is in the implementation. And the farmers themselves are not stupid. When you sit with them and explain the whole situation, they are willing to change. But they need financial support to make the necessary shift in practices.

Do we have time? The programme you are describing will take many years as well as major funding and expertise. Yet we hear that the bioregion may be facing the imminent salination or exhaustion of its aquifers.

We have to do these things. Besides, I don't believe that if we don't achieve this tomorrow, everything will collapse. We are blessed with quite a lot of rainfall, desalination is coming, and there are parts of the aquifers which are still quite okay. Like water itself, nothing is static, so we should not become obsessed with doomsday scenarios.

From an interview by Alan

The water challenge: Auroville and the bioregion

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What resources do you need to take up this work of education and of improving water management in Auroville and the bioregion?

Tom: We know what has to be done. What we miss today is the means. We need an office, equipment, and a team of 6-8 good, qualified people. We need hydrogeologists, engineers, social workers. They will go out into the field and lead the work while the office team analyse the data and come up with models.

How long would this take to set up, and what will it cost?

Tom: It would take two or three months to set up, then one and a half years to do the initial data collection and integration. This phase would cost about one and a half crores.

Giulio: So in a maximum of two years we can know where to have surface water collection, and where to percolate or recharge. But the work of acquiring office space, equipment and trained personnel has to start immediately. The task is immense – we need to act socially, technically, politically – and time is very short.

Do we have the time?

Giulio: Yes, if we are focussed. But we cannot do it on our own. We also have to network with professionals like the people from Pondycan who know how to mount a campaign and involve the media and the people.

Tom: We already have good contacts from our village work in the past. The main thing is to move as fast as possible and tell people to do whatever they can. Don't wait for us to help you, help yourself. If you wait for us, we're finished. We are at that level now.

Giulio: Education is the lever of the whole process. We have to make educating people about better water management the top priority now, both in Auroville and in the bioregion.

Is Auroville doing enough to promote this work at present?

Tom: No. In fact, just the opposite. We had a wonderful tool in Harvest, but it has been allowed to be destroyed.

Why is Auroville not doing more?

Tom: It is partly unconsciousness of the scale of the problem. Also, maybe people think desalination will be our saviour. But by the time the Auroville desalination plant would come into production probably the whole of the coastal area would be saline. Moreover, the plant could create huge social issues if the water is not shared equitably with our neighbours.

This is why I think we have to put our energy elsewhere. One idea is to pump freshwater from Kaliveli swamp when there is excess during the monsoon rains back to the plateau and down recharge wells. This would replenish the aquifers. For an investment of 2 – 3 crores it would be worth it. These are the types of innovative solutions we need to consider now.

Giulio: We have to do things with our hearts but also with our minds. Goodwill is not enough; we also need skills, competence. So let's combine the two things and go ahead.

From an interview by Alan

The Auroville desalination plant project

Michael Bonke is a long-time friend of Auroville who has been instrumental in initiating and funding major projects in the community. One of the aims of Varuna, a company he set up and runs with a team of Aurovilians, is "to build and operate a small desalination plant which can supply water to Auroville, for the future Matrimandir Lake and the nearby villages".

Auroville Today met him recently to find out more about this project.

Why is there a need for a desalination plant?

Given the present over-pumping of groundwater, the experts agree that the aquifers in this bioregion will turn saline, and perhaps sooner rather than later. In these circumstances, it is crucial that there is an abundant source of clean, drinking water. This is what a desalination plant can provide.

In the case of the planned Auroville desalination plant, the water would also be used to fill the Matrimandir Lake?

Yes. In the first phase, the desalination plant will produce one million litres of drinking water a day. Right now, Auroville has some centralized infrastructure for distributing water to a number of communities, such as in the Residential Zone and in the Industrial Zone, as well as many individual water systems. The centralised Auroville water infrastructure cannot absorb one million litres a day at present: I am told it can only deal with a maximum of 300,000 litres per day. So, once the lake is dug, we would use the balance of the water to fill it. As the water infrastructure expands, we would increase the amount channeled for drinking water and decrease the amount used for filling the lake.

After a few years, I don't think we will need to use desalinated water for the lake because we plan to have a storage lake where rainwater will be collected, and the lake will be topped up with this. Then the output from the desalination plant will only be used for drinking water.

Is there enough rainwater to top up the lake throughout the year? The evaporation from the surface of the lake in the summer must be huge.

We definitely get enough rain annually; the only problem is the storage. We are envisaging a large storage lake where, in the monsoon time, we can collect all the water that falls on the lake and its surroundings.

Do you envisage that at some point the desalinated plant would provide for all of Auroville's drinking water needs?

Yes, and even much more. When the aquifers turn saline, we have to take care not only of Auroville's water needs but also of the surroundings. This desalination plant is meant to be a model that can afterwards be scaled up or copied. If we scale it up, Auroville could be a main supplier, on a commercial basis, of water for the whole area.

The whole area means the whole bioregion?

Yes. It's too early to say yet how we would proceed, but we can either scale up this plant or encourage the setting up of other small desalination plants along the coast to provide drinking water to the villages.

Would you seek government help?

If the government asks us to collaborate, we would do so. But I think this first project can very well stand on its own feet and the government has more than enough other problems to take care of. I would prefer that we do it on our own.

What is the present status of the desalination project?

The Detailed Project Report (DPR) and the Environmental Impact Assessment (EIA) have been done. The EIA clearly testifies that it is a non-polluting project. This is the basis for getting all the necessary permits from the various government departments.

How long will this take?

I think if we push really hard we can have all the permits within one year. In the meantime, we already have permission from the Highways Department to lay the first stretch of pipes that will bring the water from the plant on the beach to the centre of Auroville. The pipes for this stretch will be delivered in the next week or so.

We are laying a double pipeline, and each pipe will have a diameter of 40 centimetres. We are putting two pipes because we are still thinking of the possibility of hydro-energy storage for Auroville [*see Auroville Today no. 271, February 2012*], so one pipe could be used to fill a lake for hydro storage and the other for supplying drinking water. Alternatively, the second pipe could also supply drinking water if we scale up the desalination plant to provide more than seven million litres per day.

What are the costs involved?

Although the first phase of the plant will be for one million litres per day, we will construct infrastructure that can handle five million litres per day. The main cost is not the plant but the offshore equipment that draws the water from the open sea and releases the byproduct of the desalination process back into the sea. The offshore part will cost around 25 crore rupees, the pipeline that brings the water to Auroville will cost around nine crores, and the actual plant equipment for the first phase will cost around seven crores. So, initially, this would be around a 40 crores project.

What about the operating costs? Desalination is energy-intensive and you have to pump the water up to the middle of Auroville. Will the Varuna windmills be able to supply all the electricity necessary?

Yes. We would need around 3,500 kilowatt-hours a day of electricity to produce one million litres of desalinated water and to pump this up into Auroville. This is less power than one windmill produces on average per day over the year, and Varuna already has six of them. But if we go to five million litres a day, then one wind-generator reserved for the desalination plant will not be enough.

It is true that desalination is energy-intensive, but we are going for the most advanced technology available today – the energy-regained system – and this allows us to almost halve the usual electricity consumption for desalinating water.

What about the pollution and brine problems associated with desalination plants?

People think that the main problem with desalination is pollution of the surrounding sea because usually chemicals are used in the desalination process. However, in our plant we won't use any chemicals, except when we need to clean the filters. Instead, we will use UV radiation and ultra-filtration to eliminate organisms in the seawater. This means that the water that comes into contact with the reverse osmosis membrane will be relatively clean, so we will not have to clean the membrane so often.

The main problem, however, is the brine. The 'waste' water released back to the sea after the desalination process has a higher salt content – 30% more – than seawater. But this is not the main issue. This water has been subjected to high pressures in the process and does not contain oxygen any more: it is 'dead' water. The heavier salt-content of the brine makes it heavier, so it sinks down to the bottom of the sea and there it forms a carpet that kills everything below it. The desalination plant to the north of Chennai produces around 600,000 cubic metres of this 'dead' water every day and releases it in one place, so there must be a large area of the sea floor affected by this.

Unlike Chennai, which has two 100-million litres a day desalination plants, we are planning a very small desalination plant of a maximum of 5 million litres a day, and our offshore pipes will run around 500 metres out to the sea, further than the pipes of the Chennai plants. We have done studies to ensure that our pipelines will in no way affect the marine life.

However, if we increased our capacity and made a bigger plant we might encounter this problem. This is why a number of small desalination plants scattered along the coast might be a more ecological option than one very large one.

Unloading pipes to transport water from the site of the desalination plant to Auroville

In short, we want to provide a model plant that is not using chemicals, that is run with green energy, and which is avoiding this problem of the brine spoiling the floor of the sea.

What about the possibility of pollution from the Kalpakkam nuclear plant further up the coast. Can desalination plants deal with radioactivity in the water?

There was the case of some American warships off the coast of Japan close to where the nuclear reactor problem occurred. The sailors were getting their water supply from ship-based desalination plants, and they discovered their desalinated water was irradiated. But the membrane is so tight in our planned plant that I think 95% of the radiation would not go through. The water quality, of course, will be checked regularly.

Let us look at the social aspect. To what extent will the villages around have access to this desalinated water?

We have made an agreement with one village close to the proposed plant that everybody will get so many litres of water free per day.

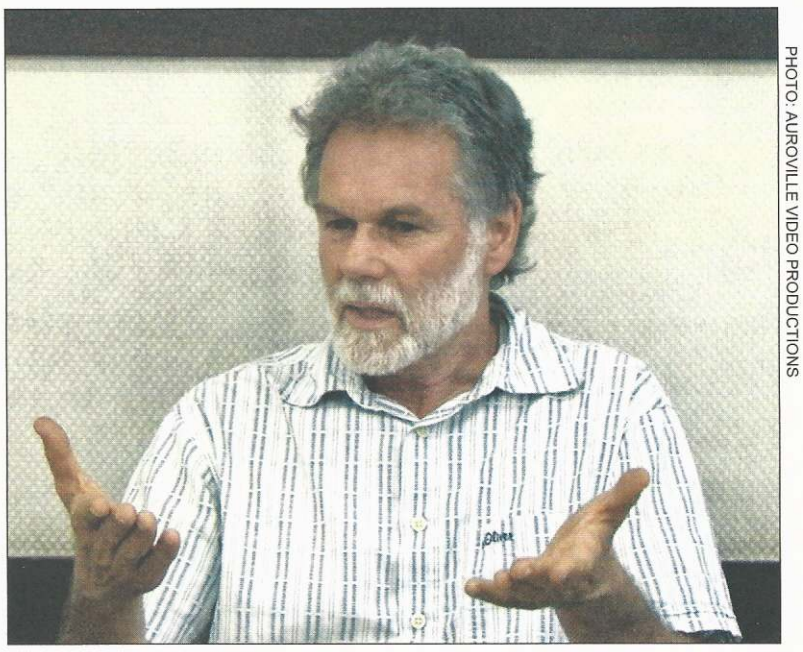


PHOTO: AUROVILLE VIDEO PRODUCTIONS

Michael Bonke

But if there is rapid desalination, and one village is getting desalinated water and another is not, will this not lead to social tensions and resentment?

But the plant will ease the problem rather than aggravate it because we are creating clean drinking water which we will supply to the villagers. We may not supply it free of charge but the villagers should be happy that such a plant exists. Otherwise, where would they get the water from?

How much would you charge for the water?

This has to be seen. The Chennai desalination plant charges Rs. 45 per cubic metre. If the local villagers can get desalinated water for Rs. 45 a cubic metre, I think it is very fair.

And they don't have to get the desalinated water from us. They could set up their own small desalination plants to provide water to the villages. Beach land has a very high value at present. If the owners sold only 20 acres of beach land, they could finance a small plant that could provide three villages with water. It's a real option, and I'm sure that if the aquifers turn saline and they are confronted with a choice either to leave or to come together to finance a desalination plant, they would consider it seriously. And we may help them set up such a plant.

Of course, we are talking of providing drinking water, not water for irritating crops. Surely such a plant could not provide sufficient water for conventional irrigated farming?

It might do. But then the farmers would have to calculate how much they would be willing to pay.

Returning to a worst-case scenario where the bioregion turns saline, where the villages have no access to drinking water and it would be difficult or take time to set up alternative desalination facilities, how do you think our neighbours would react to seeing desalinated water being pumped to Auroville to fill a lake?

But whatever clean water we create, as long as we create it ecologically and in a sustainable way, will finally penetrate into the aquifers and so ease the problem of salinity. We cannot be expected to save the whole bioregion: others have to take up some responsibility. At least, we are doing something. We are creating a desalination plant that will provide much clean water.

Over the years, you have done a great deal for Auroville. You played an important role in the finishing of the Matrimandir, the Varuna project is providing free electricity to Aurovilians, and now you are planning a desalination project that will benefit the community. Yet you remain a controversial figure in some quarters, mainly because you do not participate in any community process and you are viewed as running a parallel development process over which many Aurovilians have little control. For example, there has been no community decision and only limited consultation regarding the desalination plant. Is there is still scope for the community to give its input on this?

Do you mean that the community could be asked to make a decision, yes or no? And if the majority says no, we should abandon the project? I don't think this is the way to go.

In the Varuna team we have a clear aim and perspective. For example, we did not want to produce electricity purely for commercial benefit. Rather, we wanted very much to bring Auroville forward regarding its ideals. Auroville is meant to have a moneyless economy, so we decided to provide electricity in a moneyless way. Though this is clearly in line with the society that the Mother had envisioned, we got tremendous resistance from the community, even though today the majority of people seem to agree that we are doing the right thing. I expect the same thing will happen when we start providing desalinated drinking water and water for the Matrimandir Lake.

Perhaps the resistance is not to your intention and idealism. It comes from people feeling they are not being consulted, that they haven't had a chance to have their say.

But if the community wants to allow everybody to voice their fears and concerns, I wonder if we will ever achieve anything. We know that there will be big resistance when we start to distribute the desalinated water. We will insist it is provided free of charge for every Aurovilian, and that we don't want a quota system, but then this whole discussion will start up again.

Do we want to discuss it for another ten years, by which time all the aquifers will be saline? Then everybody will come to us and say, why didn't you go ahead? If we have to go to meeting after meeting, we see no chance to get this project operational before the aquifers turn saline. This is why, while initially we planned to do this project under Varuna Auroville, we have now decided to do it under Varuna Private Limited.

How soon could the desalination plant be operational?

It is very difficult to say, but in the best possible case it could be up and running in two years. But this is an ideal scenario.

From an interview by Alan

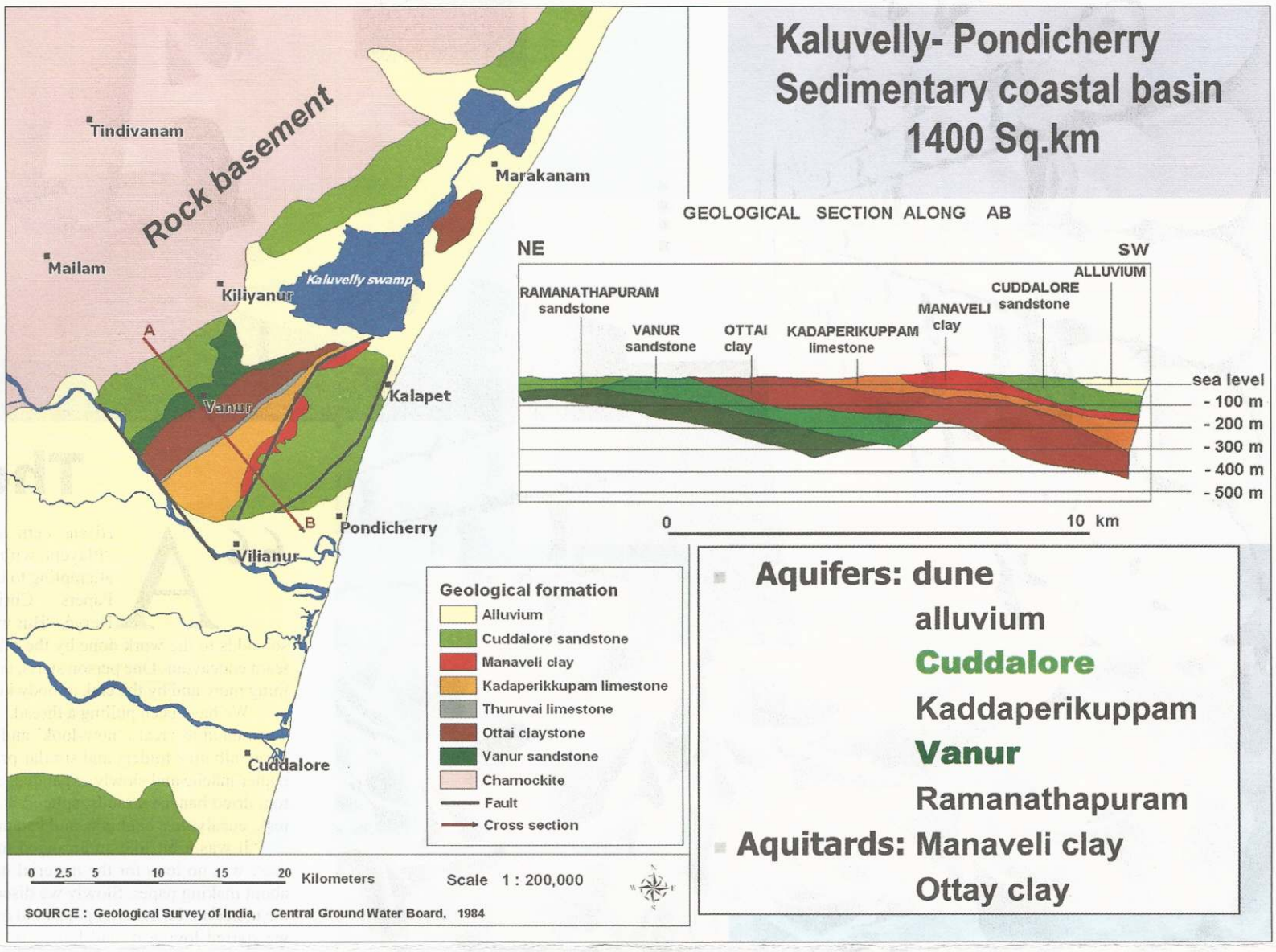
Towards an integrated water management strategy for the bioregion

On 5th May, at Hotel Athiti in Pondicherry, there was a one day consultation meeting on the topic "Water Stewardship for the Sustainable Development of the Bioregion".

The bioregion was defined as Pondicherry, Auroville, and the surrounding districts of Villupuram and Cuddalore (PAVC), an area of 2500 sq. kilometres that constitutes a distinct ecological bioregion along the Coromandel Coast.

The purpose of the meeting, organized jointly by the U.S. Consulate, Chennai, PondyCAN, The French Institute and TDC L'Avenir, Auroville, was to bring together people working on water and environmental issues to work on an integrated management programme for the region's water resources.

Unfortunately, representatives of the Puducherry Government could not attend as the Puducherry Assembly was in session. Nevertheless, some interesting presentations gave valuable insights into both the nature of the challenges and the possible solutions.



Map of the immediate bioregion of Auroville

The challenges

Water quality and water tables are dropping all over India, and Pondicherry State is no exception. Mr. V. Radhakrishnan, Hydro-geologist from the State Ground Water Unit, pointed out that the per capita availability of water in the State dropped from 1960 litres per person in 1901 to 600 litres per person in 1991, and it is projected to be only 224 litres per person in 2020.

In 1973, groundwater resources in Pondicherry State were still defined as 'prolific', but in 2013 they were classified as 'over-exploited'. Between 2000 – 2010, the levels of all the aquifers dropped by between 5 – 14 metres, and salt water has intruded into the coastal aquifer system, in some places as far as 4 kilometres inland.

Why? The reasons include encroachment and neglect of water bodies due to rapid urban expansion; over-extraction due to the vast number of tube wells and cheap or free electricity for farmers; and decreasing ground water recharge due to the conversion of agricultural lands for residential, commercial and industrial use.

There are also failures of governance. Historically, the water bodies in Pondicherry State were looked after by *Syndicates Agricoles*, an elected body of local farmers. But this successful system was allowed to decay and now water is centrally managed. This, along with tube well technology that allows many people to have their own wells, gives little incentive for local people to take care of their community water bodies.

Moreover, current practices of planning and development are localized and compartmentalized, failing to take into account the impacts on the environment, people and associated livelihoods, and different government departments have different priorities that influence how water is managed. Even when there are promising government schemes, for example to assist farmers to shift to less water-thirsty crops or to renovate irrigation ponds, the bureaucracy involved is often daunting and so the farmers often do not take them up.

The linking of water and energy

Shifting to a global scale, Dr. Jennifer Turner from the China Environment Forum of the Woodrow Wilson Center, pointed out that it is crucial that water is included in industrial development scenarios. She argued that not enough attention is paid to the big picture of how water and energy are linked, and she illustrated this with reference to modern China.

Water scarcity is the biggest problem China faces today: 30% of the water available is of low quality, and 300 million Chinese have difficulty accessing clean water. Yet a massive proportion of China's water, some 20%, goes to the coal sector to produce goods primarily for export. (Incidentally, 68% of China's pollution is due to the burning of coal.)

The primacy of coal in China's energy mix, and the shortage of water in the area of the coalfields means that China is planning a massive project to transfer water from the southern, more rain-fed part of the country, to the arid north, with all the associated losses.

The concern is that India wants to go the same way as China by developing its coal resources to produce more energy. (In this context, it is rumoured that a new coal-fired plant is planned for Marakanam, to the north of Auroville.) This will definitely impact its water reserves as well as increase air, soil and water pollution.

However, perhaps the biggest challenge worldwide is that water – a precious, finite and irreplaceable resource – is taken for granted by so many people, and this leads to a culture of apathy. As the introduction paper to the meeting put it, there is a need for a "paradigm shift in protecting and conserving water", for which we need to have "shifts in individual and collective values and norms, structure, policies and laws."

A case study

How do local farmers view the water issue? Audrey Richard-Ferroudji and colleagues of the French Institute made a study of Sorapet, a village in Pondicherry State. They noted the decline in the use of irrigation tanks compared to individual tube wells, and a trend for the farmers to grow more casuarina and paddy, which are water-thirsty crops, because of labour and market issues. Figures show that the number of tube wells continues to increase, and they are dug at greater depth now because there is less water in the shallower aquifers. But the main concern for the farmers is not water – there is little use of drip-irrigation, for example – but the difficulty of getting farm labour and a decent price for their crops.

The farmers want more mechanisation and higher profits. However, the fact that few young people are willing to take up farming makes the farmers very pessimistic about the future of farming in this area. The statistics bear this out. In 1991, 16% of the villagers were cultivators. In 2011, this proportion had dropped to 2%.

Possible solutions

The consultation meeting not only focussed upon the challenges. It also indicated some possible solutions. Mr. V. Radhakrishnan, the Pondicherry hydro-geologist, listed out some of the initiatives taken by his department (the Department of Agriculture) to improve water resources in the region. They include constructing check-dams across watercourses to improve groundwater potential; digging recharge shafts in riverbeds and renovating wells to recharge the aquifers; desilting village ponds and communal water bodies; and educating farmers in how to adopt water conservation measures and shift to low water-consuming crops.

He also noted that in 2004 the Pondicherry Groundwater Act had been passed to regulate groundwater extraction in the State, and that construction of rainwater harvesting systems was now mandatory in all government buildings.

Tom from the Town Development Council, Auroville, felt it is crucial that the government gives new importance to the protection of existing water bodies, and that the coastal regulations that prohibit certain activities taking place close to the coastline in order to prevent pollution and seawater intrusion need to be strengthened and applied consistently.

But how to overcome pervasive apathy and educate the general public about the importance of water conservation? In this context, Auralice Graft's presentation on the 'Seeds of Change' programme might offer one solution. Auralice, an Aurovilian who works with PondyCAN, has been working in local schools to encourage what she terms 'proactive citizenship'. The programme helps students conduct environmental audits, neighbourhood projects and promotes the awareness of the importance of wetlands. Although the programme has not been running very long, she has already seen changes in attitudes and behaviour.

The consultation meeting ended with the participants breaking up into three groups to focus, respectively, on data collection, the institutional changes needed for more effective water management in the bioregion, and on designing a campaign to build awareness leading to results-based action.

Conclusion

It is always difficult to assess the effectiveness of such meetings. The defined purpose was to bring together people working on water and environmental issues to work on an integrated management programme for the region's water resources. This didn't really happen, partly because of the absence of key players like officials of the local administration.

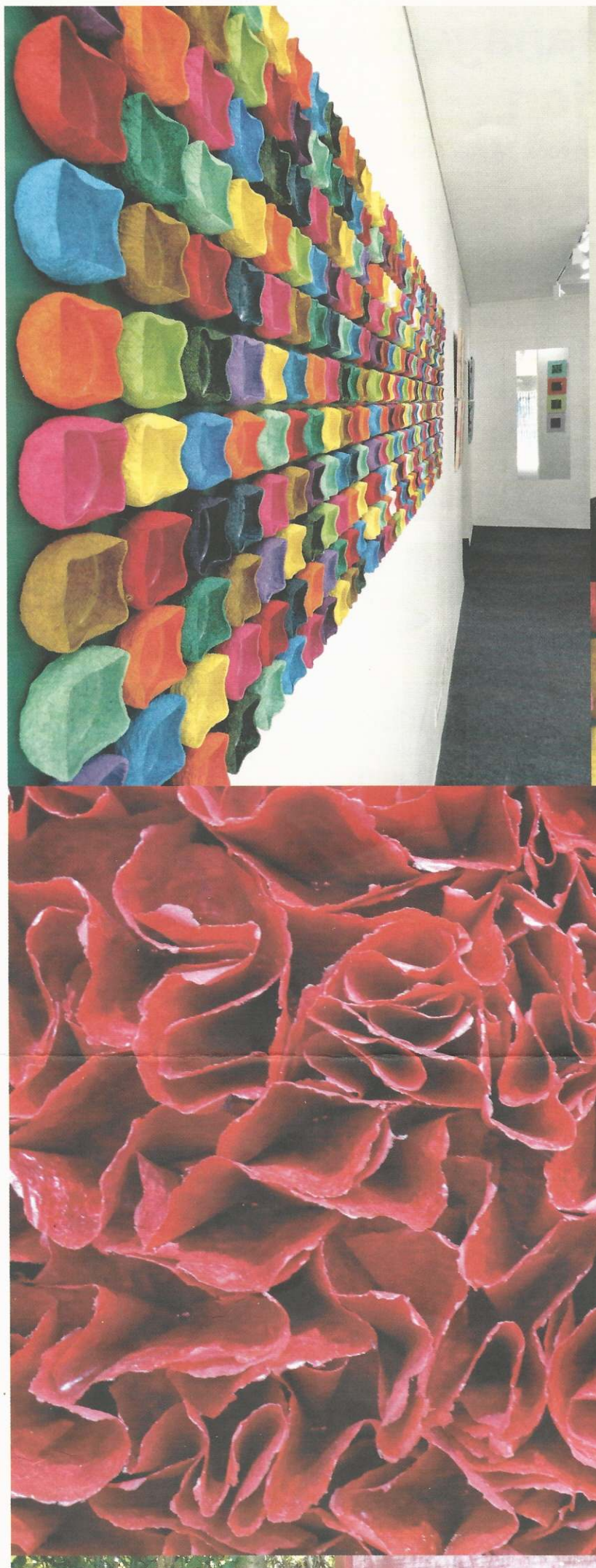
Moreover, when like-minded people come together they often over-emphasise the importance of such meetings because they celebrate the feeling that they are no longer alone. And, as Nini of PondyCAN wryly pointed out, even apparently successful meetings do not always translate into action.

One reason this happens is that such meetings often do not deal with the real challenges. In the case of this meeting, a great deal of useful general information was imparted, but the crucial challenges are often in the details that tend to be neglected. For example, how do you integrate traditional farming practices with new, water-saving technologies? How do you deal with status-quoism or apathy in the official structures set up to deal with water issues? And how do you reprogramme people's belief that progress equals abundance and the abundant use of resources? For activists often forget that many good ideas founder on the rock of human psychology and self-interest.

At the same time, the importance of such meetings often lies in the 'unquantifiables' – the meetings over coffee leading to new alliances or joint programmes, the moving personal human story that inspires new hope, the sudden discovery of the human face of bureaucracy etc.

Moreover, in the case of topics like managing scarce water resources, it is crucial that somebody keeps the issue alive, keeps trying to light the blue touch-paper that, one day, will ignite purposeful collective action. In this respect, meetings like this are both important and worthwhile.

Alan



The artistry of

"Artisans cum aspirant artists," says Luisa tentatively. "Players with paper," suggests Hervé. They laugh, attempting to label the Aurovilians working at Auroville Papers – Christine, Jean-Jacques, Florent, Luisa and Hervé. "But we act as a team," says Hervé. "Each person adds to the work done by the other. Even our art works are the results of team endeavour. One person starts, another makes a change, a third adds something more and by the end, nobody knows anymore who did what."

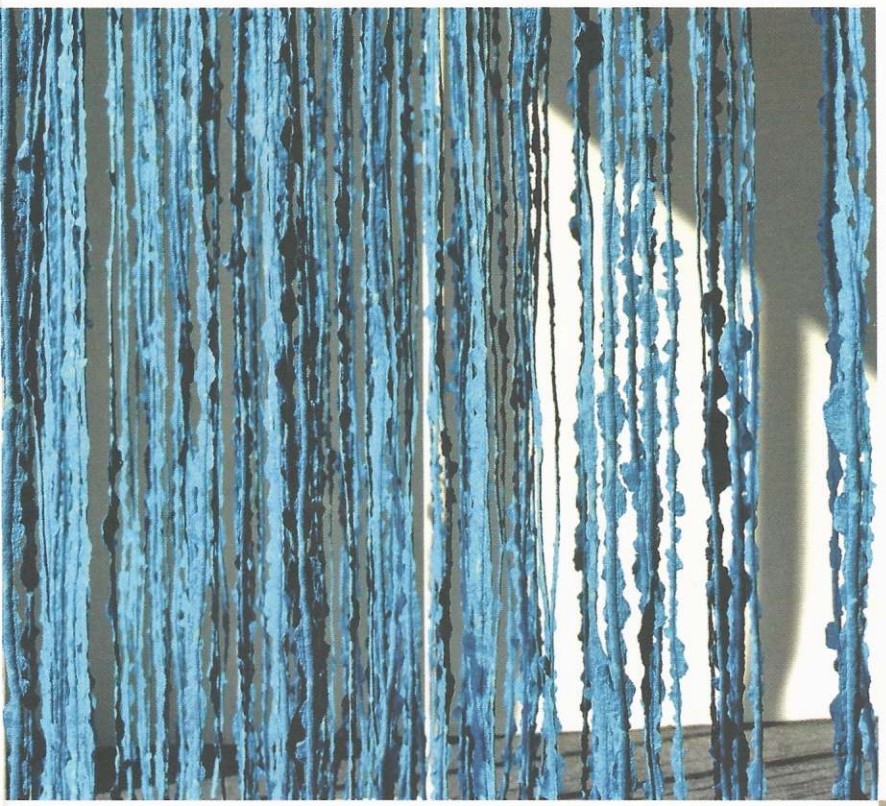
"We have been pulling a thread," says Luisa. "It started 17 years ago when we wanted to create 'new-look' and 'new-feel' paper for stationary, posters, photo albums, folders and similar products. We started using waste paper for papier mâché and slowly expanded, experimenting with materials such as cotton, dried banana strands, spliced bamboo sticks, straw, jute and leaves from teak, eucalyptus, bauhinia, and kadamba trees."

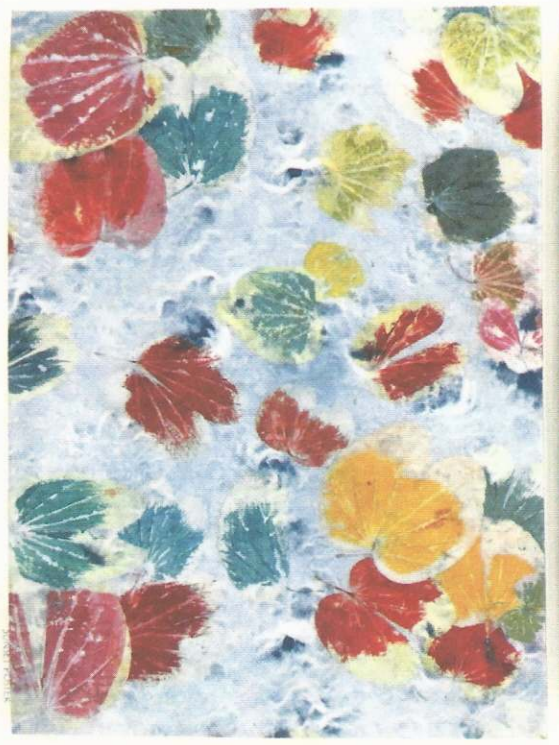
"It was a bit like an arranged marriage," says Hervé. "In the beginning there was no love for the material or the products. In fact, we knew nothing about making paper. Slowly we discovered the techniques, and as we got into the material, the material got a hold on us. The more we were doing it, the more we started loving it, and loving it, we started experimenting. We started to play."

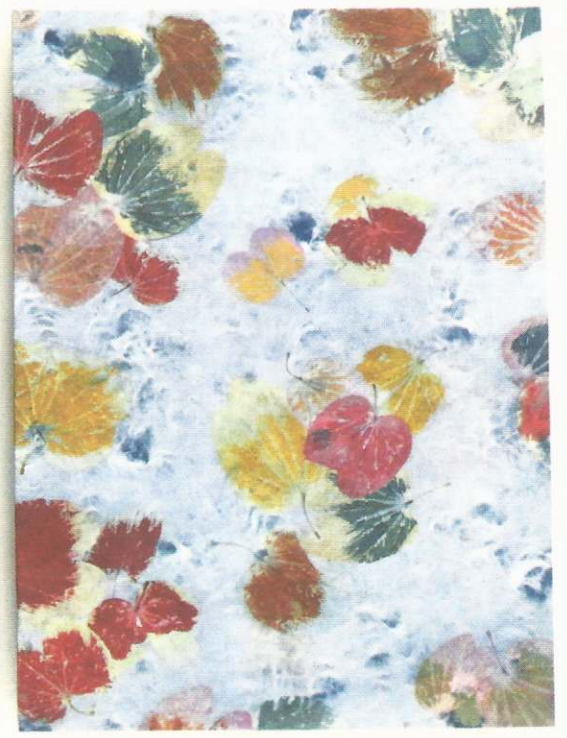
"Experimenting became our hallmark," says Luisa. "Partly this was born from necessity. With the advent of the electronic media, the stationary market started shrinking. This forced us to develop new products and discover new techniques. Now we are also making bowls, large vases, lampshades, jewellery, stools, flowers and we entered the home decoration market. We are continuously renewing the products. This is also nice for the employees, as the manufacture of identical products tends to become monotonous and dulls the spirit. None of our products is similar to any other."

The team's latest venture is in art. "Though we do not consider ourselves as artists per se, our artistic sensibility is on the increase," says Hervé. Auroville benefits as more and more Auroville art is displayed at public places, including works from Auroville Papers. "In the late fifteenth century, at the height of the Italian Renaissance, the saying was that Florence had more woodcarvers than butchers, suggesting that art, even more than meat, was a necessity of life. Something like that is now happening in Auroville," says Luisa. "Public art is found all over Auroville, with many Auroville artists donating their work for public places. It's a beautiful development and we are happy to be part of it."

The relationship with Auroville artists has always been close and this led spontaneously to Auroville Papers' first interactive exhibition in 2002 called 'Paper Folly'. It was an eye-opener for many Aurovilians and Auroville artists who, playing with paper, created a wealth of shapes and forms. A second exhibition 'Did you say paper?' happened ten years later in the Citadines Art







Auroville Papers

Centre, two weeks after the devastation of Cyclone Thane. "We never regretted that we didn't postpone the exhibition. Many Aurovilians were happy to come to a place made for harmony and joy," recollects Luisa, The third exhibition happened this year at Focus Gallery in Chennai, as part of the Auroville Festival in Chennai. "One client commented 'it's an honest work' and that summed it up well," says Luisa. Of course a fourth exhibition will happen, she says, "but as we only want to exhibit new products, it may take some time. We are also thinking of being part of an Auroville presence at the third Kochi Biennale in 2016-2017."

Auroville Papers is one of the four units run by the team. The others are Auroville Press, Auroville Press Publishers and the Seagull bookshop at the Visitors' Centre, employing 44 people. "The profits of one unit make the experimentation in another one possible," says Hervé. "The Seagull bookshop has been enlarged and Auroville Papers has just expanded its space in the Boutique d'Auroville at the Visitors' Centre." The best selling products are cotton mâché jewellery and a decoration paper with more holes than paper, made from banana fibres. "We use it for making lamp shades but also the individual sheets are very popular," says Luisa. "People use it for window decoration".

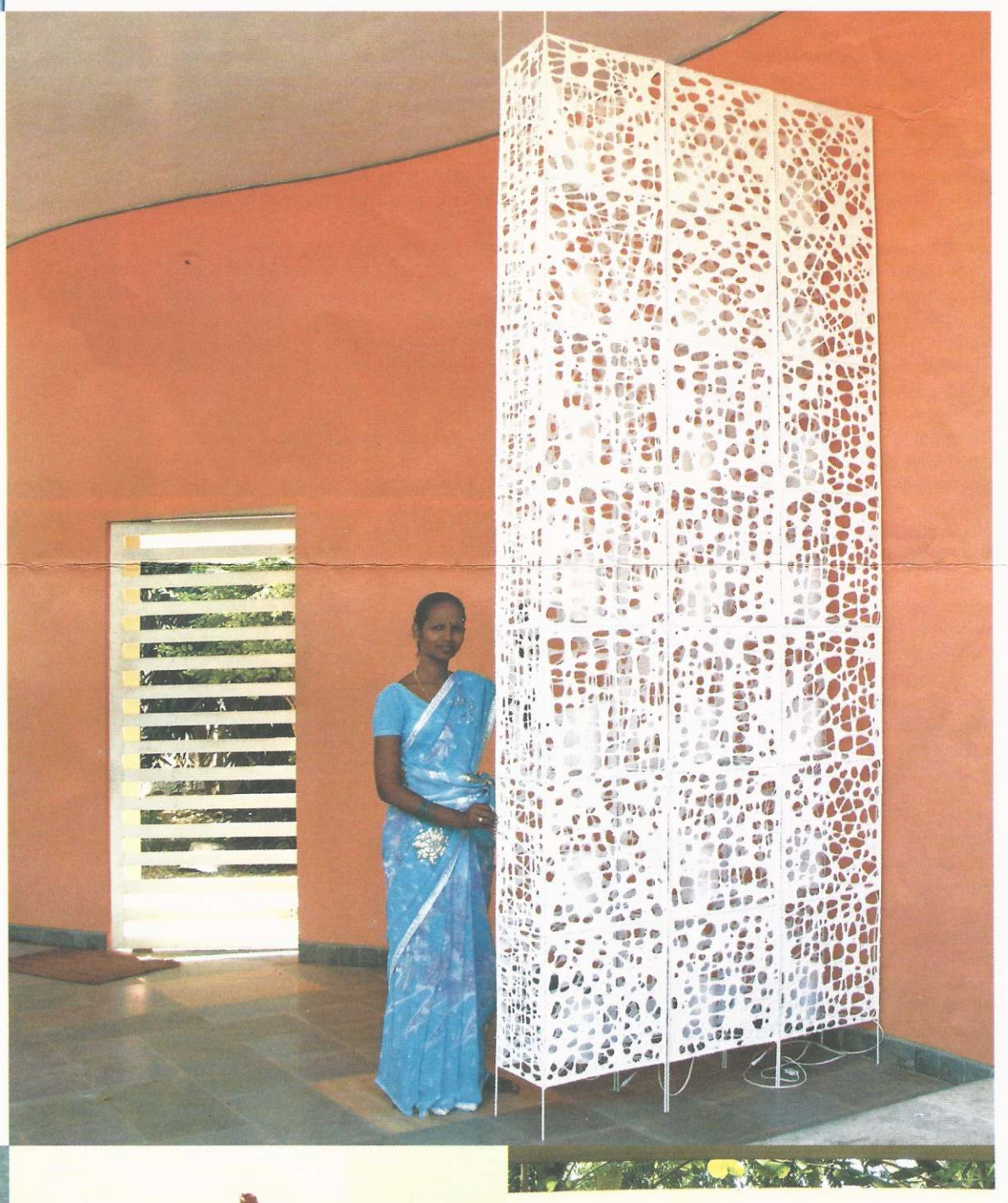
Auroville Papers also sells its products in the metro cities of India and abroad. "We often see that people get inspired seeing and touching our products," says Hervé. "We even lost a client, a hotel chain, as they complained that all the stationary provided by us was stolen by their guests. We regret the loss, of course, but it is kind of satisfying that people like our products so much that they pinch them!"

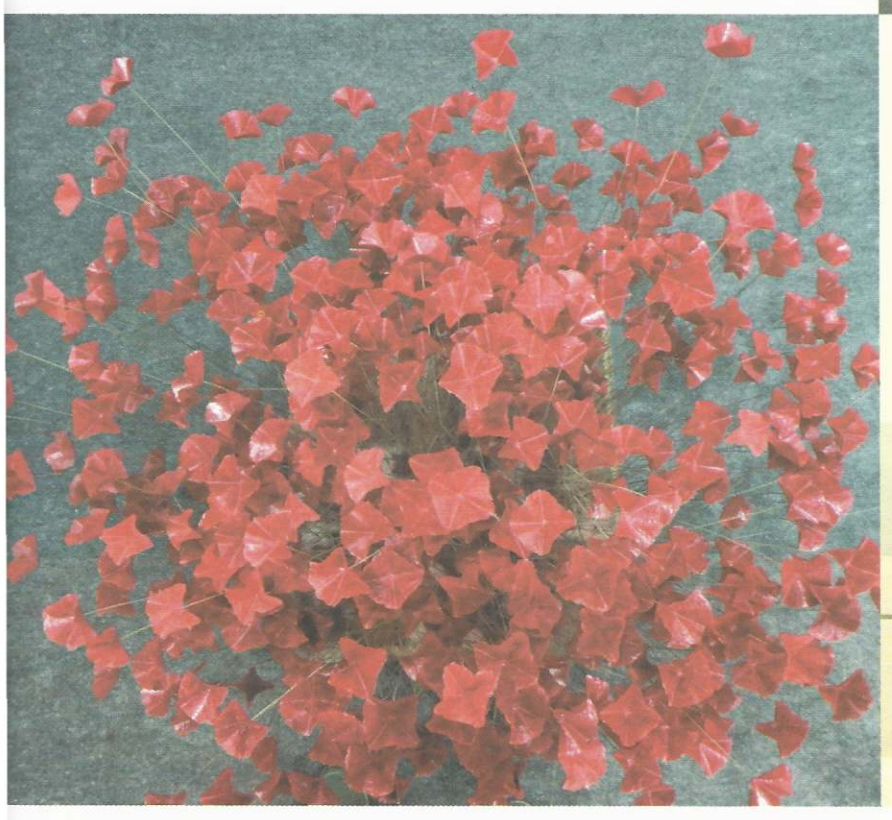
Training workshops are a new development. "We started giving one for the Auroville schools. Then we opened up, and held a two-day workshop for outside participants in September last year. Participants learned about the different fibres that go into the fabrication of paper, cooked and beat them and, using different leaves and flowers, made paper sheets." The workshop was successful and now workshops are a regular part of the work of Auroville Papers.

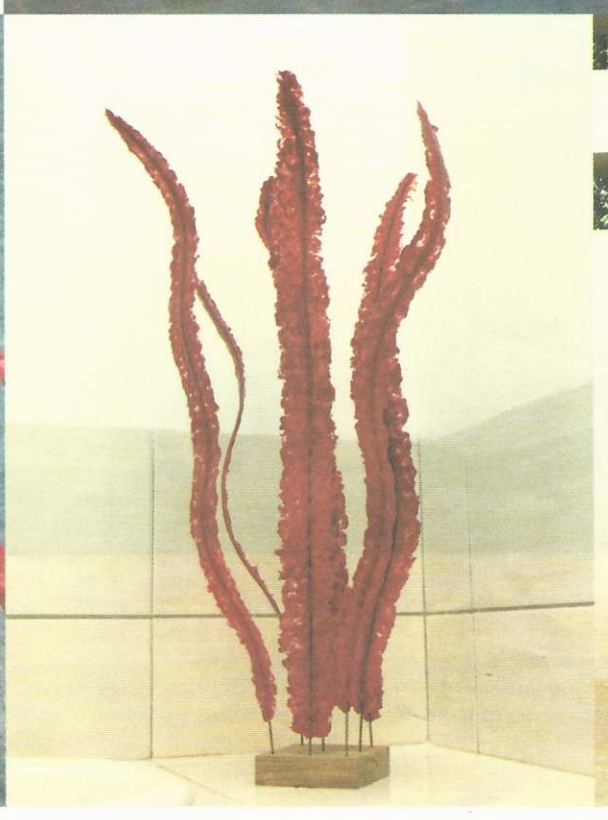
"We often hear that our products look 'modern', with an Auroville cachet," says Luisa. "Why this is so is probably because we are graced to live and work in this wonderful atmosphere of Auroville. Sure, we have our difficulties and Auroville is demanding. But here we can explore whatever we want because we do not need to run after money to live or buy luxury items. The need for artistic creation takes precedence over the need to earn money. We can work on the refining of each of our products. That's a great joy. What's supporting us is that inner feeling of being carried, of being guided to follow the thread."

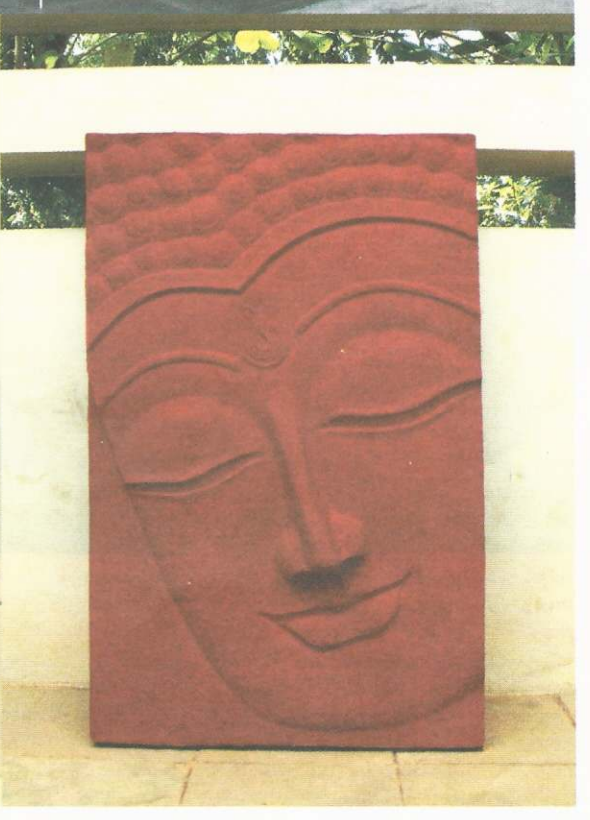
In conversation with Carel

For more information visit aurovillepapers@auroville.org.in or facebook.com/aurovillepaper









Tamil farmers and the water issue

AurovilleToday met with four local farmers who irrigate their land in the area of Kuilapalayam. Arivasu's main crop is cashew, but he irrigates coconut trees. Paneerselvam has 15 acres of irrigated cashews. Satiyabalan irrigates three acres of coconuts, and Gnanamani (Mani) irrigates seven acres of coconuts.

All the farmers are aware that there is a water problem. They know of two wells in the Kuilapalayam area which have gone dry, and when Satiyabalan last took out his well pipes, he found that the water level in his well had dropped 20 feet. This means that wells have to be dug deeper and deeper to find water. In the Kuilapalayam area, they say they have to drill to a minimum depth of 150 feet to have an assured water supply. Around the Abri/Matrimandir area, the wells have to be drilled to 500 feet.

But why is the water level going down? The farmers are sure that it is because of changes in the weather. In recent years there has been less rain, (they note the village pond has not overflowed for the past 10 years) so there is less water available to be drawn out of the ground. While they are aware that there are many more wells today, and that people in the village use far more water for their household needs now because most of them have a tap or pump near the house, they dismissed the suggestion that over-pumping by the farmers could be a factor in declining water levels. They point out that less land is irrigated today than 20 years ago, because more agricultural land is being turned into housing plots.

But how much do they actually pump on a daily basis? None of them had really checked, although one noted that his 15 hp submersible pump pumped 2,000 litres in five minutes, and another admitted that sometimes he didn't turn his pump off for over a month. Mani also has a big 15 hp pump, but he does not irrigate his coconuts at night.

They were all aware that many wells in beachside villages like Bommayapalayam and Pillaichavady that are saline. However, the water in their wells was still good. Again, they blamed the salination of wells on inadequate rainfall rather than over-pumping, noting that during big monsoons in the past, the pressure of water flowing from the land had always washed the salt back into the sea. As Paneerselvam puts it, "the ocean has entered inside and there is not enough rain to push it away".

From left to right Arivasu, Satiyabalan, Gnanamani and Paneerselvam

Mani also felt, however, that beachside erosion was the reason for the salination of beachside wells as it allowed seawater to enter these wells.

Did they think the salination would spread inland? They mentioned that some wells closer to the village already had some salt in the water, so they expected the salination to spread. But how long would it take to reach the village (which is about one kilometre inland)? "Probably four or five years," said Aruvasu, although Mani, whose coconut fields are actually between the village and the beach, felt it could take as long one to two generations.

If they were convinced that if the farmers pumped less there would be less chance of the salination spreading, would they be willing to cut down on irrigation? Of course, they said. But everybody would have to cut down, not just the four of them. And how do you get everybody to do that?

Nevertheless, as Mani puts it, "We should reserve water for future people, so we should use the minimum". In fact, in spite of the free electricity provided for farmers, they were all interested in finding more efficient ways of irrigating their crops. Arivasu was keen to try drip irrigation. He had heard that there is a government subsidy on drip irrigation systems (the government pays three-quarters of the cost) and had been many time to the local Block Development Office to get details, but so far he had had no luck. He is still not sure if the subsidy is available in this area.

Mani is very aware that the open channel water distribution system he uses for his coconuts is very inefficient and wasteful of water. He had tried a 'water gun' on his coconuts, but this had not proved very successful in conserving water and it had actually exposed the roots of the young seedlings. Now he definitely would change over to a sprinkler system if there is a government subsidy available.

In fact, Mani was the most concerned about water wastage. "In the villages, the taps are left running and water is overflowing. The children should be taught in schools to use the minimum of water, then they will teach their parents. I think this is the only way to change things."

If they think less water would be available in future, would they consider changing to crops that need less irrigation?

It turns out their main concern, when it comes to what they decide to cultivate, is not shortage of water but the shortage of field labour. "We cannot go back to our old cultivation system because we can no longer get the labour," says Arivasu. "The old crops need too much labour. Therefore, cashews and coconuts are the perfect crop because they don't require so much labour and we get a good price for them. Also, only cash crops like cashews would survive a long drought."

Cashews are not generally irrigated, but coconuts, particularly in the early years, require quite a lot of water. And irrigated casuarinas, another popular cash crop further north, are also a thirsty crop.

What about the future of farming in this area? They are not particularly optimistic. "When the child has still not learned to walk we already put him in school," says Satyabalan, "and after getting educated they will not turn to farming. Also, there is no scheme that helps young people to become farmers." In fact, they feel the government has given far too little support to farmers and has "ruined" farming over the past five years.

As one of them puts it, "I think most of our young people will sell their land in the future."

So why are they still farming? They shrug. "We don't know anything else."

From an interview by Alan.
Translator: Shankar

The water trouble of Annai Nagar

"Compared to many villages in Tamil Nadu, Alankuppam is well-off," says Moris from Auroville's Village Action (AVAG), pointing at its clean, pothole-free roads. Alankuppam is part of the Puducherry Union Territory, located in one of Puducherry's enclaves in Tamil Nadu, near Auroville. Annai Nagar, the dalit settlement of Alankuppam, shares its clean appearance. But in this village a water problem has arisen.

"The groundwater level has gone down and the well is dry. A nearby landowner now supplies water to the overhead water tank, but he charges for it," says Moris. "The costs are paid by the Government of Puducherry, but the situation is not ideal. The villagers resent depending on a private individual for an essential need."

A villager from Annai Nagar shows the illegally-dug bore well

A year ago, a government grant enabled AVAG to improve the drinking water situation in 15 villages around Auroville. "In most villages we installed hand pumps, but in Annai Nagar we decided to dig a well," says Moris. Discussions on the best location were settled when a water diviner selected an ideal spot – however, on a piece of land owned by Auroville. "What followed was a series of mistakes," admits Moris. "We had sent the drilling rig to the village, but when the best spot was finally selected I could not be contacted and no-one acted to get permission. The villagers waited for some time, but as the rig owner was charging by the day, they decided to go ahead." When called afterwards by Auroville, the villagers and AVAG duly apologized, but by that time the well was dug. Auroville refused permission to use it.

"The situation has been blocked for almost a year now," says Moris. The local MLA [member of the Legislative Assembly of Puducherry, eds.] very much wants Auroville to give a NOC [No Objection Certificate, eds.]. The Government of Puducherry is ready to install a pump and make the electricity connection on condition that Auroville provide the NOC, but Auroville hasn't made up its mind as this piece of land is to be exchanged for land within the greenbelt or city area."

The old well is about 95 metres deep while the new well goes to a depth of 122 metres. "The ground water levels are going down everywhere," says Moris gravely. "When we ask the people for the reason, the standard reply is that the monsoon has failed. But that's not true. In the past, the villages harvested rainwater in village ponds. But the channels in the catchment area, which conducted the rainwater to the ponds, are now almost all blocked because of house constructions. Lack of recharge is one reason for the lowering of the water level."

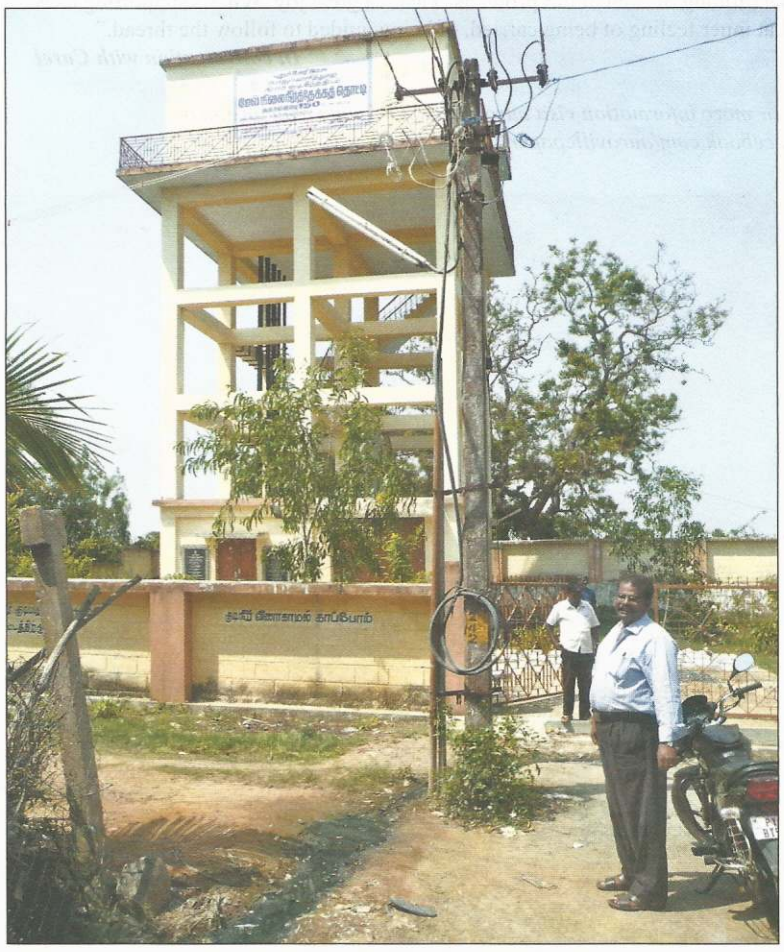
Another reason is money. "People are over-pumping the aquifer for watering their farm lands," explains Moris. "As electricity for farming is free in Puducherry and in Tamil Nadu, farmers keep their pumps running all day and even sell water to their neighbours. Ideally, they should install drip irrigation or cultivate the traditional crops of this area that don't need much water. Instead, they are growing cash-crops such as coconut, casuarina, sugarcane and paddy that bring in more money but require large volumes of water."

The lowering of the ground water level in Annai Nagar has yet another reason. "There is not much agriculture in this village," says Moris. "The drop here is a consequence of improved standards of living. The water from the overhead tank is supposed to feed the public taps in every street but, instead, people have laid pipelines into their houses. They use the water for their personal needs and for their cattle and gardens."

Meanwhile, a new Puducherry government scheme is sponsoring the building of home toilets with a contribution of Rs 12,000. This is not sufficient. A toilet costs approximately Rs 20,000, so the villager has to pay the rest. AVAG is arranging for bank loans for the people," says Moris. While the initiative will greatly enhance sanitation and personal comfort, it will also put additional stress on the ground water. "We are also concerned about the effluent," admits Moris. "Part of the government grant must be used for building leach pits, but leach pits pollute the ground water. Ideally, people should build septic tanks, but these are still too expensive."

As village awareness about groundwater issues is under-developed, AVAG plans to start an educational programme to create more understanding, though with little hope that it will substantially impact the situation. Annai Nagar's villagers, meanwhile, are awaiting Auroville's decision.

In conversation with Carel



Moris next to Annai Nagar's 150,000 litres overhead water tank

From pond to borewell

Many famous civilisations were born around water sources, such as the Indus Valley or the Nile, and Kuilapalayam village is no different, according to local school principal and history enthusiast, Shankar. When people first came to collect firewood in the area more than 200 years ago, they discovered water and shifted there, building huts around the pond, he says. "So those people had an understanding of collecting rainwater, saving it, channeling and using it. They did not have ground water."

Water has also been traditionally worshipped in Tamil culture and placed at the centre of many rituals. In particular, farmers petitioned the rain deity Mariamman when they needed rain for their crops. "They thought they had done mistakes, which meant Mariamman did not give water, so they had to do a firewalk, as an apology, penance, punishment," says Shankar. "It's meaningful."

Nowadays, the concept of the sacredness of water is a fading and abstract one that has not carried over into respect for water within daily practices. Shankar says the understanding was lost at the beginning of his generation, when borewells were introduced. "Before the first borewell was made in Kuilapalayam, people were happy with the pond and rainwater, but not now. The modern equipment was given to us, without telling us how the groundwater table is refilled. No one knows – they think it rains and it goes in directly. With borewells, people just switch on the motor. They think, 'OK, water table going down', and they send the pump a couple of metres further down. It's really sad. Nowadays there is no respect."

There are now about 30 private borewells in Kuilapalayam (a village of 340 houses), and the remaining houses depend on the street tap. Shankar points out that since people no longer have to fetch water from the pond, their attitudes towards usage and wastage have changed dramatically. They wash clothes when they are barely dirty, and use more water than previously."Oh yeah, I touched the cloth! [He mimes washing]…For one lungi, they use 30 litres, three containers of water. First we apply soap and wash the cloth in one pot, and then another, and then another… So that is our style.You'd be amazed at the amount of water that drains out of houses and the whole village…"

Shankar supports the concept of access to water as a basic human right, but he says that the village has no ideas for conserving water. "I'm angry about it. In Kulaipalyam, there's no concern. People pump it, make it dirty, then drain it away – what a sin!Only in Auroville I hear people saying "I wash something, and I use the water to flush my toilet". No villagers say that. I get irritated. I saw in Sadhana Forest, you take a jar of water, wash your fingers with water dripping from just one jar, but wash well. But here in the village, people take two litres, and still hands are not clean. We have a problem."

The children in Aikyam School, where Shankar is the Principal, are taught how to conserve water when they wash their hands, and they also visit Sadhana Forest to learn about water conservation. However, this education and understanding doesn't necessarily flow into the village homes. Shankar advances the idea of rationing water by charging people when they use more than five pots (100 litres) per person per day, in order to make them more conscious about wastage.

The village pond these days is kept for thirsty cows and has lost its focus as the hub of village life where people used to meet as they collected water and washed themselves. "I had to go there twice a day as a child," says Shankar."That was the only source. I used to go with a huge aluminium pot, and we were hesitant to ask people to help us lift the full pot and put it on our heads. So I would roll my towel, put it on my head, put the pot on top, dip myself fully under the water with the pot, fill it, and then raise up and walk. I did this five times, and the last time I'd do it, I'd use soap to clean myself well. Then I'd take the last pot home."

A village lady washes puja items on the street

The pond still remains the village's only water storage device, but Shankar claims the natural flow of water into the pond is now blocked because of the bunds built on higher land and villagers' own ignorance about the topography and how to funnel and collect water.

And in the shift from the pond to the borewell, does the burden of fetching water still fall on women? "It hasn't changed. Mostly women are doing it, and men are just using it. Some men go with the can to get AquaDyn drinking water [from Auroville], but other than that, water for the family is taken care of by the women. They have to get into the pit around the street tap and fetch water. It still happens."

Shankar points out that villagers no longer grow their own food, and that the traditional crops of varagu and ragi – which don't require much water – are no longer grown on village land. Even the owners of cashew fields lease the land to others to harvest, and undertake other business activities themselves, such as running taxis. "This village was producing and selling so much food! My father produced a minimum of 50-60 bags, quintals of kombu, and 50 bags of ragi and sesame seeds… My father never ate food from outside. Varagu can easily grow through drought, and so can sesame and ragi. We used to make our own oil, from our own sesame seeds and peanuts. And now everyone buys packets of sunflower oil, which is really petrochemical. Everyone has cholesterol."

Part of the village resistance to growing and eating traditional grains is that such food is regarded as "low status", therefore villagers aspire to eat polished white rice as an expression of upward social mobility. "If I drink ragi porridge, people say, 'Oh you don't even have money to spend on food' even though it is very healthy!", exclaims Shankar. As a solution, he suggests that each village collectively grows traditional grains on land irrigated by the village pond, but he concedes that villagers "don't care about it."

Can the concept of water as sacred be leveraged for educational purposes amongst villagers?"The word 'sacred', we have lost it in our daily life. Sacredness is a concept that Tamil culture knew but the very word is ignored by people these days, it's not in our practice. Religiously, we have to see that this pond is respected this way… We need to create awareness in the village."

Although water doesn't hold the same sacred status as it did previously, it is still central to village rituals. In order to start the annual Kuilapalayam festival, villagers go to the pond to invoke Mariamman. "They believe the water force can get into somebody and the person goes into trance and communicates with Mariamman. They say: 'This year we want to celebrate our festival – will we get permission from you?' The person in trance conveys the permission, and then they start. In Edaiyanchavady in summer time, they do a celebration where they pour hot chilli on their bodies and drink chilli, which creates burning… These are the ways of telling the goddess: 'Please, give us water, we need it in order to do our cultivation, to grow our food'."

Public water taps are standard in most villages in Tamil Nadu

Taps are forbidden in Sadhana Forest

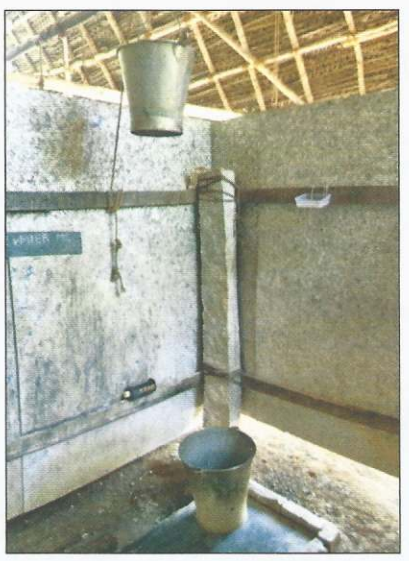
The work of Sadhana Forest is well known. Yearly, more than 1,000 volunteers come for shorter or longer periods to learn about water conservation, rainwater harvesting, earth dam building, afforestation, alternative energies and many more 'green' practices. "Recently we've started giving green-practice workshops," says Yorit. "We have been inviting people from Tamil Nadu to come here for a weekend to learn about water conservation. The outcome was a *yatra*, a tour to lands north of Chennai owned by some of the participants. We helped them to redesign their land to optimize it for rainwater harvesting, and our JCB operator, who has been working with us for many years, has gone there and started the work." Another outreach work was helping with the reforestation of Omkareshwar Island, an island in the river Narmada which has the shape of the Sanskrit syllable "AUM" and which is sacred to Shiva.

Yorit demonstrates a water station

What, exactly, Sadhana Forest does at home to encourage water conservation is less well-known. How do these 1,000 volunteers deal with water? "Very sparingly," laughs Yorit, who together with her husband Aviram started Sadhana Forest 11 years ago. "Here we choose to conserve water at every step." She explains that Sadhana Forest has only dry compost toilets where water is only used to wash. Grey water is used for gardening. For dishwashing, the volunteers use four buckets of water. The first one is for rinsing the dirt using ash from the wood stoves and coconut husk for scrubbing; then the dish is plunged into the next bucket, followed by an immersion in a third one which holds a vinegar solution, to ensure that all bacteria have left. The dish is then finally rinsed in a fourth bucket. "So for a 100 dishes, we only use 40 litres of water," says Yorit. The waste water, of course, is used for gardening.

Another ingenious system is used for hand washing and for showers. "You won't find a tap in Sadhana Forest!" says Yorit. "That would be the end of our experience, as people are used to leaving taps open and keeping the water running. Instead, we have water stations for washing our hands." The system consists of a water barrel and two jugs. One jug, attached to a nearby tree, has a hole in the bottom. The other one is used for scooping water from the barrel and pouring it into the jug with the hole. Water drips down and that's used to wash your hands. "You learn very fast that half a jug is enough to wash your hands 3 times," says Yorit. An immense coconut tree is the silent beneficiary of all the water used.

While the water barrel for the hand wash is close at hand, the same cannot be said for the shower system. Here, the water source is a hand pump which has deliberately been put at quite a distance from the shower rooms. "People have to fill their bucket and carry it all the way to the showers, a distance of 50 metres at least. That's a heavy load. In this way, people quickly realise that water is precious," explains Yorit. While most volunteers use a jar to shower themselves, for the persistent there is the possibility to empty the bucket into another bucket which has holes in the bottom, hoist it up by using a rope and then enjoy a – by then well-needed – shower. "But most people soon conclude that half a bucket will do," says Yorit.



The shower system of Sadhana Forest

To her regret, these water conservation methods haven't made inroads in Auroville. "We would love it if the schools would change their water systems, and start experimenting with different ways of washing hands. It's easy to teach children, and important to do so."

In conversation with Carel

"We are trying to catch a vibration"

Francis and Doris are the Auroville Video Productions team which, for the past ten years, has been documenting the history and unfolding of Auroville. What is their motivation? What are the challenges? And what have they learned about Auroville and themselves in the process?

PHOTO: GIORGIO

Doris and Francis

Give us a brief history of the Auroville video experiments.

Francis. The first video that presented Auroville to the world was made by Michael Klostermann in the early 1970s. In the early 1980s, Alain and Patricia started a video unit. I got involved with them in the middle 1980s. For a while, Yanne and I had a great time making weekly 'Newsreals' with them. These were light-hearted takes on what was happening in the community, primarily for internal consumption. However, at a certain point Alain and Patricia were disturbed by what we were doing that they didn't want to be part of it any more. Suddenly Yanne and I found ourselves doing everything: writing the scripts, shooting, editing, and we had to come up with a product once a week. That was my introduction to video.

So how did Auroville Video Productions begin?

Doris: It all started with the tsunami. I was participating in the tsunami relief meetings because at that time I was the webmaster of the Auroville website, and I saw all these extraordinary things happening – Uma and Tsunamika, Wellpaper initiatives, people going to the villages to clean up after the destruction. I said, somebody should document all this. At which point Hemant Lamba, who was coordinating the meetings, said, 'Get a camera and do it'.

So I got a camera and the first thing I did was to make a 10 minute video documenting the making of the Tsunamika project in the villages. It made me realise I had a lot to learn about video-making. So I went and sat by Basile and watched him at work. We didn't talk much but I began to understand what he was doing when he edited a video, why he rejected one shot or moved another one round.

Then I got a professional camera. One day somebody asked us to film something in the Matrimandir Chamber. Afterwards, I asked John Harper who was documenting the whole Matrimandir project. He said, 'nobody'. I just couldn't believe it! So I turned around to Francis and said. 'We will do it'. I think he said, 'You must be mad' because I had no idea what we were letting ourselves in for.

Francis: The whole project took us three years because there was a ten-year gap in the record that we had to fill, and some of the older material was poorly catalogued and in a very bad state. When we went into the Auroville Archives, I couldn't believe what we found. There were cans of films and the films were covered in mould, there were boxes full of photographs with no names, no dates. It was a total mess. So to find the things that were relevant to what we were doing, and to photograph the photographs, took us a long time.

Doris: I was still "new in Auroville". So I read every issue of Matrimandir News to find out what had happened in the past and who was who. And we told all the Matrimandir workers to call us whenever they started a new work so that we could document it.

What was really nice is that when we said we were making a film about Matrimandir, everybody gave their help for free. At the end we donated the film to the Matrimandir, and today it is one of the best sellers at the Visitors Centre.

Did this give you the impetus to go on making other films?

Francis: Doris had already decided to upgrade the software and get a better camera, so it was never really a discussion if we were going to go on or not.

Did many people come to you after that and ask you to make films for them?

Francis: Everybody! But nobody understands the work involved. Everybody thinks you just roll the camera and put out the product. But the actual shooting is only 5% of the work.

Do you divide the work between you?

Doris: Yes. We both do filming, but I do all the editing and then he comes in and tells me what works and what doesn't, what I have to change, and how. He has always been the director!

Francis: I am looking to see if what we are trying to communicate is being communicated smoothly. You have to grasp how unconscious the average viewer is, and if it is too subtle or too confusing then it doesn't work.

So how do you decide which projects you take up?

Francis: We finance all the films and equipment ourselves; we never got a penny from anyone, because we want the freedom to say 'no' if we don't want to do something. So when people come with an idea for a video, we listen carefully to what they are looking for. But even if we say 'yes', we make it clear that we will give them our version of what they want, not theirs.

Doris: Only once we were presented with a script. These people knew exactly what they wanted, but when we tried it, it just didn't work. It was too long, too wordy. So we rewrote the script and it turned out well.

Do you initiate some projects yourself?

Francis: Yes. The 'Children of Auroville' series is one example, 'Born at the Right Time', which is a series of beautiful, refreshing images, is another.

What made you initiate those projects?

Francis: Regarding 'The Children' series, I was interested in finding out what the youth thinks and does.

Doris: One thing that motivated me was when I heard about 'Last School' closing down in the 1970s. I was still fresh from the West and couldn't believe what I was hearing. So then we interviewed Shraddhavan, who had been a teacher there at the time, and we talked to a lot of the ex-students and got the story. We transcribed everything and then we figured out a script based on certain themes that emerged.

The theme of the first 'Children of Auroville' film was the struggle of that generation to get educated. The theme of the second was why some of them returned to Auroville, and what they are contributing to the community now.

Francis: That generation includes some very bright people, but we found out they want nothing to do with the present governance of Auroville. Yet these are exactly the guys we need.

Doris: You could feel their love for Auroville that brought them back, but when they are asked why they don't participate in governance they said we tried, but we couldn't get anywhere because the older Aurovilians didn't want to include us.

Francis: We are documenting Auroville's happenings for the present and future generations. Now we have about 70 interviews of Aurovilians that could be turned into other history videos.

Doris: There are enough people out there covering Auroville events. We do this as well, but we are more interested in people's perceptions of what is happening, and how this changes over time as they change.

What are some of the other topics you have covered over the last ten years?

Doris: Among other projects we did Paul's musical, *Sorcery at Sea*, the Sacred Groves project and, most recently, the Retreat. I got interested in the Sacred Groves experiment because I thought something interesting was happening there; I'm always on the lookout for things like that. But we stopped when the project started encountering problems.

Does that mean you don't like to cover negative aspects?

Francis: We only cover them if they turn into something positive. There is a tendency towards negativity in this community and you have to swim upstream against it all the time. If you want to get into the underbelly of Auroville, there is no end to it. So, no, we are not interested in doing exposes of what is wrong here.

What about the technical challenges?

Francis: Our main priority now is upgrading our equipment. Our cameras are eight years old and they use DVD tapes that are getting difficult to obtain: everything is on SD cards now. So we had to buy new cameras, which is a heavy investment, and we had to get the latest software. And now there is the question on how to archive the old DVD tapes. This is a work in progress.

To what extent does the technology determine what you can shoot?

Francis: It plays a big role. One of the cameras we have has a fantastic depth of field, the clarity is unbelievable, but it is hard to zoom or pan. Recently I got a 'Go Pro' camera. Again, the quality is unbelievable but it is always in focus, and there is no zooming, panning. So we bought a nice Camcorder to cover these missing aspects. We are on a steep learning curve.

Apart from the technical considerations, how did you decide what you were going to shoot during the Retreat? After all, so much was happening.

Doris: We covered the main presentations and summaries. Other than that, you get a feeling for when something interesting is happening but it is difficult to catch those moments.

Is it the same problem when you are doing individual interviews?

Francis: Loosening people up is usually my job. You have to get them to turn off to the presence of the camera if you want them to relax and be honest rather than just giving you rhetoric. I don't always succeed!

Are there occasions when someone is saying something you are very much out of sympathy with? If so, can you remain objective?

Francis: We had to shoot one interview with an Aurovilian twice because I allowed my personal views to come through too strongly in the questions.

What have been the most moving moments?

Francis: We did an interview with someone who had had a very tough childhood here. She began by saying, 'Do I get all warm and fuzzy when I think about Auroville? No I don't'.

Doris: But she had worked on herself so much that she could look back and see certain things very clearly now, and she could express this very well. It was an unbelievable interview. Afterwards she said that talking to us had been very good for her.

Francis: She actually reconnected with Auroville after that.

Doris: These moments make me feel so grateful that we are doing this work.

Francis: The interview with Serge, who knew he was dying, was also unbelievable. All three of us were so tuned in.

Doris: He was looking back over the past and simply speaking the truth; he had nothing to hide. This is what we are looking for.

Francis: In the end, it's not so much about documenting something as catching a vibration. All the visuals, all the audio, all the technical stuff is just trying to transfer a certain feeling from the screen to the viewer.

Doris: It's why people watch the Matrimandir or the *Sorcery at Sea* videos time and time again. The Auroville vibration is there. It's about people coming together, working together in a certain spirit.

Do you have any dream projects you would like to do in the future?

Francis: If someone tells me he is supramentalised and can levitate and asks me to capture it on video, I'll certainly do it. Otherwise, I have no dream projects. We simply respond to what is there.

Has this work in any way changed your perspective on Auroville?

Doris: I think coming into contact with that special vibration during the Matrimandir project changed me. It is what is leading me now; I keep looking for those moments.

Francis: When you are doing this work you get to look at Auroville from a little bit of distance and with greater clarity. And what you see is not always pleasant. In the last ten years of doing this work, I have learned that the baseness of human nature is much more extensive than I had conceived of beforehand. In fact, I feel that the project of Auroville has become secondary to individuals' needs. Perhaps it has always been like that, but I was too immersed in it before; when you see it through the lens, you get a bit more detachment. Again, looking at the unbelievable quality of life that everybody is experiencing here, something that brings tears to the eyes, I wonder why there is not more gratitude.

So it can be tough, intense, sitting in front of these big screens and having to watch certain things time and time again. Having said this, we are both utterly delighted that we can be part of this, that we can do this work for Auroville.

From an interview by Alan

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Editorial team:
Alan, Carel, Ing-Marie. Guest editor: Lesley. Proofreading: Alan. DTP: Carel. Photo editing: Jean-Denis. Published by Carel Thieme on behalf of the Auroville Fondation. Printed by Brihat Consultants, Pondicherry, and published at Surrender, Auroville - 605101, Tamil Nadu.
Contact: Auroville Today, Samasti, Auroville - 605101, Tamil Nadu, India. Phone: +91.413.2622572, avtoday@auroville.org.in.