

Blended adaptation and mitigation practice

At the just concluded COP22 held in Marrakech, Morocco, the World Agroforestry Centre (ICRAF) and the International Network Bamboo and Rattan (INBAR) hosted a side event on bioenergy. In her opening remarks, Dr Rachel Kyte, CEO of Sustainable Energy for All (SE4ALL) mentioned that the SDGs cannot move ahead unless we involve everyone. She wants to make bioenergy more clean and affordable for the 2.9 b worldwide who don't have access to energy. It will have to bring new evidence and data to bring the models to the market and bring clean energy to those who do not have it by bringing bioenergy into the agenda.

In Indonesia, bioenergy sector is dominated by biodiesel from crude palm oil. It makes other resources such as biogas left behind. Currently there is only limited biogas programmes in Indonesia. One of the programmes called BIRU, has 18,590 digesters in all over Indonesia from 2010-2015. Compared to about five millions of cow and pig farmers in Indonesia which is potentially able to generate the biogas, the BIRU digesters are still in very small number. It also does not work very well because most programmes are still subsidized by the government. People will not use the biogas if it is not free from the government, even some people who already have it, still don't utilise the digester. They prefer to take health risk from indoor cooking smoke from fire wood. A lack of demand for biogas is one of the key obstacles for further expansion.

To generate the biogas demand, the stakeholders need to implement sustainably win-win solutions by finding potential industry which can utilise the biogas. Coffee industry seems to have advanced value chain to be integrated with the biogas systems in Indonesia. Indonesia was the world's fourth-largest coffee producer and exporters in 2014, according to data from the International Coffee Organization. Coffee is also the second biggest commodity in the world after oil. There are many coffee festivals held to celebrate the relations between roasters, baristas and coffee owners. It is expected to produce good results for the advancement of Indonesian coffee. However, one importantly base element is often forgotten, which is the coffee farmers as the producer of coffee beans. The farmers are potential user of the biogas to do coffee roasting process. It is an extensive demand for coffee industry present an opportunity for farmers to play a significant role in promoting clean energy through a biogas-coffee concept. Indonesia's domestic consumption of coffee has been growing. It rose by a Compound Annual Growth Rate (CAGR) of 7.7 percent in the years 2011-2014. At the same time, the concept will also support The Ministry of Trade programme to make Indonesia become the primary exporter for roasted coffee beans in Asia since the coffee bean exports have declined from 2012 to 2015.

The biogas-coffee concept promotes use of bioenergy such as biogas based on a value added approach throughout the coffee supply chain. The biogas, including methane is harvested using anaerobic digestion technology from agricultural waste, primarily manure. An abundant supply of agricultural waste in Indonesia makes biogas an excellent renewable energy source for rural areas. It includes residual waste from coffee production such as coffee cherry husk which can also be used for biogas in circular way. This practice has been done in Indonesia together with majority biogas from manure. There is a large supply of animal manure available for biogas production nearby coffee farms because farmers used to apply mixed crop-livestock farming.

It is not difficult to finding the biogas technology. BIRU programmes in partnership with the governments and private sectors are currently expanding their effort to deliver the biogas to the last mile. It enables local farmers to have capacity to build. The biogas digester from anaerobic digestion can be used in this concept with manure as main feedstock since the technology is already widely distributed. Bioslurry can also be produced as side product of the biogas, it can be used as organic fertilizers in the coffee plantation. It will have an impact on the declining use of fossil fertilizers. Hence, the biogas acts as a means of waste alleviation and management, preventing pollution, and enabling a healthy environment for farming communities. With the help of the coffee community, the concept can make biogas more accessible and make a real, positive impact on the reduction of greenhouse gas emissions.

The biogas-coffee concept is a promising transition pathway for climate change adaptation and mitigation. There is great potential for farmers to use biogas not only for coffee roasting, but also for expanding other small businesses. It is committed to advancing the energy-agriculture nexus in Indonesia. In terms of adaptation, the biogas-coffee has the potential to be a win-win solution by enabling opportunities for rural farmers to diversify livelihoods and alleviating the poverty. At the same time, it also will support country green growth. By combining the biogas element with a sound transition to a resilient crop such coffee, it provides a solution for blended climate change adaptation and mitigation as a key to enabling environment and increasing adaptive capacity by protecting livelihoods of communities.

The concept leads the farmers to use climate-smart agriculture practices which have the least greenhouse gas production, agricultural waste and water consumption to be considered as part of organic practices. For example, opting for natural processing over full wash processing, saving a significant amount of water, is a sustainability technique the project aims to promote. The farmers need assistance for sustainable processing, drying, and roasting of coffee. It will bring farmers to produce sustainable organic products and practicing fair trade which provide customers a sense of higher value toward the product. Green business and eco-friendly products are in extremely high demand in modern society. Thus, coffee farmers are raising high value end products which will ensure steady incomes of farmers.

The developmental measures for the coffee industry include the increasing of added value for coffee beans, and roasted coffee beans, by mastering roasting technologies. The biogas-coffee concept is realistic measure to lead to synergy in the industry's chain, from farmers to industry and retail services, along with the cafe, and the connection will continue to improve, offering a significant added value to the nation's economy. Finally, it is not only promoting the biogas, but it also helps the coffee industry which is included in the priority sector of the Indonesia Main Development Plans for 2015-2035, to create an improved business environment.

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