

# Alternate wetting and drying for climate change adaptation, mitigation and livelihoods

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ice is a staple food for more than half of the global population and a source of livelihoods for millions of mostly shareholder farmers. The vast majority is grown in Asia – about 90% of annual production from 1980 to 2019, one-fifth to a quarter of it in Southeast Asia.

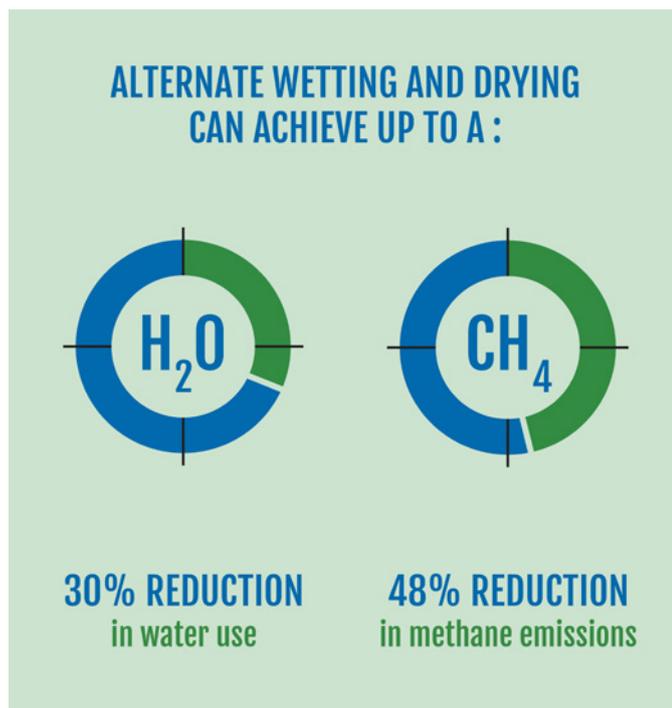
Within the region, Indonesia, Thailand and Vietnam are the top producers.

Rice production is highly vulnerable to climate change impacts, including shifts in precipitation patterns and reduced water availability. Traditional rice production is

very water-intensive, and in Southeast Asia, 45% of rice production is irrigated, using up a large share of available freshwater. Rice paddy is also a major source of methane emissions, a powerful greenhouse gas released by flooded fields.

Alternate wetting and drying (AWD), a technique in which rice fields are flooded, drained and reflooded as needed to maintain optimal water levels, can reduce water use by 15–35% without significant yield losses when implemented correctly. It can also halve methane emissions and reduce runoff and erosion, improving soil structure and making rice paddies more suitable for crop rotation and mechanisation.

Figure 1: Benefits of alternate wetting and drying.



Source: Adapted from CCAFS (2014).



Photo : IRRI/Amelia Henry

AWD can reduce water, seed and fertiliser costs, making it particularly beneficial for low-income farmers. It has benefits to human health as well. It been found to improve the quality of the rice grains, including their zinc content, and to sharply decrease arsenic accumulation. With less standing water, mosquitoes and the diseases they transmit, such as malaria, can also be reduced.

## Insights for policy-makers, donors and project implementers

AWD holds great promise, but it does deviate from traditional practices. This means it requires capacity-building and support for farmers, who may see more weed growth and a shift in pests and diseases. AWD is also not suitable for rainfed rice, and may not work well in rainy areas where fields may not dry well.

Realising AWD's potential to build resilience and improve the lives of smallholders requires deliberate attention to equity and inclusion as well. With their food security at stake, AWD may be too risky for poor farmers unless they have support to avoid or make up for any yield reductions. It is also crucial to address structures that may exclude women and other marginalised groups. This means providing training and support equitably and recognising the knowledge, perspectives and capacities each brings to the table.

AWD is already being implemented in several ASEAN Member States, including Myanmar, the Philippines, Thailand and Vietnam, with multiple pilot projects supported by experts from international organisations. ASEAN has collaborated closely with the International Rice Research Institute to improve rice cultivation across the region, including through AWD. The technique is often introduced as part of the system of rice intensification (SRI), which aims to increase yields while minimising inputs.

ASEAN and its Member States already recognise AWD as a promising climate change adaptation and mitigation strategy and have promoted it through national policies, the ASEAN Regional Guidelines for Promoting Climate Smart Agriculture (CSA) Practices and other guidance documents. ASEAN Member States have also highlighted AWD at the international level, as one of several climate change mitigation practices proven to sustainably enhance food security, resilience and productivity.

Still, AWD has yet to be scaled up across the region. Policy-makers, project implementers and researchers all have roles to play in realising the technique's potential across the region. It is important to strengthen incentives for farmers to adopt AWD and reduce water use – such as through fee schedules that provide appropriate amounts of water affordably, with escalating costs for higher consumption.

Farmers also need extension support and capacity-building to help them determine whether AWD is appropriate for their land, ensure they have access to well-functioning and efficient irrigation systems, and guide them so they are able to implement AWD correctly and minimise yield reductions. It may be helpful to coordinate among farmers and local authorities to design irrigation schemes suitable to limited water resources for rice production.

ASEAN Member States may also want to explore how AWD could be included in projects proposed under Nationally Appropriate Mitigation Actions or to the Green Climate Fund or the Clean Development Mechanism, and how it can be incorporated in sustainable and climate adaptive water governance.

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*For a more comprehensive overview of AWD and its climate change adaptation and mitigation potential, as well as considerations for equity and inclusion, please consult the full version of this Insight Brief. This Insight Brief is part of a series prepared by the Stockholm Environment Institute on behalf of the Climate-Smart Land Use (CSLU) in ASEAN project. All briefs are available at <https://asean-crn.org/overview/publications/study-and-policy/>. This digest is written by Marion Davis based on Anschell, N., and Salamanca, A (2021). Alternate wetting and drying for climate change adaptation, mitigation and livelihoods, ASEAN Climate-Smart Land Use Insight Brief 2. Jakarta: Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ).*

Published by Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH  
Registered offices Bonn and Eschborn, Germany

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As at June 2021

Design Jippy Rinaldi, Jakarta

Photo credits International Rice Research Institute (IRRI)  
/Amelia Henry  
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