

SÓC SƠN AND SƠN TÂY, VIETNAM

CATALYZING CLEANLINESS: HANOI'S PATH TOWARDS CURBING AIR POLLUTION

The Story in Short



The Vietnamese capital of Hanoi has become a hotbed of air pollution amidst rapid economic growth. Citizens are increasingly concerned that effects from poor air quality will multiply, particularly as industrialization continues to accelerate in Hanoi's outer agricultural districts.

In response, the Hanoi People's Committee Council issued a directive in 2017 mandating the citywide elimination of straw burning (a pollutant-heavy agricultural practice) and beehive coal stoves (for many, the traditional cooking methods). In the outlying Sóc Sơn and Sơn Tây Districts, local authorities and stakeholders are driving Hanoi's movement towards behavioral changes that elevate collective environmental and climate action among Hanoians.

Figure 1: Air pollution in Hanoi. Source: © Mikhail Gnatkovskiy, Shutterstock

Sóc Sơn District : Facts and figures

Population

338,386 (2017)

Land area

306.5 km²

Sơn Tây District : Facts and figures

Population

233,620 (2019)

Land area

113.5 km²



Sơn Tây is the economic, cultural, and social center of Hanoi's North-West area. In Hanoi's master plan, Sơn Tây is classified as a historical and ecotourism hub as well as military center. As one of the important cities of the Hanoi metropolitan area, it also shares similar priorities and commitments towards low emission development as the greater Hanoi region.

Sóc Sơn District is one of the five satellite cities of Hanoi Metropolitan Area. It lies 40 km north of the city center and is home to Noi Ban International Airport. Sóc Sơn is a semi-mountainous region with three main types of terrain: hilly areas, midlands and riverside deltas. In the development process, Sóc Sơn has faced multiple problems attempting to harmonize economic development and environmental protection. Sóc Sơn's government has set sector-specific sustainable development targets to better direct the largely-agricultural district's rapid growth and introduction to industry.

Figure 3: Location of Sóc Sơn and Sơn Tây Districts, Hanoi, Vietnam

Introducing Vietnamese traditional practices

The practices of straw burning and beehive coal stove cooking are deeply embedded in Hanoi's local culture. Often, these methods are accessible, convenient and inexpensive, consistently appealing for populations of little means. These widespread practices, however, significantly worsen air pollution, GHG emissions, and risks to public health and safety. Here is a bit more about each:

What is Straw Burning?

The agriculture sector accounts for 18% of the overall GHG emissions of Hanoi and this is attributable to the methane and nitrous oxide emissions from rice cultivation. Straw burning, a common practice among farmers in Asia, is among the culprits generating these emissions. Yet, it remains the most convenient, fastest, and cheapest way to discard the straws, which are considered waste of little perceived value.

Apart from GHG emissions, straw burning also results in soil degradation and air pollution. Burning eliminates soil nutrients that are essential to sustaining farming productivity. It also releases pollutants that can put nearby communities at risk of acquiring respiratory and cardiovascular diseases. Large-scale straw burning can also result in transboundary air pollution.



Figure 4: Farmers set fields ablaze with traditional straw burning practices. Source: © Vietnam Stock Images Shutterstock

What is Beehive Stove Cooking?

Beehive coal stoves have been essential in a Vietnamese household. These are also commonly seen in small restaurants and roadside food stalls all over Hanoi. A convenient and cheap cooking tool, beehive coal stoves are staple to a Hanoian's daily life. In 2017, according to DONRE, Hanoi had approximately 55,000 beehive coal stoves that used 528 tonnes of coal and generated 1,870 tonnes of carbon dioxide.

A study by Dieu (2020) on the health impact of using beehive coal stoves in households in Hoan Kiem examined 120 females who are constantly exposed to these fumes. The study found that direct exposure created moderate cancer risk, showing high levels of carboxyhemoglobin (COHb) in blood exceeding the threshold determined by the World Health Organization (WHO).



Figure 5: A street vendor cooks with a beehive stove on a street in Hanoi. Source: images.vietnamnews.vn ([link](#))

In 2017, the Hanoi People's Committee Council declared that air quality improvement to be an urgent action of the government, and issued a directive eliminating the practice of straw burning and use of beehive coal stoves by 2020. This sudden, lofty goal required drastic behavioral changes among citizens. The experiences of Sóc Sơn and Sơn Tây, the satellite cities of the German

Ministry for Environment funded Ambitious City Promises project, showcased how decentralized efforts of local authorities and stakeholders. Coupled with guidance from the Hanoi People's Committee Council, the engagement of the dents have been instrumental in successful air quality improvement initiatives across the whole metropolitan area.

From straw burning to straw composting in Sóc Sơn

Sóc Sơn, a historical anchor of Northern Hanoi, has recently become a focus of rapid development, particularly with the expansion of Noi Bai International Airport since 2001 and the growth in Hanoi's municipal boundaries that made Sóc Sơn a district of Hanoi in 2008. The area remains largely agricultural in character, and local officials have been looking to strike a balance between traditional practices and regional economic incentives.

Sóc Sơn District's master plan, jointly developed with the Hanoi Department of Planning and Architecture, orients the district towards a "high-tech industrial zones and clusters with cutting edge agriculture and forestry product processing technologies." The Women's Union of Sóc Sơn District pledged during the Ambitious City Promises Project public consultation activity that they will continue to support the farmers and Sóc Sơn District in pursuing climate-friendly farming practices starting with the transition from straw burning to straw composting.

This came to the fore in 2019. Smoke from recorded incidents of straw burning near Noi Bai International Airport affected pilots' visibility during landing, and the Northern

Airports Authority urged Hanoi and Sóc Sơn authorities to take drastic measures. Once the Hanoi People's Committee Council intensified the implementation of its policy banning straw burning, farmers were challenged to swiftly overhaul their practices.

The Department of Environment and Natural Resources (DONRE), in partnership with the Asia Pacific Clean Air Partnership (APCAP), Live & Learn, and the Vietnam Clean Air Partnership, formulated policy recommendations to aid in the transition to more environment-friendly straw management practices. These recommendations included¹:



Recognition by local authorities of the practice as an urgent issue.



Implementation of straw reuse via treatment, composting, mushroom growing material, organic fertilizer.



Creation of production value chain for both rice crops and residues.

¹ Asia Pacific Clean Air Partnership. (2021, March). Newsletter. Issue 10. Source: [link](#)

Partnerships to catalyze sustainable transitions



Figure 6: Farmers of Sóc Sơn District converting straws into organic fertilizers. Source: Women's Union of Sóc Sơn District ([link](#))

The environmental education NGO Live & Learn Vietnam further assisted DONRE in its campaign and outreach efforts to convince farmers to shift from their conventional practices. They also provided capacity building training for farmers on composting as well as converting and using residue straws into organic fertilizers for vegetable and fruit crops. Fertilizers from straw composting nutrients necessary for cultivation. These are added with cattle manure to further improve its quality and nutrient supply.

Women's Union chairwomen were also instrumental in promoting knowledge sharing for farmers. In June 2020, the Sóc Sơn Women's Union invited agricultural biology experts to demonstrate best practices for processing rice straw. Traditional methods are quite inefficient, and after guidance from experts, women

farmers in pilot models were able to begin conducting the practice themselves. With success from the pilots in two smaller communes within Sóc Sơn, the Women's Union transferred this model across the rest of the District in September 2020.

The model of processing rice straw into organic fertilizer for plants of the Women's Union of Soc Son district not only improves environment, but also raises awareness of environmental protection, reduces the cost of buying chemical fertilizers of farmers, helps beautiful the village, and reaffirms the role and contribution of women in reimagining the countryside. The COVID-19 pandemic has slowed these measures, but DONRE and its partners are determined to replicate these good practices to other 25 communes and towns. They are relying on the leadership of women's unions and other community groups to be valuable partners.

Beehive coal stoves



Figure 7: Community groups in Hanoi are also repurposing discarded beehive coal stoves into flower pots for gardens to avoid landfill disposal. Source: [link](#)

When the Hanoi People's Committee Council ordered the elimination of the use of beehive coal stoves in 2017 in response to cancer and pollution risks, there was little by way of alternatives for the local population. Part of Hanoi's program has been to co-create and disseminate different methods of clean cooking to make the transition as smooth as possible for its people.

Local cook stove manufacturers quickly developed cleaner alternatives tested by Smart Development Works Vietnam (SNV Vietnam) against efficiency, emissions, safety, and fuel savings. SNV Vietnam also offered funding for expanding production to these clean manufacturers.

On the ground, beehive coal stove users could borrow a clean biomass cook stove for a month, plus receive a 30% - 40% discount to encourage their shift.² Government partners USAID, Coca-Cola, and Namilux organized their own "Stove Swap Day" campaign.³

DONRE continues to rally support for this movement to this day. They have also engaged the support of the Department of Industry and Commerce and the Department of Finance to develop policies incentivizing local manufacturers to continuously develop cleaner and cheaper alternatives. Still, challenges persist for communities who create the coal used in the stoves.

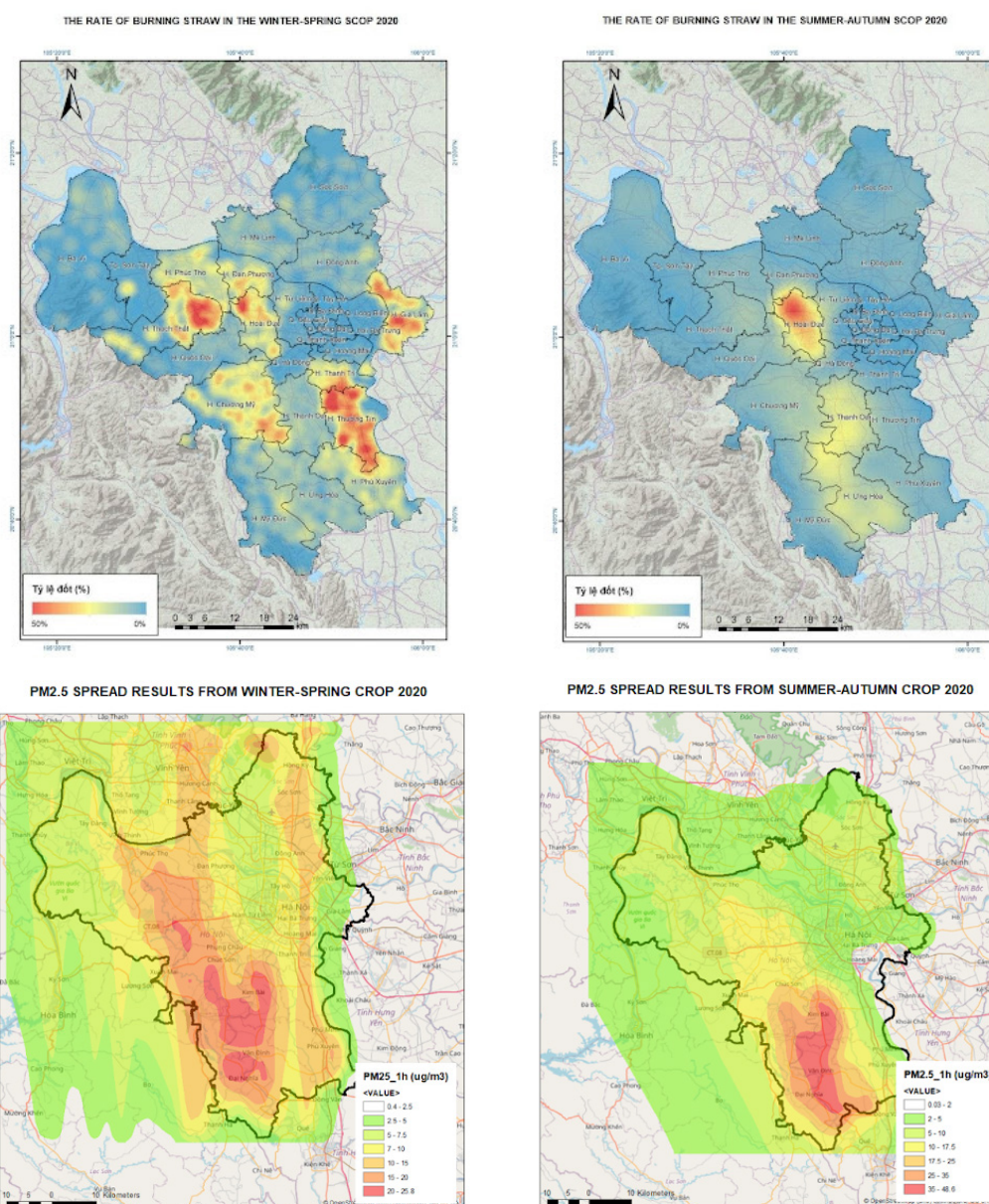
² C40. (2018, December 17). Hanoi - Households emissions reduction through cookstove conversions. Source: [link](#)

³ USAID. (2018, October 12). USAID partners with Coca-Cola to improve air quality in Hanoi. Source: [link](#).

Results to date

As shown in the maps below, Hanoi has drastically reduced air pollution since its initiatives were put in place. Banning of straw burning, in particular, has helped drive a 86% yearly decrease in PM 10 and PM 2.5 concentration in the city, according to data by DONRE. Straw composting training

for 1,350 farmers complemented these government-led efforts. Sóc Sơn farmers were able to generate 30 tons of organic fertilizer which were also used to revive a once idle and unproductive 528-hectare riceland to be used to grow vegetable and fruit crops.



Figures 8-11: Rates of straw burning in the summer/autumn crop (top right) were far below and more contained than the widespread straw burning in the winter/spring crop (top left), leading to reduced emissions (below). Information provided directly to ICLEI by DONRE, May 24, 2021.

Hanoi drastically eliminated coal stove usage with only 2,056 stoves remaining to be discarded from an initial 55,000 in 2017. According to DONRE's data, as of the second quarter of 2021, Sơn Tây District has already eliminated the use of beehive coal stoves in its locality. The two flagship policies and programs of Hanoi in addressing its pollution concerns necessitated local behavioral shifts.

The local authorities of Sóc Sơn and Sơn Tây were instrumental in translating these for a gradual transition through effective campaigns, capacity building, and resource assistance. Sustaining momentum amid COVID-19 is a great challenge. Nonetheless, the city government, through different agencies and local authorities, remains committed to the partnerships with local stakeholders to ensure an inclusive transition.

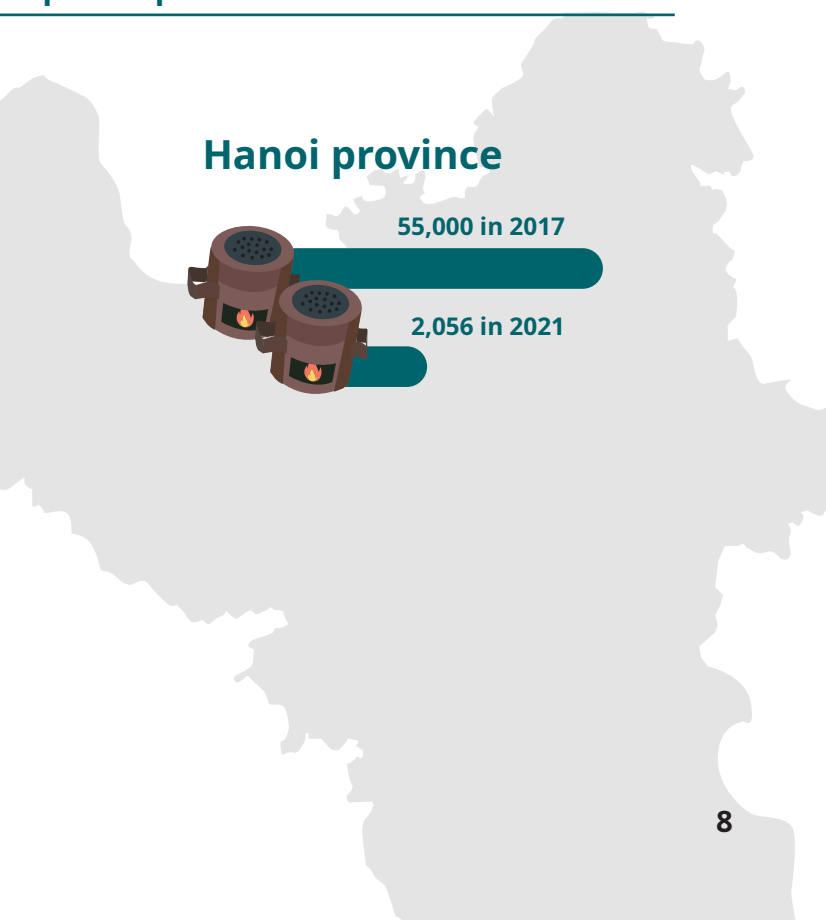
Figure 12: Aerial view of Hanoi. Source: ©satoripphoto, Shutterstock



Zooming in on the implementation or a specific phase/element of the case

These solutions can be potentially realized as Sóc Sơn District's master plan that was jointly developed with the Hanoi Department of Planning and Architecture orients the district towards a "high-tech industrial zones and clusters with cutting edge agriculture and forestry product processing technologies." The Women's Union of Sóc Sơn District pledged during the Ambitious City Promises Project public consultation activity that they will continue to support the farmers and Sóc Sơn District in pursuing climate-friendly farming practices starting with the transition from straw burning to straw composting.

Figure 13: Beehive coal stoves usage in Hanoi province



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