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RURAL ENERGY**Power-play, for the people**

Chandrakant Pathak has invented power-generation gadgets tailored especially for rural energy needs. As Pathak's gadgets are gaining popularity in rural areas of Pune district and several neighbouring districts in Maharashtra, state energy development agencies are taking note, reports [Aparna Pallavi](#).



21 January 2006 - "Free electricity for farmers is quite an easily achievable goal," remarks Chandrakant Pathak casually, "What is more, the costs too are nominal."

Coming from someone else, and at a time when the issue of free electricity is creating political ripples in Maharashtra, such a remark could only be called jaw-dropping. But for Pathak, electric power is everywhere. "Anything that moves can be used to generate power," says he, "The only thing needed is will, and creativity."

If you want proof, you have only to look at Pathak's work. He has invented power-generation gadgets that can be operated manually or by bullock power, and even installed into bullock-cart wheels. He has modified power-consuming gadgets of everyday use, like motor pumps, flour mills and even electric vegetable shredders to run on manual power.

Tailored especially to suit rural energy needs, Pathak's gadgets are gaining popularity in the rural areas of his native district of Pune, Maharashtra, and several neighbouring districts. His work has been recognised and subsidised by the Maharashtra Energy Development Agency, and he has received several awards for his work.

It all started in the year 1993. Then a mechanical engineer working with a private firm in Rajkot, Gujarat, Pathak volunteered for rehabilitation work with the Sakal Relief Fund. This work took him to some remote villages in the Ratnagiri district of Maharashtra.

In one of these 'on the other side of nowhere' places, the only source of water was a river running through a deep ravine. "There was no electricity or diesel to run a pump. We had to draw water by tying a child to the end of a rope and letting him down into the ravine." The memory still sends a shiver down his spine. It was this incident that set him thinking on the power crisis in rural India.

Bicycles and bullocks

One of the first things that suggested itself to Pathak's imagination as a solution was the presence of bicycles and bullocks in nearly every rural household. "When I returned home,"

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If accent was placed on local power production by the people, not only would the per unit cost of power come down dramatically, but the entire power problem would become non-existent in a few years.

-- Chandrakant Pathak

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says he, "I attached a motor pump to an old bicycle and ran it. After a few modifications, it worked. It was a real 'eureka' moment for me."



Bicycle-powered pump developed by Chandrakant Pathak.

In 1995, Pathak started his own institute, the Modern Technical Centre, in Pune, with the aim of devising gadgets for power self-sufficiency in rural areas.

Today, his first bicycle pump has evolved into several varieties of bicycle-operated lift and spray pumps to suit different needs. Some of

the pumps are powerful enough to draw water from a depth of fifty feet and pump it up to a height of 100 feet. Anything between 15-40 litres of water can be pumped per minute. Keeping in mind the requirements of crops like fruit trees that reach great heights, he also invented a bicycle-operated spray pump that can spray insecticide or water up to the height of 30 feet.

Shantaram Damse, a farmer in Wadgaon, Pune district has bought two bicycle powered pumps from Pathak, a spray pump and a water pump. He uses the water pump to get drinking water and to water his garden. The spray pump has a larger reach than the usual sprayer and involves less exertion. "As the tank is mounted on the bicycle, I don't have to carry it on my back," says Damse.

Namdeo Shinde of Wadgaon uses Pathak's bicycle-powered spray irrigation pump. "This pump serves a double purpose -- it can be used to pump water for storage purposes as well as for spray irrigation," he says, pointing to its convenience. "Before I had this pump I had to shell out exorbitant amounts in electricity bills. But the small one-time investment on this pump is now saving me all those bills," he adds. Baban Dimple of Mawan concurs. "I use it to irrigate delicate crops like Methi (Fenugreek) and coriander. It has very good reach, and saves a lot of electricity," he says.

After the bicycle, Pathak turned his attention to the other source of rural power, the bullock, and invented a bullock-cart-mounted and powered 'Jaladhara pump', a mechanical contraption which can be used to spray insecticide and to run four sprinklers simultaneously for spray irrigation. The pump is powered by the motion of the bullock cart, and is mounted on the cart itself, along with a barrel for water or insecticide.

And while he was at it, he also found ways to operate other rural machines requiring electricity, like the floor mills, winnowers and threshers on manual and bullock power. He also devised a floating turbine that uses the power of a running river or stream to pump water from the same stream.

"The effectiveness of these gadgets told me that instead of free electricity, it is possible to develop electricity-free, self-sustaining irrigation systems for farmers," he says.

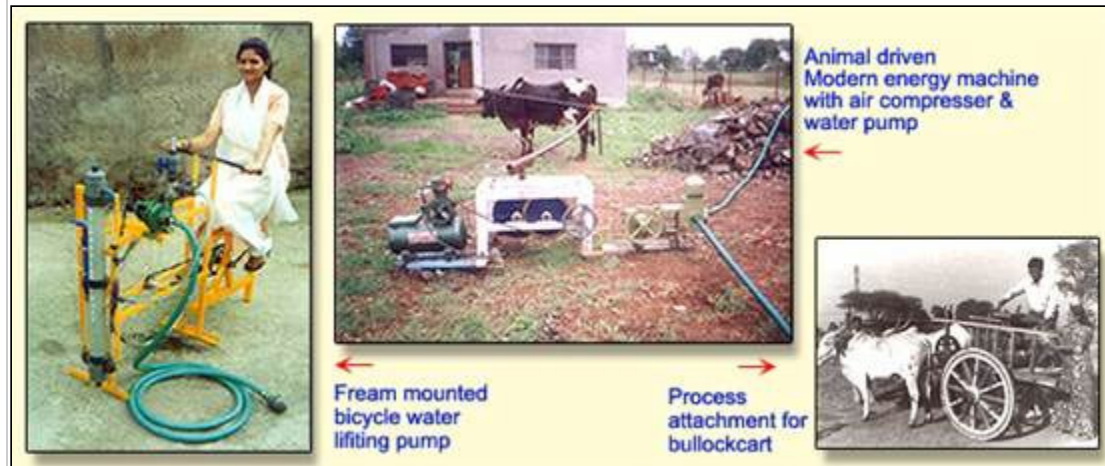
Generate power, don't buy it

The rural power-crisis involves more than just irrigation, and very soon Pathak realised that without the means for actual power production, rural India can never be power-self-sufficient.

Initially he modified his Jaladhara pump by installing a pulley and dynamo on its wheel to generate an electric current. The result was what he jokingly calls his 'video-coach bullock cart', so called because the power generated by it is sufficient to run a TV. At a serious level, this system can be used to charge batteries, which can be used for household power supply in a limited way.

Later, Pathak dispensed with the cart and concentrated on the bullock, and invented what he believes to be his greatest achievement yet -- the 'bullock powered energy machine'. Run in the same way as the oil-presses of old (*Kolhu* in Hindi, *Ghani* in Marathi), this machine converts the 2 RPM input from a bullock into a 1500 RPM output with the help of a simple

gear box. The machine is stationery (no cart is involved), with a long lever like the lever of a kolhu (oil press). A bullock is tied to this lever, and it runs the machine by walking in circles around the machine, like a bull operating an oil press. The circular motion generates electricity.



Source: Chandrakant Pathak

This machine is extremely versatile -- it can be used to run a five horse-power centrifugal pump, and all small machines like a 1 KV generator, a flour mill, an air compressor and so on. A single machine can run the entire water supply system of a small village. Run for two hours, it can keep ten street lights burning for the whole night.

About the power-generation potential of rural India, Pathak says that there are some 8,20,000 bullocks in Maharashtra. Even if just ten per cent of these bullocks are put to work on such power-generating machines for two hours a day, plenty* of electricity can be produced per day. "So where is the power crisis, tell me?" he asks.

Power for women

Another subject Pathak has devoted considerable attention to is electric power for rural women. In rural India, the entire agricultural and economic system is against women. Women don't own bicycles and bullocks; and even though most of the bicycle-powered gadgets invented by Pathak can be run comfortably by women, cycling is still anathema for them in many parts of rural Maharashtra.

On a sudden inspiration, Mr Pathak landed on the swing -- a traditional mode of amusement and play for women and children all over India -- as a means of power generation. "The to and fro movement of the swing can be used to run a piston pump ten times as powerful as a hand-pump," says he. The swing pump is Mr Pathak's latest innovation, and can pump water from a depth of 10 metres and up to a height of 30 metres at the rate of 20 litres per minute. Some 10-12 schools in the Pune and Ratnagiri districts are using this pump effectively to pump their drinking water. The swing also has great potential in the area of air-compression and power generation, and Pathak is currently exploring these possibilities.

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Knowledge to the people

Pathak's products cost much less than what most power-generation and advanced agricultural gadgets cost. The bullock energy machine, for example, the most expensive of his gadgets, costs just Rs 20,000. The products further save the farmers a packet in electricity bills in the bargain, have found wide acceptance among the rural people of Western Maharashtra. Pathak says his products are popular in the Sangli, Satara, Solapur, Latur and Pune districts and also parts of Vidarbha. He also says he has sold 900 manual water pumps and spray pumps till date and 20 bullock energy machines, along with other products.

What distinguishes Pathak from other inventors is the fact that he has not drawn a patent on even a single one of his inventions. "These machines are all based on very simple principles. I want to spread this knowledge, not hoard it." Pathak has propagated both his concepts and products through various craft, agricultural and technical fairs in the state. Only recently, at an agricultural fair in Latur, 100 bullock power machines were booked by farmers, personally as well as collectively by villages or communities.

Scaling up low-cost rural energy

In his attempts to spread his knowledge, Pathak has held training camps for rural youth. A few groups are manufacturing a light steel bullock cart devised by Pathak. The Rural Technical Centre in Wardha will also start manufacturing the same this month. Other products are still being manufactured by Pathak alone, because the awareness and acceptance rate of these products are rising, but are still too low for profit-making ventures.



Pathak is dissatisfied with the scale of the work. "We need such training everywhere. How many gadgets can one organisation make and sell? Rural people must learn to manufacture, operate and improvise on such gadgets and even invent their own gadgets to suit their special needs. And the government must invest in such training in a big way."

His own institute, the Modern Technical Centre, employs 9 people. Earlier it was not very sustainable, but for the past two years, the Maharashtra Energy Development Agency has been forking out subsidies of 50 per cent on the products. This has caused the market to grow. Pathak says that last year, the institute sold products worth Rs 10-12 lakh, and this year they expect to cross the Rs 25 lakh mark. Other state level energy organisations are taking note of his work. The Karnataka Renewable Energy Development Agency and the Punjab Energy Development Agency have just contacted him and shown interest in propagating his products in their states, says Pathak.

Pathak's dissatisfaction with the country's present power policy is evident. He points out that

the entire accent of our power policy is on exorbitantly expensive, hopelessly centralised production methods coupled with slogans about saving and vigilance against theft which are never implemented. "Privatisation has made matters worse. If instead, it could place its accent on power production by the people, not only would the per unit cost of power come down dramatically, but the entire power problem would become non-existent in a few years." ⊕

Aparna Pallavi

21 Jan 2006

Aparna Pallavi is a journalist based in Nagpur, and writes on development issues. Modern Technical Centre is at: 114 Narayanpeth, Kasat Chowk, Kelkar Road, Pune 411030. Tel: +91-20-4452620/4452448.

* Sentence on power potential from bullocks was corrected in March 2006.

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Comments (14)

- Posted by zaheer nooruddin,

A very enlightening report on an extremely noble initiative. One wonders whether the state and central governments are taking such 'visions' into any sort of serious consideration, especially in a time when there's talk of expensive, complicated and possibly shady (not to mention hazardous) deals with the US and other foreign nations for nuclear (power-generating) technologies. Grass-roots answers to the issues of rural (and urban) India MUST be given priority over big-interests/ businesses/ centralized ventures - and if this is not the case, then our governments must be held accountable. Thanks Aparna, for this story.

- Posted by Chandru Narayan,

Congratulations to Mr. Pathak for doing something for the poor and the villagers, all our Congress and BJP did is to Pillage the villager's votes and give them nothing. India's needs need to be satisfied by similar, affordable, dependable and doable processes like what Pathak has done, any big technology will involve red tape, corruption and gonda giri! Help the farmer he is like your mother who helps feed you.

- Posted by Abhishek Jain,

I really liked this inspiring article.
Many a people think about poor, only few actually do something. Great job Mr. Pathak!

- Posted by S.S.GADA,

Mr. Pathak Should apply for the Patent, not for himself, as he believes, but for preventing other unscrupulous elements from copying the gadgets and patenting it.

- Posted by Dr.B.Thyagarajan,

This is an excellent article which deserves the widest possible circulation..Other

Foundations ought to support this project of Mr.Pathak's....India's glory and peace and prosperity lies in the villages and they should thrive the way they did for thousands of years. Manually (and mechanically) generated power is the best for human kind. In the west, they eat too much, then go to gyms to burn their body energy by spending more electrical energy from the power plants ! This is the reverse of that. Imagine, every bullockcart in every village equipped with the Pathak Power producer...I proposed this idea in 1947 to my collegemates in Loyola College, Madras..no one paid heed...

all success to you.
sincerely,
Dr.B.Thyagarajan

- Posted by Rajkumar,

Scientific inventions at grassroots level among our farming community brings out not only some technology but technology with wisdom. Any technology blended with wisdom just does not disturb the rhythm of nature but adds strength to it..joy to it...But the world's scientific community has negated this wisdom and hence their technology not only bulldozes whatever our wisdom-communities have created but destroys the human and natural ecology. The only contribution it made is accumulation of profit to few!

Solidarity Salute to our Wisdom Scientists!
Rajkumar
Svaraj/Oxfam India
Bangalore

- Posted by Jann,

These are fantastic inventions, but please urge Mr Pathak to Patent his work, the money he earns for it could be put to other good work. What a beautiful image, a woman swinging on a swing and creating electricity, while she can rest and draw water at the same time...true shakti power.

- Posted by Sahadev K,

Thanks to Aparna Pallavi for bringing into focus a fantastic effort and a great product. Please advise the inventor to patent the same. Small contribution for patenting the products from all readers should be encouraged.

- Posted by Benjamin,

I think that Mr Pathak as created useful devices that enhances the abilities of humans instead of making them redundant.

The world could do with more people like him.

These kinds of devices would be useful for all poor communities around the world as they keep the most important and abundant form of energy - human and human guided animals operating non polluting practices. With simpler devices you reduce dependency on the parasites of the capitalist institutions.

- Posted by RAFFI,

Great Effort!

Basically India is having enormous man power but the utilisation is very less. People try to get a job in secure places like government or reputed concerns. Most of the people are hard working with very less salary in small companies or work shop etc. We can utilise the man power and reduce the unemployment by using this type of inventions.

Government also should take necessary steps to produce electricity using man power (may be call it as ARM POWER). If we could implement this in cities or urban areas, we never face any power shortage and unemployment.

Now people ready to excercise or warm up daily minimum one hour. We can utilise or convert this into power.

- Posted by Hamid A Kahn,

Congratulation to Mr.Pathak for doing marvellous job and also would like to thanks to Aparna Pallavi & India togather because of them I came to know about Mr Pathak innovation. We definately need encouragment to such people and also would like to spread this information specially in rural India who can adopt Mr Pathak work and get the benefit. Pls. mention Mr.Pathak contact and the products detail and its cost.

- Posted by Karan,

Certainly an achievement with limited resources. Comendable job Mr. Pathak. The need of the hour is to find the ways to spread the knowledge and realize the role of power/electricity in improving the situation of our rural areas. Village panchayats and municipalities can take initiative to subsidize these products for their residents as most of the time these products are out of the reach of the people who require them. I totally agree with the people who would think about the financial resources of panchayats and municipal corporations but then the argument is you can't always look and wait for things that come from the top (state or central govt.). The solution should come in the same way as did Mr. Pathak.

May the day come soon!!!

- Posted by Rajan Ramanujam,

Excellent example of innovation to meet rural India's needs in a cost effective and efficient manner. Congratulations Mr.Pathak on your excellent work. If you need help in raising funds for expanding your good work I will try to organize fund raising for you in Ottawa, Canada.

- Posted by K.Krishna Murty,

A very enlightening and inspiring article on innovative and creative thoughts translated in to reality. Thanks to Aparna for disseminating valuable information to those working in the field of rural/renewable energies. I am looking after (desk in-charge) Decentralised Energy Options for an N.G.O.based in Visakhapatnam. From this moment I personally take the responsibility of propagating Mr.Pathak's fantastic inventions to the tribal and rural communities (remote, interior and inaccessible) with whom we are working in the state of Andhra Pradesh.

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