Photo source: Chris Ensminger via Unsplash

A Factsheet Series

Carbon Farming: Implications on Food Systems and Agriculture in Asia

The urgency of addressing the climate crisis is unquestionably the main justification for the global push for technological fixes to reduce the concentration of greenhouse gases (GHG) in the atmosphere and to explore carbon sinks to serve as permanent storage for these gases that cause global warming. Serious concerns on the costs, safety, stability and permanence of using geological formations such as depleted oil wells, gas reservoirs and coal mines as storage of carbon dioxide (CO_2) captured in carbon capture and storage (CCS) systems – discussed in another Fact Sheet that we are producing as part of this series - have led attention to natural or biological sinks, namely oceans, forests and soils. A wide array of approaches, technologies and techniques have been promoted to store CO_2 in these natural reservoirs over the past decades. Reforestation, afforestation, agroforestry and many forest management approaches to revive and make trees, plants, soil and organic matters in forests as carbon storage. Mangrove restoration, marine conservation and even geoengineering technologies to enhance ocean alkalinity are being proposed to improve the biological sequestration capacity of oceans, considered as the largest carbon sink absorbing up to 30% of global GHG emissions. Soil has the highest long-term capacity to store CO_2 and approaches under the banner of carbon farming are proposed to enhance the natural capacity of soil to absorb and store carbon.

PAN ASIA PACIFIC
For a just and pesticide-free future

48, Persiaran Mutiara 1, Pusat Komersial Bandar Mutiara, 14120 Simpang Ampat, Penang, Malaysia
Tel: (604) 5022337 | Email: info@panap.net | Homepage: www.panap.net

Carbon Farming broadly refers to technologies intended to remove CO_2 from the atmosphere which are emitted from forestry or agricultural practices. The concept is based on the premise that agricultural soil is a huge carbon sink. Studies show that agricultural soil stores about 1.5 gigaton of carbon which could be enhanced through improved agricultural management practices such as crop rotation, cover cropping and conservation tillage, and through technological approaches such as addition of biochar.[1]

This Fact Sheet focuses on carbon farming in agricultural soils, to reduce GHG emissions and generate carbon credits for trading in the carbon market to incentivize and mobilize investments in climate mitigation. The Fact Sheet will only cover two carbon farming approaches in agriculture: one is an improved management practice in rice farming called **alternate wetting and drying (AWD)**, and the other is a technological approach in soil carbon sequestration called **biochar**. Both are aggressively promoted across Asia to earn carbon removal credits while claiming to bring benefits to small-scale farmers.

Alternate wetting and drying (AWD) is done by regulating irrigation in paddy fields and involving water-saving practices that farmers can apply to reduce their irrigation water consumption in rice fields without decreasing yields. In AWD, irrigation water is applied a few days after the disappearance of the ponded water, so the field gets alternately flooded and non-flooded depending on the number of factors such as soil type, weather and crop growth stage.[2] AWD was developed to reduce methane emissions from wet rice paddy cultivation, particularly in Asia, where around 90% of the world's rice is produced using wet cultivation methods. Studies show that rice production involves emission of about 1 gigaton of CO_2 and 12% of the total methane emission annually.[3]

Biochar is produced by burning of biomass or organic matter under a limited supply of oxygen in a controlled environment, primarily through a process called ***pyrolysis*** and also more recently through ***gasification***. Biochar traces it inspiration to *Terra preta*, the dark-colored and carbon-rich soil nurtured by indigenous communities in the Amazon for over 2,000 years by slowly burning biomass from the forest and agricultural activities in piles on the ground which limit oxygen supply, and mixing the resulting charcoal in plots where they cultivate crops.[4] When mixed with soil, biochar is found to be stable for microbial degradation and could store carbon for many centuries.[5] Biochar is also found to improve soil structure, increase soil porosity, have high water retention and nutrients.[6] Referred to as "black gold" in carbon trading circles as a valuable commodity that serves as a permanent carbon sink, biochar projects provided 86% of carbon removal credits in 2024 and currently command US$200 per tonne.[7] Biochar projects are attractive to investors and carbon credit buyers because they are relatively easy to implement, involve technologies that are not very expensive and scaleable, and could

1 https://www.frontiersin.org/journals/climate/articles/10.3389/fclim.2019.00008/full
2 http://www.knowledgebank.irri.org/training/fact-sheets/water-management/saving-water-alternate-wetting-drying-awd
3 https://www.mittilabs.earth/climate-smart-rice
4 https://www.tandfonline.com/doi/full/10.1080/17583004.2025.2560126
5 https://doi.org/10.1016/j.biombioe.2025.108365
6 https://link.springer.com/article/10.1007/s42773-024-00323-4
7 https://carboncredits.com/the-biochar-gold-rush-why-companies-are-scrambling-to-lock-in-carbon-credits/

PAN ASIA PACIFIC
For a just and pesticide-free future

48, Persiaran Mutiara 1, Pusat Komersial Bandar Mutiara, 14120 Simpang Ampat, Penang, Malaysia
Tel: (604) 5022337 | Email: info@panap.net | Homepage: www.panap.net

directly involve the participation of farmers and communities. Biochar has also earned the reputation as a source of "durable" carbon for its capacity to store CO_2 for 1,000 to 2,500 years and thus deemed as "permanent storage".

The fact that traditional burning of by-products from agricultural production such as rice husks, corn cobs and cotton stalks remains widespread in agricultural areas across Asia, causing air pollution and contributing to respiratory diseases in farming areas, provides a strong justification for biochar projects. It is important to distinguish between household-based biochar production using cookstoves to make use of agricultural wastes from home gardens and small-scale plots, and commercial-scale production of biochar to generate carbon removal credits while claiming to bring co-benefits such as production of biofertilizers and biopesticides. Proponents employ various techniques, often proprietary or protected by patents, to produce biochar on a commercial scale and generate carbon credits. These include pyrolysis techniques to burn biomass with very limited supply of oxygen, ranging from enlarged "artisanal" kilns to modern and efficient facilities that require big investments, or through gasification which involves partial absence of oxygen. Both pyrolysis and gasification use intense heat with minimal or no oxygen to burn organic matter, and convert them into solid, liquid and gaseous products in the case of pyrolysis while gasification produces syngas.[8] Organic matters that are burned using these low-oxygen technologies are referred to as **feedstocks**. In Asia, feedstock for biochar projects are primarily agricultural wastes from farms cultivating key staple crops such as rice and pigeon pea and commercial crops like corn, cotton, coffee and cocoa, as well as organic matters from bamboo and rubber plantations and even from invasive tree species.

State of Play of Carbon Farming in Asia

Carbon farming projects in Asia, specifically on AWD and biochar, are primarily developed and implemented by startup companies which may be home-grown and based in the country where the project is located, or by those that are operating in other countries and partnering with local collaborators which are mostly local governments or enterprises. Many of these startups were established in the past five years mostly during the Covid pandemic when much of the world was pushed to depend on digitalization as the default means to connect and conduct businesses. Many were set up by technology-savvy young entrepreneurs who aligned their ideas with the global call to address the climate crisis and pitched their business proposals to venture capitalists and governments. Most of these carbon farming projects boast of using digital tools like GPS, remote sensing, drones and geo-tagging for monitoring, reporting and verification (dMRV) of CO_2 removed from the atmosphere to boost their pitch for efficiency and transparency on their claim. The backdrop for their business models is the communities and farmers who are willing to implement AWD protocols prescribed by experts and who will deliver the agricultural biomass needed as feedstock for biochar facilities. Additional income for farmers and access to cheap biofertilizers are then heralded as co-benefits of the carbon credit

8 https://www.advancedcyclonesystems.com/en/pyrolysis-gasification/#:~:text=Pyrolysis%20&%20gasification%20are%20both%20thermal,use%20and%20generating%20renewable%20energy.

48, Persiaran Mutiara 1, Pusat Komersial Bandar Mutiara, 14120 Simpang Ampat, Penang, Malaysia
Tel: (604) 5022337 | Email: info@panap.net | Homepage: www.panap.net

generation scheme that claim permanent and stable carbon removal. Carbon credit registries for the voluntary carbon market like Verra[9], Gold Standard[10] and Puro Earth[11] then come in to verify the carbon removal credits of projects using their respective standards. Carbon buyers that want to purchase "high-quality" and "high-integrity" carbon removal credits that include Big Tech companies like Microsoft and Google, big polluting industries like Shell, Mitsui Lines and Mitsubishi, and even investment firms buy these registered carbon credits.

In the past two years, a number of so-called "offtake agreements" were signed between developers of carbon farming projects in Asia and major corporate buyers of carbon credits, mainly Big Tech companies like Microsoft and Google. An **offtake agreement**, also called **Long-term Carbon Removal Agreement** or **Future Carbon Credit Purchase**, is a multi-year contract where a buyer commits to buy a specific amount of carbon projects at an agreed price before the credits are even generated.[12] Offtake agreement involves trading future carbon credits to be generated by registered carbon removal projects that may have only been pilot tested. The agreements could involve advanced payments or can be used as guarantee to secure bank financing needed to start the project, including building biochar facilities and operational expenses in organizing farmers in AWD schemes, at a scale that could deliver the committed carbon credits within agreed timelines.

This is the basic playbook for carbon farming in Asia.

Alternate Wetting and Drying projects

By its nature, AWD projects need to be large-scale to make any impact on the planet or to generate sufficient methane removal that can be translated to verified credit units (VCUs) in voluntary carbon markets. Meeting the standards in permanence, additionality and leakage to generate high-quality credits in carbon mitigation projects in rice cultivation is a big challenge. Rice as a short-term crop that often involves diverse management practices across communities raises questions on the actual period of time that methane reduction is guaranteed. Introduction of AWD as a method barely presents additionality as many farmers are already practicing AWD for years albeit using various approaches and may not be consistently. Leakage is bound to happen since individual rice farmers practice a mosaic of crop management practices in their own fields. AWD in rice areas thus inherently requires participating farmers to adhere to strict protocols in wetting and drying techniques that include monitoring of water levels as well as rigid crop management practices. Moreover, centralized control or regulation of irrigation water is crucial to make large-scale AWD projects work in contiguous paddy rice fields. Capacity building and organizing of farmers and local trainers are integral components in AWD schemes which would require investments in training and even provision of incentives. All these explain why AWD project proponents in Asia enter into partnership agreements with local government units, government agencies and irrigators associations to ensure that these key components of AWD would work.

9 https://verra.org/programs/verified-carbon-standard/
10 https://www.goldstandard.org
11 https://puro.earth/puro-standard-carbon-removal-credits
12 https://www.arbonics.com/knowledge-hub/carbon-offtake-agreements

PAN ASIA PACIFIC
For a just and pesticide-free future

48, Persiaran Mutiara 1, Pusat Komersial Bandar Mutiara, 14120 Simpang Ampat, Penang, Malaysia
Tel: (604) 5022337 | Email: info@panap.net | Homepage: www.panap.net

Verra's Verified Carbon Standards (VCS) is currently working on developing standards for carbon removal crediting in rice which project developers are pinning their hopes on to be able to sell carbon credits from rice AWD projects as high-quality, stable and long-term carbon removals that command premium prices in carbon markets.

Green Carbon, Inc., a Japanese startup formed in 2019 to develop and sell carbon credits mainly from nature-based projects and funded by several Japanese investment firms,[13] is aggressively implementing carbon farming projects in many parts of Asia, namely in the Philippines, Vietnam and India, as well as in Thailand and Cambodia.[14] In Southeast Asia, the company focuses primarily in scaling up alternate wetting and drying (AWD) irrigation techniques in rice paddies, while it focuses in developing industrial-scale production of biochar in India in partnership with local companies like Varhad Capital. It has also signed a number of agreements with provincial governments across the Philippines to develop AWD projects. The largest AWD projects developed by Green Carbon, Inc. are implemented in Vietnam. The company has registered voluntary carbon units from province-wide AWD projects across Vietnam. Much of Green Carbon, Inc's AWD projects are explicitly tied to generating carbon credits for the **Joint Crediting Mechanism (JCM)** of Japan with the country where the particular project is located. The JCM is patterned after the Clean Development Mechanism (CDM) under the old Kyoto Protocol of the United Nations Framework Convention on Climate Change (UNFCCC) which was replaced by the Paris Agreement in 2015. Like its predecessor, the JCM is a project-based mechanism where Japan provides financing which are mainly in the form of loans and transfers of decarbonization technologies developed by Japanese companies through projects developed in the partner countries.[15] These projects generate carbon credits for Japan, and a portion to the host country, to help meet its nationally determined contributions (NDC) through carbon offsets. The JCM is considered aligned with Article 6.2 of the Paris Agreement on cooperative approaches. Japan has so far forged JCM with 31 countries since 2013, including 11 countries in Asia, namely, Mongolia, Bangladesh, Vietnam, Laos, Indonesia, Cambodia, Myanmar, Thailand, Philippines, Sri Lanka and India. Currently, most of the 90+ registered projects in the JCM database involve the installation of renewable energy technology in manufacturing plants owned by Japanese companies located in the partner countries.[16] Financing for these projects also provides funding for the Japanese entities that developed the project, such as Green Carbon, Inc.

In the same scale as Green Carbon Inc's AWD projects in An Giang province in Vietnam that covers 116,000 acres, **Ostrom Climate Solutions**, a Canadian climate management solutions company, is also implementing a large-scale AWD project in the rice granary area in Central Luzon, Philippines.[17] The company has partnered with the **National Irrigation Administration (NIA)**, with research and technical support provided by the **Philippine Rice Research Institute (PhilRICE)**. It is interesting to note that Green Carbon, Inc has also signed agreements to develop AWD projects with local governments in a number of rice-producing provinces where Ostrom is currently implementing its own

13 https://green-carbon.co.jp/en/corporate/
14 https://www.greencarbon.com
15 https://www.mofa.go.jp/ic/ch/page1we_000105.html
16 https://www.jcm.go.jp/projects/registers
17 https://ostromclimate.com/about-us/history/

PAN ASIA PACIFIC
For a just and pesticide-free future

48, Persiaran Mutiara 1, Pusat Komersial Bandar Mutiara, 14120 Simpang Ampat, Penang, Malaysia
Tel: (604) 5022337 | Email: info@panap.net | Homepage: www.panap.net

AWD project. The **International Rice Research Institute (IRRI)** has been implementing AWD projects in Bangladesh together with the national rice research institute, financed by the **Asian Development Bank (ADB)**.

Carbon Farming Projects in Selected Asian Countries

Country	Alternate Wetting and Drying (AWD) projects	Biochar projects
Bangladesh	**International Rice Research Institute (IRRI)** and **Tufts University**: AWD project since 2021 **IRRI** and **Bangladesh Rice Research Institute (BRRI)**, funded by the **Asian Development Bank (ADB)**: AWD pilot project in drought-prone areas since 2024, using sensors powered by internet of things (IoT) to monitor water levels; exploring generation of carbon credits for JCM with Japan and voluntary markets[18]	**Bangladesh Biochar Initiative (BBI)**[19] and **Christian Commission for Development in Bangladesh (CCDB)**[20] since 2013 promotes the production of biochar in cookstoves for local use as soil fertilizer
India	**Mitti Labs**: a startup that promotes the generation of **Rice Carbon Credit** among rice farmers through adoption of a package of carbon-reduction technologies that include dry seeding, AWD and stubble management to reduce methane emission in rice farming by 50% and freshwater use by 30% using country-level *cont. next page*	**Varaha Climate Ag**: develops 'artisanal biochar' projects with small-scale producers across India from 2022.[21] The startup has signed deals with big tech companies to sell carbon credits from high-quality biochar produced from cotton stalks in Maharashtra and from the invasive shrub *Prosopis juliflora* in Gujarat *cont. next page*

18 https://www.irri.org/news-and-events/news/adb-initiative-promotes-water-saving-irrigation-practice-drought-prone#:~:text=AWD%20is%20a%20scientifically%20proven,application%20of%20smart%20agriculture%20technologies.
19 https://cleancooking.org/sector-directory/bangladesh-biochar-initiative/
20 https://ccdbbd.org/biochar/
21 https://agfundernews.com/breaking-varaha-signs-landmark-deal-with-google-to-make-smallholders-part-of-the-carbon-removal-solution

PAN ASIA PACIFIC
For a just and pesticide-free future

48, Persiaran Mutiara 1, Pusat Komersial Bandar Mutiara, 14120 Simpang Ampat, Penang, Malaysia
Tel: (604) 5022337 | Email: info@panap.net | Homepage: www.panap.net

India (cont.)	validation, satellite technology and AI.[22] It partners with NGOs and entities like Syngenta Foundation in training and organizing farmers at the local level and claims to work with over 40,000 farmers from across 6 states including Andhra Pradesh.[23]	as feedstock. In January 2025, **Google** purchased 100,000 tons of carbon credits from Varaha from production of biochar in Gujarat until 2030, hailed as the biggest such deal.[24] The startup signed an agreement with Microsoft in January 2026 to develop 18 industrial gasification reactors to produce high-quality biochar from cotton stalks in Maharashtra, with a total projected CO_2 removal of over 2 million tonnes for 15 years.[25] Part of the offtake deal is **Microsoft** buying 100,000 tons of carbon credit from biochar projects of Varaha until 2029 that will involve at least 40,000 cotton farmers in Maharashtra.[26] **Boomitra** projects: implements carbon farming projects in over 200,000 acres of land across India, involving residue management and enhanced farming practices.[27]
	cont. next page	*cont. next page*

22 https://agfundernews.com/mitti-labs-raises-3m-seed-round-to-tackle-methane-emissions-in-rice-farming
23 https://www.mittilabs.earth/insights/mitti-labs-and-access-are-transforming-rice-farming-in-india
24 https://techcrunch.com/2025/01/16/google-strikes-worlds-largest-biochar-carbon-removal-deal-with-indian-startup-varaha/
25 https://w.theasset.com/article-esg/55691/india-s-varaha-signs-microsoft-biochar-carbon-removal-deal
26 https://techcrunch.com/2026/01/15/microsoft-taps-indias-varaha-for-asia-first-durable-carbon-removal-offtake/
27 https://boomitra.com/projects/boomitra-carbon-farming-india/

PAN ASIA PACIFIC
For a just and pesticide-free future

48, Persiaran Mutiara 1, Pusat Komersial Bandar Mutiara, 14120 Simpang Ampat, Penang, Malaysia
Tel: (604) 5022337 | Email: info@panap.net | Homepage: www.panap.net

India (cont.)

Varhad Capital Pvt. Ltd: specializes in production of bio-char from agricultural biomass such as cotton and pigeon pea stalks mixed with organically produced compost to produce enriched blended biochar called **Biochaar++**[28] and claims to work directly with 550,000 farmers organized into 165 farmer-producer organizations across Uttar Pradesh, Maharashtra, Gujarat, Karnataka and Andra Pradesh.[29]

Green Carbon, Inc. (Japan) partners with the startup **Varhad Capital** in building 2 industrial-scale biochar production facilities in Maharashtra to be operational by August 2025, expected to generate 120,300 tons of carbon credit.[30] The design of the facility is based on traditional kiln methods and is expected to generate 120,300 tons of carbon credits by early 2026 which will be listed and traded in the digital trust infrastructure of **Carbonfuture**, a Swiss startup that vets on the integrity of captured removal credit.[31]

Greenerth Climate Tech and Impact Solutions: biochar project in over 500 acres of land in Maharashtra using artisanal kon-tiki kilns to burn agro-residues, giving out biochar fertilizers to farmer-partners.[32]

28 https://registry.isometric.com/project/prj_1JYGSV7SE1S03PH9
29 https://varhad.in/about-us/
30 http://green-carbon.co.jp/en/enindias-largest-biochar-carbon-removal-project/
31 https://www.carbonfuture.earth
32 https://www.greenerthsolutions.com/projects/artisanal-biochar

PAN ASIA PACIFIC
For a just and pesticide-free future

48, Persiaran Mutiara 1, Pusat Komersial Bandar Mutiara, 14120 Simpang Ampat, Penang, Malaysia
Tel: (604) 5022337 | Email: info@panap.net | Homepage: www.panap.net

Indonesia	Green Carbon, Inc. signed a Memorandum of Understanding with Bogor Agricultural University in November 2025 to design a carbon farming project involving AWD in rice paddy areas in West Java to generate carbon credits primarily for Japan's Joint Crediting Mechanism (JCM).[33]	Indonesian companies like **Sampangan Carbon Factory and Circular Hub**[34] and **TerraBaru**[35] are commercially producing biochar fertilizers from agricultural wastes, including from oil palm residues. **Startups** funded by venture capital and other private financing are implementing biochar projects to generate carbon credits: **Sawa EcoSolutions**, based in Singapore, opened its biochar production facility in West Java in April 2024 and will be expanding in South Sumatra to generate carbon credits from processing of agricultural wastes from sugarcane and cassava.[36] The project received early stage investment from **Offset8 Capital**, a financial investor based in Abu Dhabi that focuses its portfolio on nature-based solutions.[37] It is the first commercial biochar project in Indonesia and is expected to remove 50,000 tons of CO_2 and generate about US$50 million over a decade.[38] **WasteX** started a project in Central Java with the Ministry of Agriculture in Sept 2025 to convert farm wastes from rice and corn fields into biochar.[39]

cont. next page

33 https://green-carbon.co.jp/en/mou-with-bogor-agricultural-university/
34 https://carbonfarming.id/#products
35 https://terrabaru.com/our-products/
36 https://offset8capital.com/portfolio/sawa/
37 https://carbonherald.com/offset8-capital-ltd-initiates-first-transaction-for-biochar-project-in-indonesia/
38 https://carbonlocktech.com/2024/02/offset8-announces-the-first-transaction-from-abu-dhabi/
39 https://www.wastex.io/post/wastex-and-indonesia-ministry-of-agriculture-bring-biochar-to-the-countrys-csa

PAN ASIA PACIFIC
For a just and pesticide-free future

48, Persiaran Mutiara 1, Pusat Komersial Bandar Mutiara, 14120 Simpang Ampat, Penang, Malaysia
Tel: (604) 5022337 | Email: info@panap.net | Homepage: www.panap.net

Indonesia (cont.)	**BiocharLife** works with Corus International, a church-based NGO that also works in many parts of Asia, Africa and Latin America, in community-based production of biochar to deliver carbon credits to **Grab**, a Singapore-based delivery app company.[40]
Malaysia	**Reclimate**, a Malaysian startup that implements biochar projects in some 600 acres of land in the hills of the Greater Klang Valley, surrounding Kuala Lumpur using simple pyrolysis technology that it calls "pit-to-plot" approach.[41] **Wild Asia Group Scheme for Small Producers (WAGS)** BIOchar for Smallholders is a non-profit enterprise working with small-scale producers of oil palm to produce biochar in Sabah since 2022.[42] The project which uses oil palm fronds as feedstock expects to earn 200-400 metric tons of carbon credits annually and targets to become Malaysia's first *Artisanal Biochar C-sink Credits* under Carbon Standards International by mid 2025.[43] **Carbon Plus** launched **Bukit Selar Carbon Station** located in Kelantan state, Malaysia's first industrial biochar facility. The facility uses wild and mature bamboo and Palm Kernel Shell (PKS) as feedstocks and expects to produce 500 tons of biochar annually, utilizing advanced gasification technology provided by **Renewables Plus**.[44]

40 https://biochar.life/blog/scaling-biochar-in-indonesia-our-partnership-with-corus-international
41 https://www.reclimate.earth/greater-klang-valley-biochar-project
42 https://global-c-registry.org/project-view/1041
43 https://oilpalm.wildasia.org/wags/wags-biochar/
44 https://carboncredits.com/malaysias-first-industrial-biochar-facility-carbon-plus-partners-with-crystaltrade-for-carbon-removal-optimization/

PAN ASIA PACIFIC
For a just and pesticide-free future

48, Persiaran Mutiara 1, Pusat Komersial Bandar Mutiara, 14120 Simpang Ampat, Penang, Malaysia
Tel: (604) 5022337 | Email: info@panap.net | Homepage: www.panap.net

Philippines	**Ostrom Climate Solutions (Canada)**: Upper Pampanga River Integrated Irrigation Systems (UPRIIS) project covering over 100,000 has. of paddy rice lands in central Luzon, aiming for methane reduction through AWD under payment for ecosystem services, in partnership with the **National Irrigation Administration (NIA)** and support from the **Philippine Rice Research Institute (PhilRice)** since 2023[45] **Green Carbon, Inc. (Japan)**: has signed agreements with local governments in major rice-producing provinces, namely Batangas, Bulacan, Tarlac, Pampanga and Ilocos Norte in the north, Bohol and Leyte in central Philippines, and in Bukidnon in the south, to implement large-scale AWD projects to generate credits for Japan's Joint Crediting Mechanism (JCM).[46]	**Alcom Carbon Markets Phils** operates biochar production facilities in Nueva Ecija and Oriental Mindoro using rice stalks and residues to produce bio-fertilizers and to absorb CO_2.[47] Hailed as the first biochar project in Southeast Asia certified by **Puro Earth**, a carbon trading entity that certifies projects for long-term removal of CO_2 from the atmosphere, making Alcom's biochar project attractive to wholesale buyers of future CO2 Reduction Certificate (CORCs).[48] **Green Carbon Inc** has an MoU with **Alcom Carbon Markets** to expand biochar production in major rice producing provinces.[49]
Sri Lanka		**Planboo**: artisanal biochar project from rubber work in partnership with a big plantation, Lalan Rubbers, to produce bio-fertilizers and for long-term carbon sink.[50]

45 https://ostromclimate.com/case-study/the-upper-pampanga-rice-climate-smart-rice-project/
46 http://green-carbon.co.jp/en/tag/philippine/page/2/
47 https://www.alcomsg.com/carbon-removal
48 https://carbonherald.com/altitude-signs-one-of-its-largest-biochar-deals-yet-across-two-asian-markets/
49 https://green-carbon.co.jp/en/alcom_en/
50 https://www.klimate.co/project/planboo-sri-lanka-lalan

PAN ASIA PACIFIC
For a just and pesticide-free future

48, Persiaran Mutiara 1, Pusat Komersial Bandar Mutiara, 14120 Simpang Ampat, Penang, Malaysia
Tel: (604) 5022337 | Email: info@panap.net | Homepage: www.panap.net

Vietnam	**Green Carbon, Inc. (Japan)**: large-scale AWD projects across Vietnam to reduce methane emission in rice cultivation which the startup has registered/listed in voluntary carbon markets in 2025:[51] • 116,000 has. over 7 years in An Giang province • 62,000 hectares over 10 years in Nge An province	**Bamboo King Vina Biochar**: built 6 pyrolysis production lines in Than Hoa province in 2024, using bamboo wood as feedstock.[52] The project is verified under the Verified Carbon Standard (VCS) of Verra. **Atmosfair** (German climate non-profit) and **HUSK** (a startup in Cambodia): produces biochar fertilizer products from rice husk.[53] [54] **Trong Duc Cacao Co., Ltd**: commercial production of biochar fertilizers from dried cocoa pods in Dong Nai province. The project was initially supported by Helvetas Swiss since 2022.[55] The company signed an agreement February 2026 with **Tromsø (Japan)** to produce biochar from cacao husks using the industrial manufacturer's proprietary grind mill technology.[56] **Green Carbon, Inc**: has partnership with local governments, universities and farmers' organizations to implement carbon farming projects using AWD and also biochar technolog

51 http://green-carbon.co.jp/en/enjapans-first-gold-standard-rice-paddy-project/
52 https://biocharvietnam.org/turning-bamboo-waste-into-biochar-opens-up-a-new-pathway-for-carbon-credits/
53 https://www.atmosfair.de/en/climate-protection-projects/negative-emissions/cambodia-vietnam-biochar-en/
54 https://www.huskventures.com/about-us/
55 https://www.switch-asia.eu/news/turning-cocoa-pod-waste-into-biochar-a-success-circular-economy-story-from-vietnam/
56 https://tromso.co.jp

PAN ASIA PACIFIC
For a just and pesticide-free future

48, Persiaran Mutiara 1, Pusat Komersial Bandar Mutiara, 14120 Simpang Ampat, Penang, Malaysia
Tel: (604) 5022337 | Email: info@panap.net | Homepage: www.panap.net

Biochar projects

There is a surge in the number of biochar projects across Asia in recent years[57] from a handful of pilot projects in the past. Most biochar projects in the region are developed and implemented by startups aimed at generating carbon credits from converting agricultural wastes into biochar and claiming to store CO_2 permanently by spreading biochar particles in the fields as biofertilizers. These projects share promises of producing cheap, even free, biofertilizers from biochar and increasing soil fertility while making use of agricultural wastes and residues. Regardless of the specific incineration technique involved, biochar projects claim to bring co-benefits to farmers and the environment, from providing extra income to farmers from selling biochar fertilizers to improving soil fertility by spreading biochar in fields while avoiding the traditional burning of agricultural residues that causes air pollution all the way to cities during burning season.

Unicorn startups in India that have received capital infusion from venture capital firms and investments from transnational companies that want to purchase "high quality", stable and permanent carbon removals through so-called off-trade deals, are hailed as leaders in high-stake biochar projects in Asia. **Varaha** has carbon removal projects in India, Nepal and Bangladesh, and has clinched high-profile offtake agreements with Google in 2025 and with Microsoft in 2026 on advance purchase of future carbon credits that will be generated from the startup's projects in Gujarat. **Boomitra**, another Indian start up with proprietary technology in measurement, reporting and verification of carbon reduction agricultural practices, is a winner of the 2023 Earthshot Prize which recognizes simple but ambitious projects that will drive significant progress towards repairing the planet by 2030.[58] Startups that received capital infusion from international investors are also behind most biochar projects in Indonesia, Malaysia and Sri Lanka. In contrast, commercial-scale biochar projects in Vietnam are mainly initiated by companies in agricultural enterprises such as cacao farming for exporting chocolates and also bamboo production.

Impacts of Carbon Farming on Farmers, Food Systems and Agriculture in Asia

As carbon farming projects are taking off in Asia largely due to demand for high-quality and long-term carbon removal credits in voluntary carbon markets, civil society and grassroots movements need to raise critical awareness on these projects and their impacts on farmers, agriculture and food systems. Carbon farming after all directly involves agricultural soil as carbon storage and projects require the use of farm residues, involve changes in farm practices and depend on participation of farmers.

57 https://www.cdr.fyi/carbon-removal-map
58 https://earthshotprize.org/winners-finalists/all/?filter-impact-area=india

PAN ASIA PACIFIC
For a just and pesticide-free future

48, Persiaran Mutiara 1, Pusat Komersial Bandar Mutiara, 14120 Simpang Ampat, Penang, Malaysia
Tel: (604) 5022337 | Email: info@panap.net | Homepage: www.panap.net

Competition for agricultural biomass. Biochar projects are premised on agricultural biomass as "wastes", these organic matters are generally used by small-scale farmers in their fields to keep moisture on the ground, for water retention, control weeds and for composting to produce organic fertilizers. In the Philippines, the burning of rice husk and residues has been banned long before biochar projects started and promoted the use of crop residues in production of organic fertilizers through composting. Commercial scale production of biochar will compete with traditional uses of crop residues on-farm.

Crop uniformity. Commercial-scale incineration of agricultural biomass requires a massive amount of feedstocks for machines and technological systems to function efficiently and deliver large amounts of biochar to store the committed amount of carbon into the soil. In order to produce highly porous char that can effectively retain water and nutrients while storing carbon permanently, the feedstock materials should ideally come from the same crop residues. Using a specific biomass material would also ensure consistency in quality of biochar and help reduce contamination of heavy metals that could harm the soil. Biomass from hard nutshells like coconut and woody materials like bamboo are preferred. Rice husk produces high quality biochar but production is challenging because of its high silica content that reduces its carbon content, and high alkalinity that can affect the soil pH.[59]

Imposition of prescribed farming practices. AWD schemes require strict adherence to specific farm management practices and calendar prescribed by experts to attain the expected reduction of methane reduction. AWD developers like Ostrom Climate Solutions in the Philippines provides incentives to participating farmers in the form of "payment for ecosystems services (PES)" for them to commit to follow the company's farming protocol to ensure that that criteria of permanence, additionality and leakage are met in order to generate high-integrity carbon credits. The scheme could lock in farmers and impede them from cultivating other crops during the year or use other crop management practices, thus impinging on farmers' rights to make decisions in their own farms and also contradicting agrobiodiversity objectives.

Does not reduce dependence on agrochemicals. None of the carbon farming projects scrutinized for this Fact Sheet aim to reduce the use of agrochemicals. Biochar projects claim to provide biological or even organic fertilizers to farmers and improve soil fertility, none of them aim to reduce dependence on synthetic fertilizers as biochar is often promoted mainly for soil augmentation.

Concerns on farmers participation and benefits. Flagship projects in biochar and AWD presented in this Fact Sheet boast of benefits to farmers and their active participation in implementation. A recent independent study among farmers participating in biochar projects in several states in India has challenged these claims, calling out the absence of participation, dominance by rich and male farmers, and non-payment of promised monetary benefits. More research like this on on-the-ground experiences of communities in carbon farming projects across Asia are urgently needed to present a concrete picture from the lens of farmers. Partnerships between developers of carbon farming with government agencies and local governments tend to trap farmers into committing to participate in schemes to deliver their farm residues to biochar facilities and to participating in AWD projects.

59 https://www.sciencedirect.com/science/article/pii/S1658077X21001041

PAN ASIA PACIFIC
For a just and pesticide-free future

48, Persiaran Mutiara 1, Pusat Komersial Bandar Mutiara, 14120 Simpang Ampat, Penang, Malaysia
Tel: (604) 5022337 | Email: info@panap.net | Homepage: www.panap.net

Acknowledgements

This factsheet was prepared by Neth Daño.

48, Persiaran Mutiara 1, Pusat Komersial Bandar Mutiara, 14120 Simpang Ampat, Penang, Malaysia
Tel: (604) 5022337 | Email: info@panap.net | Homepage: www.panap.net