



*Management of Technology in Arid Areas:  
A Long Term Programme*



विद्याविनियोगाद्धिकासः  
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### Development and Outreach Station

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# Management of Technology in Arid Areas: A Long Term Programme

## The Mission

This programme has evolved from projects to a Mission with following goals.

- To develop techniques of protected agriculture suitable for arid areas which are characterized by wide occurrence of salt affected soils, poor quality water and high ambient temperatures.
- To evaluate technology developed elsewhere for its suitability to local conditions and economy.
- To use science and engineering to improve living conditions in rural areas in arid regions, especially Saurashtra and Kutch.
- To develop management systems necessary to make good use of new technology.

Problems are identified by direct interaction with people in villages, solutions are developed keeping in view the special environmental features , natural resources and adversities of the region. Signifying this shift the initiative is now called Long Term Programme of Technology for Arid Areas.



## Activity Set

- conceive, generate, and screen science/technology-based business ideas
- design and test concepts and prototypes
- build successful commercializable projects
- encourage entrepreneurs to manufacture and market new products
- actively create, share, and encourage the use of knowledge assets through case writing, research papers, workshops, management development programmes, etc.
- provide a platform for exchange of ideas and solutions of researchers and practitioners involved in the management of arid zones in other parts of the country and the world.

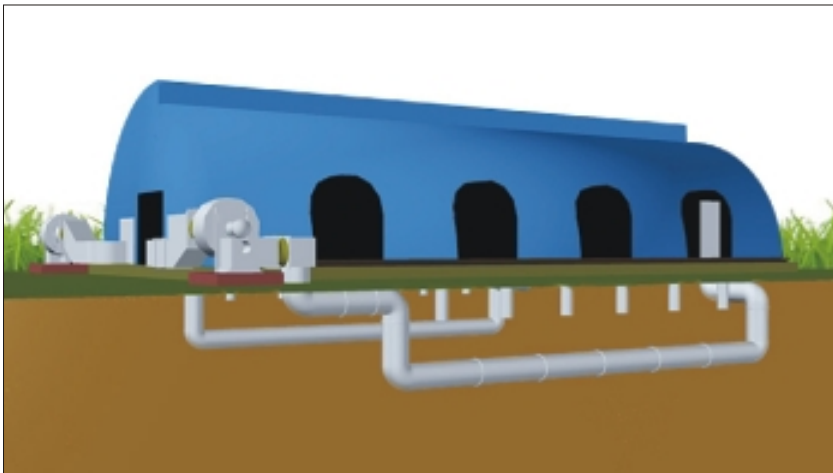
## Development and Outreach Station

The programme has two bases – at IIMA and at Kothara (Kutch). The base at Kothara is the Programme's **Development and Outreach Station (DOS)**. All experimental and developmental facilities are based here. DOS will also carry out outreach activities. The experimental facilities available are the following:

## Technologies Developed (2000-08)

### Earth Tube Heat Exchanger and Its Applications

ETHE is a device that enables transfer of heat from ambient air to deeper layers of soil and vice versa. It uses the known fact that temperature regime in deeper layers of soil say beyond 3 m depth remains stable permitting large mass of soil to be used as sink and source of heat. ETHE does not require water and is therefore specially suited for greenhouse, cattle barns, and human residences in hot arid areas.

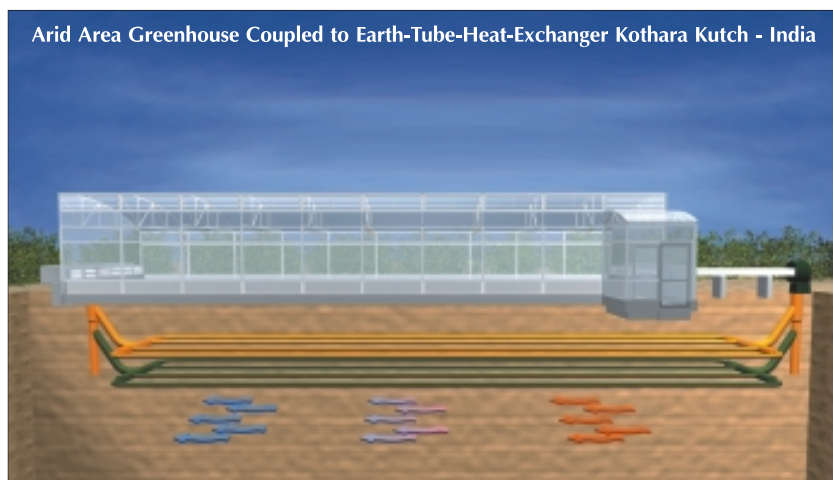


ETHE System at Auditorium-2, Science City, Gandhinagar



## Arid Area Greenhouse (AAG)

Arid Area Greenhouse ( AAG) is a cultivation technology specially developed to suit the conditions in hot and extremely arid regions like Kutch where water is scarce, soils are salt-affected , ambient temperatures high and rainfall low. AAG uses earth-tube-heat-exchanger (ETHE) for cooling and heating. ETHE is a device that enables transfer of heat from ambient air to deeper layers of soil and vice versa.



## Dewrain Harvest Systems

Dewrain systems are specifically engineered to harvest dew in the coastal arid region of Kutch in the north-west India. Rain is routinely harvested – hence the name dewrain. Two types of systems are being promoted. The Condenser-on-Roof (CoR) systems are meant for family, are installed on the roof and have mean daily yields of about 15-20 liters in the season. The Condenser-on-Ground (CoG) systems are larger, installed on the waste lands and serve a community. The condensers are made of plastic. We also encourage - Roof-as-Condenser (RaC) - for properties that have large sheet metal roofs ( warehouses etc).





### Solar Cafeteria

Making use of the large amount of solar radiation in Kutch solar cafeteria has been developed for use in schools and small catering businesses in these areas.





## Technology Development in Progress

Renewable and sustainable energy Park - Kothara

This is being developed as a place that combines fun and learning about technology relevant for the region, renewable and sustainable.

## Ideas for future projects

- Large scale solar driven desalination process
- *Three-in-One Production Facility:* Greenhouse Combining Solar Desalination and Dew Harvest for Kutch.  
This facility will use the experience of greenhouse already under investigation at Kothara. Two new features are being considered for being added to the greenhouse. One is solar desalination facility and the other is dew harvest mechanism. This facility is meant for coastal villages of Kutch where drinking water problem is serious and chronic and so is the problem of providing fodder for animals.
- Solar powered Eco-tour resort for the big rann of Kutch.

## Funding Support

We have received support from Cummins Diesel India Foundation, Pune, Sir Ratan Tata Trust, Mumbai, Gujarat Energy Development Agency, Vadodara, and the World Bank.

## Honors and Recognition

I S A E Gold Medal 2004-05

Medal is the highest honor given by the Indian Society of Agricultural Engineers ISAE to its members for Outstanding contribution to technology development

PLASTINDIA Foundation's award for New Product Development 2005  
For new use of polymers to make dew condensers - A citation and a trophy

India Country Level Development Marketplace - 2004 Award.  
For dew harvest development - a certificate and \$ 20,000 .

Global Development Marketplace 2005 Award  
For Arid Area Greenhouse - a plaque and \$ 150,000.



**The President Dr. A.P.J. Abdul Kalam at the Dew Condensers Display stand**



**Dr. Girja Sharan receiving award from Mr. James D. Wolfensohn, President, World Bank**





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