

# Better Fuel, Better Future

## How Private Sector Partnership Helps Cambodia Mitigate Climate Change and Burn Less Wood

A case study in partnership between the Department of Climate Change, GERES, and the private sector in Cambodia.

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## Executive Summary

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Currently the garment industry in Cambodia meets its energy needs by burning wood, amongst other fuel sources. Burning wood is estimated to cause 368,000 tonnes of CO<sub>2</sub> emissions (tCO<sub>2</sub>e) per year. Replacing unsustainable forest wood with rice husk briquettes (RHB), a carbon-neutral biomass fuel, could therefore have a critical impact on climate change mitigation for Cambodia.

Working with rice millers, garment factories and international buyers, GERES has created a project approach that takes waste from one industry in Cambodia – rice millers – and uses it to provide energy to another: the garment industry. By doing this, they have shown that private sector co-operation can lead to climate change mitigation and reduce business costs, as well as increasing Corporate Social Responsibility for an international company and creating new insights through research.

## Climate Change: a Serious Threat to Cambodia

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Climate change is a serious threat to the wellbeing of Cambodians, and people around the world.

On October 8<sup>th</sup>, the United Nations published a landmark report which warned that carbon pollution would need to reduce globally by 45% in order to limit global temperature rises to 1.5 degrees in the next 80 years.<sup>1</sup> This reduction would limit the severity of the floods, droughts, windstorms, and seawater intrusion that will threaten Cambodia.

One major part of the Royal Government of Cambodia's response to the serious threat of climate change is the Climate Change Strategic Plan 2014-2023 (CCCSP), as part of Cambodia's commitment to the United Nations Framework Convention on Climate Change (UNFCCC). CCCSP contains measures to enable businesses, NGOs, government administrations and communities to respond to climate change through adaptation and mitigation activities – the two types of activity which can help people to survive the threat of climate change, and make future climate change less serious.

Mitigation activities reduce the emission of greenhouse gases (GHGs) – gases which cause the Earth's atmosphere to retain heat, and cause climate change to happen more quickly. There are many sources of GHGs, but one of the major sources is industry.

## Mitigation Can Help Reduce the Impact of Climate Change

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An important mitigation activity is finding low-emission fuel sources. Emissions are measured in tonnes of CO<sup>2</sup> emissions (tCO<sub>2</sub>e), and it is estimated that the garment industry in Cambodia creates 368,000 tCO<sub>2</sub>e per year by burning wood for energy. Alternative fuel sources could enable Cambodia to lower its emissions, and to be a global leader showing other nations how emissions can be mitigated.

Following more than two decades of strong economic growth, Cambodia attained lower middle income status in 2015. Driven mostly by the garment industry, which represents 11% of the country's GDP, this impressive economic performance comes at a high environmental cost. **The garment sector is a large consumer of energy in Cambodia, consuming 301,000 metric tons of firewood every year, equivalent to 3,500 hectares of deciduous forest every year.**

According to Cambodia's Nationally Determined Contribution (NDC), 'Efforts in addressing climate change in Cambodia cannot be separated from economic development and poverty alleviation goals. Cambodia has more than 57% forest cover...the pressure on resources and land is high.'<sup>2</sup>

As of 2018, it is estimated that 70% of the garment industry's thermal energy is unsustainably provided by natural forests, sourced either from forest conversion for agriculture or from illegal harvesting. To switch to cleaner production of garments in Cambodia, a number of barriers need to be overcome, including a lack of large scale supply of sustainable biomass fuels, and a lack of incentives for factories to switch sources, leading to low profitability of sustainable energy plantations.

Working together, GERES, a French NGO based in Phnom Penh, and the Department for Climate Change realized that currently, a large amount of potential fuel is generated by the rice milling industry, as rice husks. Rice husks can be turned into briquettes (rice husk briquettes, or RHBs), then used as fuel. However, this conversion often doesn't happen, meaning

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<sup>1</sup> <https://www.theguardian.com/environment/2018/oct/08/global-warming-must-not-exceed-15c-warns-landmark-un-report>

<sup>2</sup> Kingdom of Cambodia: Nationally Determined Contribution

that a potential fuel source is not used, and is often burned as waste; meaning that industry operates inefficiently, purchasing unsustainable wood-based energy whilst potential fuel is converted into emissions without using the energy stored in them.

## Partnership for Mitigation

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There was huge potential for co-operation and synergy between different organizations in the private sector. Few links existed between companies who were creating rice milling waste, and companies who could have benefitted from using that waste to generate energy. In 2016 GERES initiated a mapping of Cambodian agricultural residues, and wood fuel consumption by industry, identifying actors that might be interested in RHB production or use: garment suppliers (and buyers), and rice millers.

GERES saw that replacing unsustainable forest wood with RHBs, as a carbon-neutral biomass fuel, could have a critical impact on climate change mitigation for Cambodia. A single activity – converting rice waste products into fuel – could mitigate climate change in two ways: by reducing usage of wood in industry, and by using rice husk energy that was not being used.

A project that created a cost-effective process to use the waste from one industry as fuel for another, could represent a win for everyone: private companies, the Royal Government of Cambodia, and the people of Cambodia.

### Benefit 1: Cambodian Business Profitability Through Sustainable Fuel

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GERES and DCC worked with international companies, rice millers and Cambodian garment factories to find a way to use waste products from rice milling to provide energy to factories in Cambodia, and reduce their greenhouse gas emissions.

GERES worked directly with rice milling companies to help them create RHBs effectively, and then to connect with potential customers in the garment sector who were willing and able to use RHBs to reduce some of their usage of wood for energy.

One such example is Rann Sa Rice Mill, in Kandal Province. Rann Sa processes between 75 and 100 metric tonnes of paddy rice per day, and produces between 15 and 20 metric tonnes of rice husk per day. A few years ago, they invested in briquetting machines and started to produce rice husk briquettes to sell to garment factories, and they now produce between 180 and 200 metric tonnes of RHB per month to sell to garment factories. This is about half of their production capacity, and they are the only RHB producer in Cambodia.

“Rice Husk Briquettes are a good way to generate extra income from my activity”

- Rann Sa rice mill owner

Rann Sa’s primary challenge was that the machinery they use to create RHBs required very labour-intensive maintenance, meaning that the machine cannot be in constant use. In addition to this production challenge, Rann Sa also lacked access to new clients, who would be able to buy and use the RHBs they produced.



RICE HUSK BRIQUETTE PRODUCTION UNIT  
AT RANN SA RICE MILL

Collaboration with GERES enabled Rann Sa to get advice on how to make the RHB production smoother and less costly by reducing the operation and maintenance costs and increase their access to the market. Particularly, GERES were able to give Rann Sa's staff data on the performance of RHB in comparison with wood, to give them more arguments to convince clients to buy RHB.

While they have faced challenges, Rann Sa's benefit from RHB production is clear. The owner of Rann Sa is enthusiastic: "Rice Husk Briquettes are a good way to generate extra income from my activity – and they are easier to store than loose rice husks, which require a lot of space. I am interested in working with GERES to gain access to more clients and extend my business, and their technical support is appreciated as well, to improve the production process and quality of the briquettes"

## Benefit 2: International Partnership – Mitigation is Good Corporate Social Responsibility

A key part of the activity was co-operation between international buyers – in this case H&M, a major garment business operating around the world – and Cambodian garment factories who manufacture and supply garments to buyers.

GERES and H&M discussed the energy usage of H&M-supplying factories, and estimated that these factories burn more than 72,000 metric tons of wood each year, and that it is very likely that this energy use directly contributes to deforestation. H&M were clear that this is a matter of concern, and that they would like to identify legal and sustainable fuel options for its suppliers.

H&M is developing renewable energy targets to drive its transition towards a carbon-neutral supply chain. To enable this, GERES and H&M initiated a partnership, with H&M supporting GERES financially and connecting GERES to its network of suppliers, while GERES supports the emergence of a supply chain of alternative biomass fuel by demonstrating that renewable energy sources are technically and economically feasible for the garment industry.

**“Working with actors like GERES is crucial to be able to propose concrete renewable energy solutions to our suppliers”**

**- Aurélie Pruvost, H&M**

For the RHB project, this meant that, while GERES worked with rice millers, H&M used their position and influence with garment factories to encourage and enable them to switch their energy sources from wood and towards RHBs.

H&M's responsible staff member for their Environmental Sustainability Program in Cambodia and Vietnam, Aurélie Pruvost, said, "H&M set an ambition to achieve a climate neutral supply chain by 2030. One of our main milestones is to reduce 30% of GHG emissions per product by 2025. We want to support the transition into renewable energy for the whole world by using renewable energy ourselves. Working with actors like GERES is crucial to be able to propose concrete renewable energy solutions to our suppliers."

### Benefit 3: Research and Further Learning

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In addition to showing the viability of using RHBs to reduce emissions from wood-burning in the garment sector, the GERES project has led to clearer understanding of a range of areas through research:

- Mapping and quantification of the agricultural residues available in Cambodia
- Mapping and quantification of the fire wood consumption by the brick and garment sector in Cambodia
- Assessment of woodfuel consumption-related GHG emissions in the brick and garment sector
- Assessment of the technical and economic feasibility of a switch from woodfuel to alternative biomass fuels (including rice husk briquettes) for steam production in the garment sector
- Design of a Nationally Appropriate Mitigation Action (an output encouraged by the UNFCCC) on Sustainable Thermal Energy in the Garment Sector in Cambodia

### Conclusion: Mitigation for the Future

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It's clear that there is a significant need to reduce the garment industry's reliance on wood as a fuel source, and that RHB use is a way for businesses to both reduce their fuel costs and their emissions. It's also clear that co-operation between international buyers, Cambodian garment factories and Cambodian rice millers can lead to greater efficiency.

Co-operation between garment factories, buyers, and rice millers has been successful on a small scale, and there is potential for more production of RHBs, and more integration of RHBs into garment factory energy use.

Future actions that can encourage this could include:

- Low-cost loans to enable rice millers to purchase equipment for the creation of RHBs
- Ongoing support for linking together rice millers and garment factories
- Ongoing engagement with international buyers to integrate RBH purchasing in their production chain as part of ongoing Corporate Social Responsibility activities
- Further research to identify other industries which could reduce reliance on wood and other high-emissions fuels by switching to use of RHBs



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**Supported by:**

