

'Like a miracle': Poo powering Kenya's modern farmers

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Biogas bounty: Kenyan farmer Josphat Muchiri looks at his flourishing coffee trees—their harvest has doubled thanks to fertiliser from his cow-dung biodigester, he says

In 35 years working the land, Kenyan farmer Josphat Muchiri Njonge

has never seen his coffee shrubs burst with so much fruit on his verdant hillside plot outside bustling Nairobi.

Same too goes for the banana and avocado trees swaying on his two-acre (0.8 hectare) family farm in Kiambu. The plot is also lush with kale, spinach, maize and the cereal amaranth.

His secret weapon lies underground.

There, in a brick tank, dung from his 10 dairy cows is quietly transformed into a rich, organic fertiliser that he says has supercharged the soil and harvests.

It isn't the only benefit Njonge, and tens of thousands of other [smallholder farmers](#) across Africa derive from "biodigesters."

These tanks, either made of masonry or modern plastics, act like a magical mechanical stomach.

In the darkness, natural micro-organisms break down manure in the absence of oxygen to create compost and [biogas](#), a clean, renewable energy source.

Kenya boasts more biodigesters than anywhere else in Africa—a "poo power" that is being used to run everything from cooking stoves to farm equipment, phone chargers and shower heaters.

It is a smart use of land, something that the UN's top scientific panel for [climate change](#) says will be crucial for keeping global temperatures at safer levels while feeding a growing population.

In a special report this week, the Intergovernmental Panel on Climate Change (IPCC) detailed how intensive farming has degraded the

environment—a crisis that requires a major rethink about how food is produced and land used wisely.



Anne Mburu uses a flexibag to generate biogas. She used to spend around \$20 a month in buying firewood - now methane provides her fuel

Agriculture and deforestation produces almost a quarter of greenhouse gas emissions, with methane from livestock a major contributor to a warming planet.

Biogas is essentially carbon neutral, and helps reduce fossil fuel emissions by replacing the firewood and charcoal traditionally burned in kitchens in Africa.

Enormous demand for these cheap sources of wood has ravaged Kenya's forests and degraded its soils.

Their fumes also kill, with 15,000 deaths a year from indoor air pollution, according to government figures.

"It's very convenient for me. I've been using firewood, charcoal, but I don't anymore," said Anne Mburu, a farmer in Kiambu, who used to spend 2,000 shillings (\$20/17 euros) a month on firewood before installing a modern, prefabricated digester alongside her cow shed.

Future energy

Biogas is filling a gap in East Africa, where developing economies are fast growing but power is costly, unreliable or non-existent.

The technology has been around in Kenya since the 1950s but was neglected until the Kenya Biogas Program (KBP) began promoting efforts to scale-up and commercialise the sector around 2009.

Since then, more than 100,000 people have gained access to biogas in their homes, more than anywhere else on the continent, says KBP.

Ethiopia rivals Kenya in biogas production while initiatives in Uganda, Tanzania and Rwanda are also gaining pace.



Cow manure has to be mixed with a little water, and twigs have to be sifted, to prevent the biogas digester from getting clogged

Tim Mungai, a business development manager at KBP, said there were "huge opportunities" for growth in the Kenyan market alone, where two million farmers keep cattle at home.

"Biogas will be part of the energy mix for the future to come," he told AFP.

Local and [foreign companies](#)—including Dutch outfit SimGas, Mexican firm Sistema, and HomeBiogas, an Israeli manufacturer—are rolling out new technologies in East Africa.

Simpler "plug and play" models, often made from recycled plastic instead of traditional brick and mortar, can be installed in hours and generating gas within a day.

Manufacturers are testing new types of feed stock, diversifying from ordinary cow manure, which is mixed with a little water to prevent the system becoming clogged.

Some education facilities in Kenya are firing their kitchens on human excrement, and waste from slum latrines in Nairobi is also being transformed into green energy.

Others mulch food scraps and slaughterhouse waste while some greenhouses along Lake Naivasha, where Kenya's world-famous roses blossom, have also been producing energy from flower offcuts.

Need to adapt

Farmers across Africa are learning to make do with less as arable land is swallowed by the continent's fast-growing cities. Desertification, deforestation and degraded soils are also heaping further strain on land and farmer.

In the hilly breadbasket of Kiambu, coffee and concrete vie for space.



An udder choice: Green campaigners say biogas is the clean option compared to fossil fuels or firewood

Agricultural land has rapidly dwindled as Nairobi has pushed ever outwards, housing projects abutting plantations where harvesters hand-pick crops to feed Kenya's mushrooming population.

"Farmers need to adapt on the issue of climate-smart agriculture," said Mungai.

The compost left behind in the biogas production process is an added bonus, but important for land regeneration.

The "bioslurry" can be used in animal feed, to rear earthworms, replace

chemical pesticides and restore humus to over-farmed soils.

Njonge, a 67-year-old veteran coffee farmer, swears by it.

The nutrient-dense plant food has doubled his coffee production in under three years, and improved the quality of his beans.

Apart from higher returns, and saving cash on fertilisers and firewood, he also gives some of the bounty to one of his sons living on an adjacent plot—he pipes the biogas to his home nearby.

And all of it thanks to his cows.

"It's just like a miracle. Something which we never thought we would make use of, in that way, becomes something very amazing," he chuckled.

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