Rural renewable energy

Film as tool

Women in Zimbabwe spend far too much time collecting wood for their many energy needs. **Joyce Jenje Makwenda** writes about an exciting film that is being made to educate people and the authorities about the possibilities for renewable energy in Zimbabwe's countryside, and indeed across all of rural Africa.

Women are central in looking after the family. Most of the work they do becomes easier if they have access to resources, and one which plays a pivotal role is energy. They use energy to cook, to light their houses and energy to drill water from boreholes. But because of insufficient energy it has not been easy for women to carry out their chores.

Women have had to look for alternative ways of making sure that they get energy. In the urban areas women in Zimbabwe were used to having electricity as a source of energy, but this has become a scarce commodity. Now they use generators which run on petrol or diesel.

In the rural areas it is more difficult for women to access energy. Wood is their main source of energy, but trees are also becoming scarce, either because of land degradation or the indiscriminate cutting of trees. Women and girls are the ones who bear the brunt of looking for firewood, as they cook for the family. This is a daunting task which leaves them with little personal time. The girl child has difficulty finding time to study since looking for wood, cooking and fetching water takes most of her time.

Also some of the wood that women collect is poisonous but since this is the only wood they can find they end up compromising their health.

FILM ON RENEWABLE ENERGY

A woman in the remote village in Tanzania ended up suffering from an eye disorder because of the constant exposure of smoke in her eyes from firewood cooking. Due to superstitious beliefs the people in the village jammed a spoke in her head accusing her of witchcraft, because she had red eyes. A tragedy

Mary Ann Mandishona was touched by this story and many others that women face as they try to provide for the family which can work against them. Mandishona a filmmaker and gender activist encourages the use of safer ways of accessing energy. 'I think rural women can benefit from renewable energy by using solar cookers, solar driers or methane gas stoves using biogas. If they are unable to access these appliances they could be trained to use efficient stoves such as the "Tsotso" which uses one small log at a time.

Also villages should incorporate a small chimney outlet on top of thatched houses to allow for ventilation as smoke is the root of eye infections and respiratory ailments.

Mandishona is now producing and directing a documentary film on how women can benefit from renewable energy and also to bring awareness to stakeholders involved in bringing resources to women. She hopes with the film *Towards a Greener Zimbabwe* to bring change and development into women's lives. The documentary will focus mostly on women who live in rural areas.

'From Zimbabwe census statistics women outnumber men 100 to 70 in rural areas. These households are mostly female-headed as women organise, manage and produce day-to-day household activities and routines. Most of the time young girls carry the burden of producing energy by performing various time-consuming duties including collecting firewood, water heating, cooking and drying crops/fruits. These strenuous, time-consuming activities prevent the girl-child from attending school, studying, or pursuing economically active

Joyce Jenje Makwenda

Mary Ann Mandishona – filmaker and gender activist.

pursuits. Furthermore firewood collection is a deforesting activity,' Mandishona explains.

'I believe women will play a key role in the adoption of renewable energy as a form of progress and empowerment. Already we are seeing rural women utilising solar crop driers, solar lights and biogas for cooking.

'Furthermore possessing solar power in rural and high-density areas promotes adult literacy as students are able to study and read at night. Domestic duties become less time-consuming and there is added security due to street lighting at night. Other studies have shown that there is positive social cohesion and entertainment from watching TV or listening to the radio.

'Also health standards and food security are improved from solar refrigeration or solar driers and a methane bacterium from biogas kills several pathogens responsible for infections and communicable diseases.'

Mandishona became involved in renewable energy due to her father, Dr Gibson Mandishona, who made innovative renewable energy gadgets during the 1980s which pricked her interest at a young age. She and her brothers played with his devices and asked questions. They realised the importance and value of sustainable energy technologies through utilising natural resources such as sun, wind and water to power energy. So as a filmmaker, she is eager to spread awareness about renewable energy.

At their home they have a solar geyser and solar lights which saves 50% of their Zesa (Zimbabwe Electricity Supply Authority) bill. Says Mandishona, 'A solar crop drier he designed in the1980s is now used in some rural areas by women to make biltong, dried fruit and mufushwa (dried vegetables), for home consumption and they sell the excess produce.'

She encourages governments to play a huge role in marketing sustainable energy technologies. She explains that government can implement an affirmative, comprehensive energy policy which could include the building of local renewable energy manufacturing plants, which would also provide employment.

Governments can remove taxes and duties for individuals or companies wishing to import renewable energy products such as solar panels, solar refrigerators, solar battery chargers, and biogas cookers. They can institute public awareness programmes as well as socialisation schemes for the acceptance of renewables as a national priority. They could also subsidise acquisition costs for energy equipment as they do in India, China and the West.

Mandishona wonders why Africa does not use its free resource, the sun. 'Why should Africa fall behind when we have the richest energy resources, free and readily available? Zimbabwe can lead the way in terms of renewable energy implementation programmes as we have a people who are intelligent, motivated and progressive. I believe a Solar City foreseen by scientists like my father will materialize soon.'

She encourages not only Zimbabwe to use renewable energy but also developing countries which she believes must make efforts to mitigate against global warming, greenhouse gas pollution and ozone depletion. 'The provision of energy has been an acute problem in sub-Saharan Africa and hence the need to look for alternative energy resources which comprise solar, wind, hydro and biomass. Subtropical Africa has abundant sunshine all year round and Zimbabwe is perfectly situated in the sunshine belt with an average of 3 000 hours of sunshine per year.

FORMS OF RENEWABLE ENERGY

But what is renewable energy? Mandishona explains, 'Renewable energy does not pollute the environment. It is user friendly and does not require a lot of education for the end user and it is replenishable or non exhaustive.'

She explains that all energy utilised on earth can come from the sun. Solar photovoltaic cells directly convert sunlight into electricity. Solar PV electricity can substitute or replace to some extent conventional grid electricity.

Currently Zimbabwe uses grid electricity derived from coal-fired power stations and the Kariba hydro power plant. Due to financial constraints the country cannot sustain adequate delivery of electricity and power outages are frequent, hence the need to import from neighboring countries such as the Democratic Republic of Congo, Mozambique and South Africa. The thermal power stations need refurbishment, requiring vast finances which Zimbabwe cannot afford. Furthermore coal is the biggest polluter of the ecosystem and environment.

Wind energy conversion systems harness the solar energy that accumulates in the air. Most modern systems make use of the thrust exerted on a supporting surface, while some systems use a

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Mary Ann was deeply influenced by her father, Dr Gibson Mandishona (right) who makes innovative renewable energy gadgets.

pulling apparatus to turn the blades of the rotor. The rotor is generally linked to an electric generator to produce a direct current. To produce wind energy, different types of multiblade wind turbines, aerogenerators, horizontal and vertical axis windmills can be used.

Zimbabwe's wind system has slow velocities because the country is land-locked. However there are mountainous and hilly regions where windmills or wind turbines can be deployed for mechanical work or to generate electricity. These can be used to pump water from wells or irrigate crops. Other uses include turning grinding stones in mills, which grind wheat or corn.

There is an example of a small wind farm at a rural business centre close to Rusape. Also some small-scale farmers are using the traditional Dutch-type windmills for water pumping.

Hydropower is the energy released during nature's water cycle such as evaporation, condensation and rain. Fast flowing water has much energy which can be trapped. Hydro energy derives from water stored in a dam, which is released through outflow pipes to drive electricity-producing turbines. It is an example of energy conversion from potential to kinetic and then to electrical energy. Hydroenergy can also take the form of mini or micro-hydro power plants.

A mini-hydro energy plant has been installed at Nyafaru in the Nyanga District. There are waterfalls surrounding rural villages there which can be harnessed to generate energy for local people. An inventive teenager, Luke Kasu, used his bicycle generator to make a micro-hydro plant, enabling the lighting of three huts.

Biomass is the total mass of living organisms. Biomass energy is found in the form of carbon cycle or photosynthesis. Biomass provides direct fuel such as wood or fossil fuels over time. Biogas is a methane-rich gas produced by the fermentation of organic waste such as the decomposition of animal and human waste in a controlled environment.

Use of this technology contributes to waste disposal and environmental protection. There are positive health aspects from utilising biogas plants, whereby the methane gas bacteria destroys pathogens responsible for communicable diseases such as typhoid, cholera, dysentery, hookworm, bilharzias, tapeworm and roundworm.

CONCLUSION

To produce the documentary Mandishona is working with an organisation which Dr Mandishona formed in 1998, Creet (Centre for Renewable Energy and Environmental Technology). The organisation works towards uplifting living standards in rural and high density areas by implementing, supplying and spreading awareness about renewable energy.

'Dr Mandishona and one of our partners Benny Brown, an American solar consultant, have recently installed sample solar streetlights in Budiriro and Kwadzana townships, with the aim of making Harare into a vibrant solar city,' Mandishona comments.

Because of her film background Mandishona is confident about shooting a film of this nature. She completed a directing course at the New York Film Academy at Universal Studios in California and holds a masters in film directing from Goldsmiths, University of London. She has won film awards in South Africa for the African Co-production Forum.

Women take time to understand how to use renewable energy and be able to create personal time for development, recreation and other things that lift your spirits. Women can continue to celebrate life and womanhood. LB

Joyce Jenje Makwenda is a researcher, archivist, author, freelance journalist and producer.