

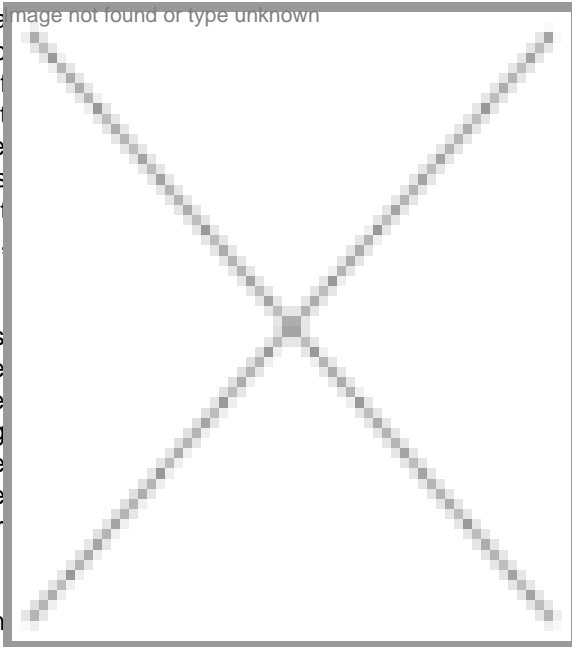
## Fuel of the future: A success story

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*Karnataka's first-of-its kind biofuel park in Hassan has set an example for others. With the extension of the project to the entire state, it expects to generate revenue of about [₹1,400 crore per year](#) and, also save on the oil bill*

In 2006, the University of Agricultural Sciences, Bangalore, initiated a biofuel park project at Madenur in Hassan district of Karnataka to encourage the biofuel industry. The local farmers were supplied saplings of Pongamia, Simarouba, Neem, Jatropha and Mahua, tree species that produce non-edible oilseeds, worth 4.25 lakh free of cost. Today, the farmers are reaping the benefits of the crop, while the project's success has led other states of India, like Chhattisgarh, Orissa, Jharkhand, Gujarat and Madhya Pradesh, and countries, like The Netherlands and Denmark, to follow the example.



### Energy scenario in India

India's energy demand is expected to grow at an annual rate of 4.8 percent over the next couple of decades. As much as 34 percent of the Centre's financial budget is allocated to import of petroleum fuels now, it may rise to 27.5 lakh crore by 2017. The biofuel policy was passed in India in 2009, which aimed for 20 percent blending of biofuels, that is either bioethanol or biodiesel, in petroleum fuels by 2017. Keeping this in mind, many state governments have announced programs to achieve these objectives.

The decentralized initiative is reminiscent of the co-operative movement involved in the procurement of milk. By extending the project to the entire state, the government expects to generate revenue of about 1,100 crore per year.

The farmers planted the saplings in the backyards of their houses, on bunds and wastelands. Today, there are 430 farmers' associations for collection of oilseeds and the farmers are paid an amount above the minimum support price fixed

### The first-of-its-kind initiative

Karnataka has been known for setting benchmarks in new areas of businesses, such as information technology and biotechnology. In March 2009, it became the first state in the country to announce the State Biofuel Policy in line with the National Biofuel Policy of the Government of India announced on September 12, 2008.

Though the policy was announced only in 2009, the Karnataka government had taken many initiatives to encourage the biofuel industry even before the policy was announced. The Hassan project, 194 kms from Bangalore, was one of them. The project is the first-of-its-kind initiative in the country and Hassan district was chosen for its variety of climatic conditions that is similar to most parts of the country.

### A co-operative initiative

This initiative, which aimed to provide an additional means for sustenance to farmers, will eventually help create a network for the procurement of oilseeds for the biofuel industry. Dr BalaKrishna Gowda, project co-ordinator at Hassan Biofuel Park, explains, "This approach requires very little effort from the farmer who gains additional income via products, such as oilseeds, and enjoys a high rate of success because they are directly involved in the process." He said that there are 70 biofuel villages in the district and each household grows any one of the given tree species.

In addition to providing saplings, the biofuel park is also associated with innovations in the machinery involved in biofuel production and the transfer of this technology directly to the farmers.

Dr Gowda said more than 1,150 awareness meetings and training programs have been conducted in the last few years involving over 70,000 farmers. "As many as 50 percent of them were women participants. These farmers had planted about 14.5 lakh seedlings over 15,000 acres of land in Hassan district," he elaborates.

Dr Gowda adds that the decentralized approach results in less carbon footprints in the production of biofuels. "Biofuels would lose their sheen if thousands of litres of fuel were burnt to transport seedstock from the field to the factory. Hence, biodiesel production units are being set up at the taluk and district levels to minimize costs and efforts involved in transportation of seedstock," he says.

### Alternative fuels

Worldwide, Brazil has been at the forefront of producing biofuels since the 1980s. It is the world's leading producer of bioethanol and uses sugarcane to produce it, while some South East Asian countries use

### Aims of Hassan Biofuel Park

- Utilization of 5.62 lakh hectare of agriculture land for plantation on bunds and 0.28 lakh hectare of degraded land for mixed plantation in Hassan district. A farmer gets 200 to 2,000 as extra income. Approximately, 50-60 man-days of employment is generated per year per family
- By growing five plants per hectare in agriculture land on bunds and approximately 70 plants in wastelands, 29,000 tons of seeds and 8,800 tons of oil can be obtained after six years
- Environmental protection and soil moisture conservation
- Marketing of oil at the rate of 30,000 per ton is expected to fetch 30 crore

palm oil and the US uses corn and soyabean. To avoid the food versus fuel debate raging in the West, India has focused on non-edible oilseed crops and trees that have short gestation period and can be grown in harsh conditions.

According to Mr Y B Ramakrishna, chairman of the Karnataka State Biofuel Board, India has a huge potential in the production of biofuels. Stressing on the need for a proactive government to integrate production of biofuels with industrial practices, he says, "India is the largest producer of sugar with Uttar Pradesh, Maharashtra and Karnataka being the leaders. There is a huge untapped market for production of bioethanol from molasses produced in the sugar factories. We are encouraging the factory owners to set up bioethanol production plants, so that this resource can be effectively utilized."

Mr Biligiri Kadambi, director of Southern Biofuel Technologies, says, "Bioethanol has the potential to make a huge industry impact. However, actively producing and distributing it is not a very viable option right now because it comes under the liquor bracket and additional taxes are applicable."

Biodiesel on the other hand has caught the fancy of entrepreneurs nationwide. Once the hype surrounding Jatropha died down, researchers started looking at other non-edible varieties of oilseeds, trees, shrubs and algae to produce biodiesel. Algae is being looked at with a lot of interest as they have a high biomass yield per unit of light and area and do not require agricultural land.

### Problems in sourcing seedstock

One of the problems that entrepreneurs face initially is the lack of a consistent supply network of seedstock and the raw material used to produce biodiesel. Mr Julesh Bantia, head of Eco Green Fuels who has established a biodiesel producing unit in Bangalore, says, "The most important factor for any company in the biofuel industry is the regular and continuous availability of seedstock. There is a lot of volatility associated with prices of seedstock, which decide the profits for any company. Soap industries offer higher prices for seedstock and, hence, emerge the biggest competitor for seedstock for biofuel industries. The biodiesel producers cannot compete with these prices due to the high production costs. The government should take concrete steps to fix the price of seedstock, so that both parties can benefit."

#### Jatropha's downfall

According to the Biodiesel Mission of 2002, jatropha was planted on over 50,000 hectares of land in eight states. But the enthusiasm surrounding jatropha died down due to various reasons:

- Jatropha is a hardy crop and can survive in any geoclimatic conditions. Hence, it was expected to give high yields without inputs, such as irrigation and pesticides, but the yield of seeds in harsh conditions was found to be very low. The expected number of seeds or the yield was 4-to-16 kg per tree but the actual number of seeds was found to be 0.4-to-0.5 kg per tree
- Long gestation period
- Toxic oil cake produced after extraction of oil. One kg oil produces two-to-three kgs of oil cake
- Seeds are available only for two weeks

or CO<sub>2</sub> is prevented, he says.

Mr Kadambi of Southern Biofuel Technologies said they took some initiatives to circumvent this problem. "At our facility in Gujarat, we have our own 1,000 acres of land where we grow crops, like safflower, castor and argimone, a variety of poppy, which are then used for the production of biodiesel. As we are in direct contact with the seedstock, we can make use of the byproducts such as de-oiled cake, flower petals, among others. These can be further processed to be used as fertilizers or animal feed or used to generate biogas. These value-added integrated practices are survive and grow."

Petroleum companies are waking up to the advantages of blending biofuels and are taking steps to facilitate it on a larger scale. Bharat Petroleum, in collaboration with Hassan Biofuel Park in Karnataka, is going to open an outlet to sell blended biodiesel shortly. The Indian Oil Corporation recently signed a memorandum of understanding with the Department of Biotechnology, Government of India, to set up the Centre for Advanced Research on Bio-energy in Faridabad to work towards developing sound

Among the various myths associated with biofuels is the belief that various engine modifications need to be carried out for their use. Mr CS Bhaskar, managing director and CEO of Naturol Bioenergy that has 12 retail stations selling biodiesel in Andhra Pradesh, explains that this was not true. "All engines built after 1996 do not use rubber and hence no change in the engine of the automobile is necessary. The use of biodiesel in a conventional diesel engine results in substantial reduction of unburned hydrocarbons, carbon monoxide, and particulate matter. It also decreases solid carbon fraction of particulate matter as the oxygen in biodiesel enables more complete combustion to CO<sub>2</sub>. For every ton of biodiesel used, the release of three ton

The cost of biodiesel remains an impediment. Industry experts say the price, though fluctuates, remains around 15 percent more than diesel. Subsidies offered on crude oil, which drastically reduces its price further, prevent biofuels from being able to compete with them. "The government should either offer similar subsidies to biodiesel or remove the value added tax on

biodiesel,” says Mr Bhaskar.

“Biofuels, being promoted as an environmentally sound approach, would lose their sheen if thousands of litres of fuel were burnt to transport seedstock from the field to the factory. Hence, biodiesel production units are being set up at the taluk and district levels to minimize costs and efforts involved in transportation of seedstock”

— **Dr Balakrishna Gowda**, Project co-ordinator, Hassan Biofuel Park

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