

# FROM DUST TO DAWN

Raven LeFay describes how an eroded landscape was turned into a bountiful eco-city and improved the local climate in the process.

Thirty years ago Auroville, located in Tamil Nadu in the south of India, was a barren wasteland, the result of two hundred years of deforestation, overgrazing and poor land stewardship. Violent monsoon rains were washing tons of topsoil into the Bay of Bengal each year, carving deep and dangerous canyons along the way, and the merciless sun of the dry season was baking the remaining red laterite earth into brick. Yet in a relatively short period of time, Auroville has been transformed from a desert into a lush and verdant jungle, supporting a thriving, diverse community of people, plants and animals.

In many ways, Auroville is a success story for sustainability. A pioneer in environmental restoration, it has gained international acclaim for innovative developments in appropriate technology, sustainable agriculture and rural regeneration. A flagship community of the ecovillage movement, Auroville has received unanimous endorsement from UNESCO as a 'city the earth needs' and been commended by such notables as the President of India, the Dalai Lama and HRH Prince of Wales.

## WHAT IS AUROVILLE?

The name Auroville means 'City of Dawn' and refers to the dawning of a new consciousness. It was conceived and founded in the late 1960s by the French visionary known as 'The Mother', a spiritual collaborator of the philosopher and yogi Sri Aurobindo. Together they envisioned a great future for humanity, one where all might live together in peace and harmony. Auroville intends to realise this dream of human unity. It is a place for the spiritual evolution of humanity: an awakening of the divine consciousness that lives in us all.

2,000 people from 35 countries currently live in Auroville, and spiritual evolution is their driving force, breathing life into all their activities. This truth is most strikingly reflected in the organic architecture of its town plan, a galaxy shape that spirals out over 5 square kilometres (2 square miles). The Matrimandir ('Temple of the Mother') sits in the centre alongside an ancient banyan tree, an amphitheatre for ceremony and ritual, and an inaugural urn that contains earth from 124 countries as a symbol of international harmony. The city is divided into four directional zones: cultural, industrial, international



John Mandeen

and residential, and surrounding everything is the 'green belt', an area dedicated to the promotion of biodiversity, organic farming, reforestation, and sustainable research.

## SOIL & WATER CONSERVATION

When the Auroville pioneers arrived, regeneration of the environment was their first concern. There was no electricity, water or shade, and finances were limited. Through careful observation and listening to local traditional knowledge, they slowly developed an integrated soil and water conservation strategy that restored the fertility of the land. Extensive networks of raised earthbanks and ditches called 'bunds' were placed along the contours of the land, along with a series of earth check dams and catchment ponds.

Learning the hard way to work with nature, they placed features near the top of the watershed following the topography, and through trial and error succeeded in their goals.

As they became more skilled and efficient in their work, Aurovillians turned their efforts towards the bioregion. Work units 'Palmyra' and 'Water Harvest' are currently targeting the rehabilitation of an ancient network of community catchment tanks that once covered the land, in an attempt to recharge the aquifers, prevent saltwater intrusion and conserve water for irrigation.

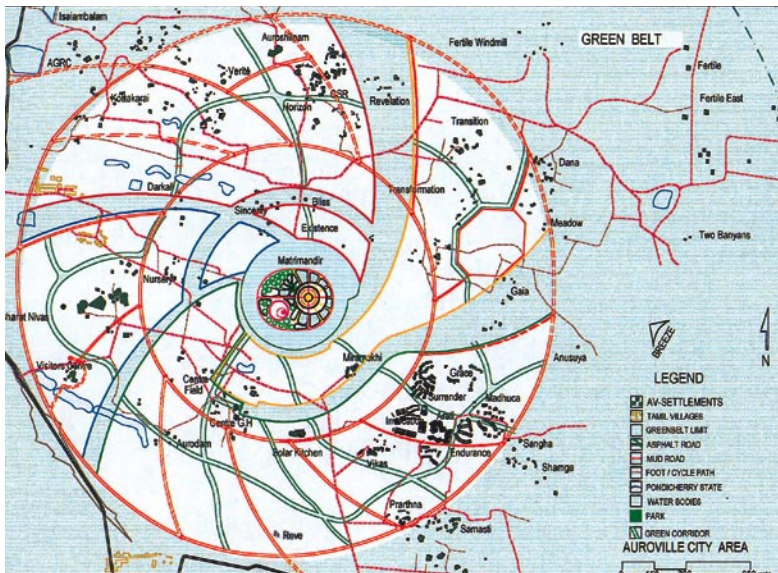
## REFORESTATION

Since the 1970s, millions of trees have been planted behind bunds, next to dams and ponds. Fences have been made from thorn and cactus to protect the vegetation from grazing. As the vegetation has grown the microclimate has changed. It has become cooler and more humid, which facilitates more plant growth, and brings in many species of animals, birds and insects. This in turn further enriches the environment through seed dissemination and fertilization.

*Above:* Matrimandir temple and an ancient banyan tree which are at the centre of Auroville.

*Below:* Author Raven LeFay.





**Above:** Auroville city plan showing galaxy structure.

Initially both native and non-native species were planted, but the Australian ‘work tree’ (*Acacia auriculiformis* or Darwin Black Wattle) became invasive and crowded out other species. Now these trees are harvested, and efforts are focused on recreating the native vegetation of a tropical dry evergreen forest. Auroville’s botanical gardens have a 20 hectare (50 acre) plot that is being developed into a research and demonstration site with over 5,000 specimens from the native forest. Pitchandikulam Bio-Resource Centre also has a 20 hectare (50 acre) forest where it has collected over 440 indigenous plant species, and runs a revitalization programme for medicinal plant traditions. Both have seed banks to protect forest biodiversity. Today, the Auroville forest is acknowledged and safeguarded as an invaluable resource for the community: for medicine, food, firewood and building materials; erosion control; as a microclimate moderator; and as a sacred sanctuary.

**APPROPRIATE TECHNOLOGY**

Having established vegetation and water control, Aurovillians started building their infrastructure. Keen to integrate appropriate technology into their designs, they aimed for solutions suitable to the climate that would incorporate passive solar features, protect from rain, reduce energy consumption and utilise rainwater harvesting, wastewater treatment and renewable energy systems. They were both constrained and motivated by such factors as no electricity, transportation, machinery, or conventional building materials on the one hand, and an abundant but unskilled labour force on the other. Solutions had to use local people and materials, be inexpensive, and simple to implement and maintain.

The basic building material was an obvious choice, since earth was abundant on site. The Auroville Earth Institute and Centre for Sustainable Research (CSR) have developed a successful manual press to create Compressed Earth Blocks (CEBs) that are used like bricks. The presses are robust, using a high compression ratio of 1.83 with 13.5 metric tons (15 tons) available force, and produce up to 1,000 accurate blocks per day of adjustable height and shape (including hollow

blocks that save on material and give insulation). In Auroville, the blocks are stabilised with 3-5% cement to prevent water erosion, but lime or bitumen can also be used. CEBs are energy efficient (using between 5 and 15 times less energy to make than a fired brick), durable, ecological, cheap, and the technology is easily transferable. The blocks are adaptable and can be used without support or form. This technique is known as free-spanning or Nubian, and is made possible through the blocks’ adhesive properties with the clay mortar. Many buildings in Auroville demonstrate this through vaulted floor and roof designs.

Along with earth construction, Auroville has had great success in the use of ferrocement, where a thin cement mortar is laid over steel wire meshing that acts as reinforcement. While not a truly sustainable solution, it has proven to be a very cost-effective and highly efficient building material that is adaptable,



Auroville Earth Institute

**Right top:** Manual presses are used to create compressed earth blocks.

**Right centre:** School building made from earth blocks.

**Right bottom:** House interior.



Auroville Earth Institute



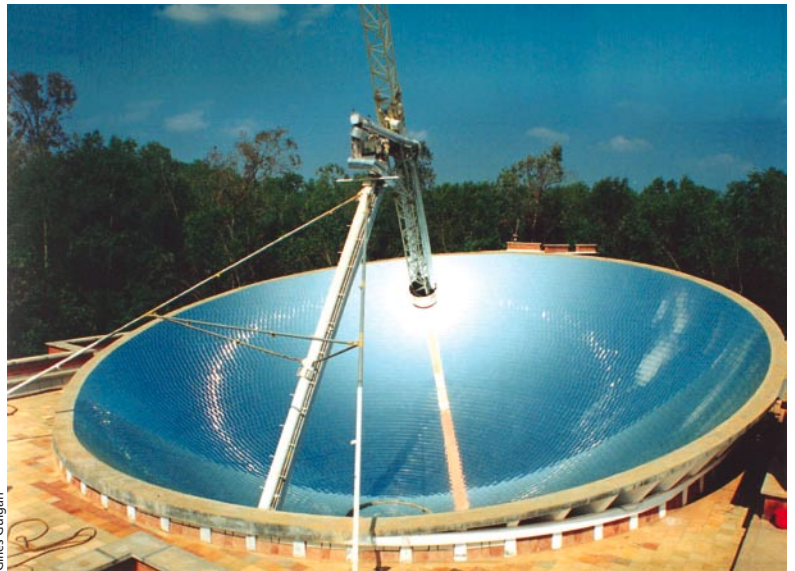
Auroville Earth Institute

strong, enduring and also simple to learn how to use. Auroville mostly uses ferrocement for water tanks, latrines, roof materials and biogas plants.

### RENEWABLE ENERGY

Early on Aurovillians searched for renewable energy solutions, since for many years there was no conventional electricity source available. Research focused on solar energy, since this is abundant for most of the year. Early houses had solar water heating and cooking facilities installed, and today some houses run entirely on solar photovoltaic (PV) panels, while many more use them in combination with other power sources. At present a total of around 250kw of electricity producing solar panels are installed in Auroville.

Several Auroville work units actively research, develop and maintain a wide range of solar energy products, including cars, water pumping and desalination



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Raven LeFay

systems, lanterns, charge controllers and inverters. One successful project in solar technology has been the community Solar Kitchen. This is a solar concentrator that uses a 15m (49ft) diameter spherical, inclined bowl with a thermal output capacity of 75kw that generates enough steam to cook the food for up to 2,000 people a day. It uses prefabricated ferrocement segments lined very precisely on the inside with 11,000 small ordinary mirrors, which makes it cheap and easy to maintain. The receiver is a 4m (13ft) high cylinder that is kept in focus through a computerised tracking system. A heat transfer liquid circulates and produces steam in a heat exchanger, which is sent to steam cooking vats in the kitchen.

**Above:** The solar concentrator that generates enough steam to cook for 2,000 people a day.

Other forms of renewable energy used are wind and biogas. Wind energy, like solar, has been used in Auroville since the beginning, primarily for water pumping. There are over 20 different designs for windmills in the community, including Aureka's efficient and successful multi-blade windmill (AV55) that uses high towers, has a low cut-in windspeed (more regular output), is reliable, inexpensive, suitable for deep and shallow wells, and requires minimum maintenance.

Currently over 20 biogas digesters are being used, both floating drum and fixed dome models, constructed out of prefabricated ferrocement. They use cow dung and other biomass (including human manure) to produce methane which is then used in cooking.

**Left top:** Verdant landscape with a small solar cooker.



Raven LeFay

### WASTE WATER TREATMENT

The first wastewater recycling solutions that Auroville developed were simple, inexpensive combinations of septic tank and soak pit. Later, European funds enabled the CSR to research and develop planted filters, also called constructed wetlands or root zone treatment systems. Currently Auroville has over 40 water treatment systems of small to moderate size many using horizontal or vertical planted filter beds, and also using baffled tank reactors, biogas plants and at least one Living Machine. Recently Auroville has been researching Effective Microorganism (EM) technology to improve system performance.

**Left centre:** Raising seedlings for medicinal plants.



CSR

**Left bottom:** Prefabricated ferrocement compost bin.



**Above:**  
Small scale  
greywater  
filter beds.

### ECOLOGICAL AGRICULTURE

Aurovillians have always practised organic agriculture, with the intention of restoring fertility to the degraded land and becoming self-sufficient in food production. At present it is self-sufficient in dairy and seasonal fruit. It produces 50% of its total fruit and vegetable needs though only 2% of its total rice and grain. A variety of food products are made by Auroville food-processing units, including nut spreads, jams, pasta, breads, pastries, dairy products, oils and even spirulina.

**Right:**  
Cashew nut  
plantation.

There are 14 farms working around 400 acres, managed by the Auroville Farm Group. Most farms are diverse, with a combination of fruit trees, field crops, vegetables and livestock. There is a strong focus on traditional breeds and varieties, and on keeping seed banks to preserve agricultural biodiversity. Each farm integrates appropriate technology, such as rainwater harvesting, wind pumps and drip irrigation. They experiment with perennial agriculture, biodynamics, natural farming, and more recently EM technology (an EM-fermented plant extract from the leaves of the indigenous Neem tree has been developed for pest management).

**Below:**  
Demonstrating  
safe  
handling  
of EM on  
Auro Annam  
farm.

### ECONOMICS & GOVERNANCE

Auroville has a unique organising principle. Although there are recognised authorities, it is essentially a self-governing community, a divine anarchy, with no fixed



hierarchical structure. Daily decisions are made by autonomous working groups in areas such as finance, health, education, and environment, through consensus.

There is no individual ownership of property. All Aurovillians work for a fixed wage and make monthly contributions towards running costs. The original vision was for Auroville to be financially self-sufficient and to have no exchange of money within the community, but this has yet to be realised. Health care, education and cultural events are free, however, and the Financial Service centre runs a comprehensive computerised money system linked with its working units to ensure very little cash is actually handled in the community.

### A CITY THE EARTH NEEDS

The immense scope of the Auroville vision and its work is awe-inspiring. It has many elements of a truly sustainable community. But despite its success, Auroville is no utopia. It is a beautiful dream unfolding into reality. It is a micro-cosmic reflection of all the challenges that India and the world are faced with, riddled with imperfections and intractable problems, as any visitor will quickly find out.



Yet it strives to model a low-impact way of life, and demonstrates ways that we can work together to restore our social, ecological and spiritual balance. More than anything, Auroville is an ongoing experiment, a positive, practical solutions-based research station. Auroville is a living laboratory intent on the search for a sustainable future and a city the earth needs 🌍

### FURTHER INFORMATION

[www.auroville.org](http://www.auroville.org)  
[www.auroville.com](http://www.auroville.com)

*Raven LeFay recently spent four months living and teaching sustainability in India on the Living Routes Ecovillage Education program. She holds a BA in Culture, Ecology & Sustainable Community from New College of California, and an MSc in Ecological Education from Schumacher College in Devon. Her passions are permaculture, holistic health and earth-based spirituality. She currently lives in the wilds of West Penwith, Cornwall, where she is an active member of local community and sustainability groups and runs an organic dairy farm with her partner.*