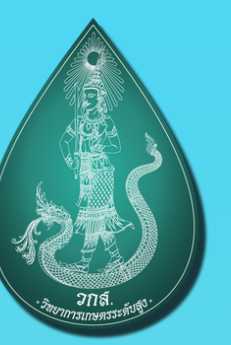




การเพิ่มได้รายได้ให้กับเกษตรกรจากคาร์บอนเครดิตสู่การเกษตรที่ยั่งยืน

increasing income for farmers
by carbon credit business to sustainable agriculture

Thailand Rice Decarbonization Journey



กลุ่มมัชฌาน



คุณเกศ อัครวทองกุล (พี่เกศ)
กรรมการบริหาร
บริษัท เวิลด์ เฟอเทอ จำกัด
โทร 081-5646999



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กรรมการผู้จัดการบริษัท ซีเอ็มที แมเนจเม้นท์ จำกัด
และอนุกรรมการพัฒนาด้านกายภาพ
องค์การสวนสัตว์แห่งประเทศไทย
โทร 080-9828687



คุณฐานวัฒน์ ลิทธิพงษ์คณกุล (พี่เพท)
กรรมการผู้จัดการบริษัท รอคแซนด์
คอร์ปอเรชั่น (ไทยแลนด์) จำกัด
โทร 098-9855288



ดร.ธีร์ ภาวิงคพันธ์ (พี่เปิ้ล)
รองเลขาธิการคณะกรรมการการศึกษาระดับพื้นฐาน
สำนักงานคณะกรรมการการศึกษาระดับพื้นฐาน
โทร 094-8935599



คุณธีรยุทธ ฉิมพิทักษ์ (พี่ยุทธ)
ที่ปรึกษาพัฒนาธุรกิจ
บริษัท เวฟ บีซีจี จำกัด
โทร 080-4412295



คุณนรณ สุขสมาน (พี่เอ็ด)
รองเลขาธิการ คณะกรรมการ
อ้อยและน้ำตาลทราย
โทร 086-7714400



คุณประพันธ์ ลีปายะคุณ (พี่พัน)
รองอธิบดี กรมประมง
โทร 062-6012349



คุณเพิ่มพูน ไรจสกุล (พี่เอ็กซ์)
รองกรรมการผู้จัดการ
บริษัท ทุเดย์ เฟอร์ทีไลเซอร์ จำกัด
โทร 081-6669048



คุณวิณัฐภา วรณจรัส (พี่ลิค)
กรรมการบริษัทและ CFO โรงพยาบาลวรรณสิริ
บริษัท ศรัณย์การแพทย์ จำกัด
โทร 062-9144456



ดร.ชรัญวัฒน์ ทวีสิทธิ์าพล (พี่ป้อม)
ประธานเจ้าหน้าที่บริหาร
กลุ่มบริษัท จัสท์
โทร 063-7894289



คุณสมพิศ วงศ์ปัญญา (พี่ปู้)
รองผู้อำนวยการ สำนักงานพิพิธภัณฑสถานแห่งชาติ
พระบาทสมเด็จพระเจ้าอยู่หัว (องค์การมหาชน)
โทร 084-6374736

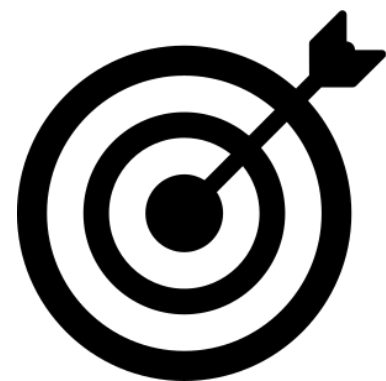


ดร.สุมาลี ศรีสุภรวาณิชย์ (พี่เล็ก)
รองประธานกรรมการ
ห้างหุ้นส่วนจำกัด สุรัตน์พัฒนาการทอ
โทร 084-4562332

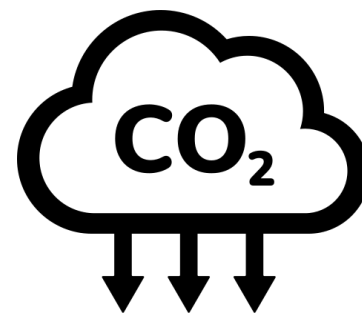
IMPACT FROM PROJECT IMPLEMENTATION



AWD implementation would enable Thailand to achieve its carbon emission goal in 2030



↓ 166
MtCO₂e Emission reduction target in 2030



↓ 20
MtCO₂e Emission reduction from AWD in 2030
~12% of overall target

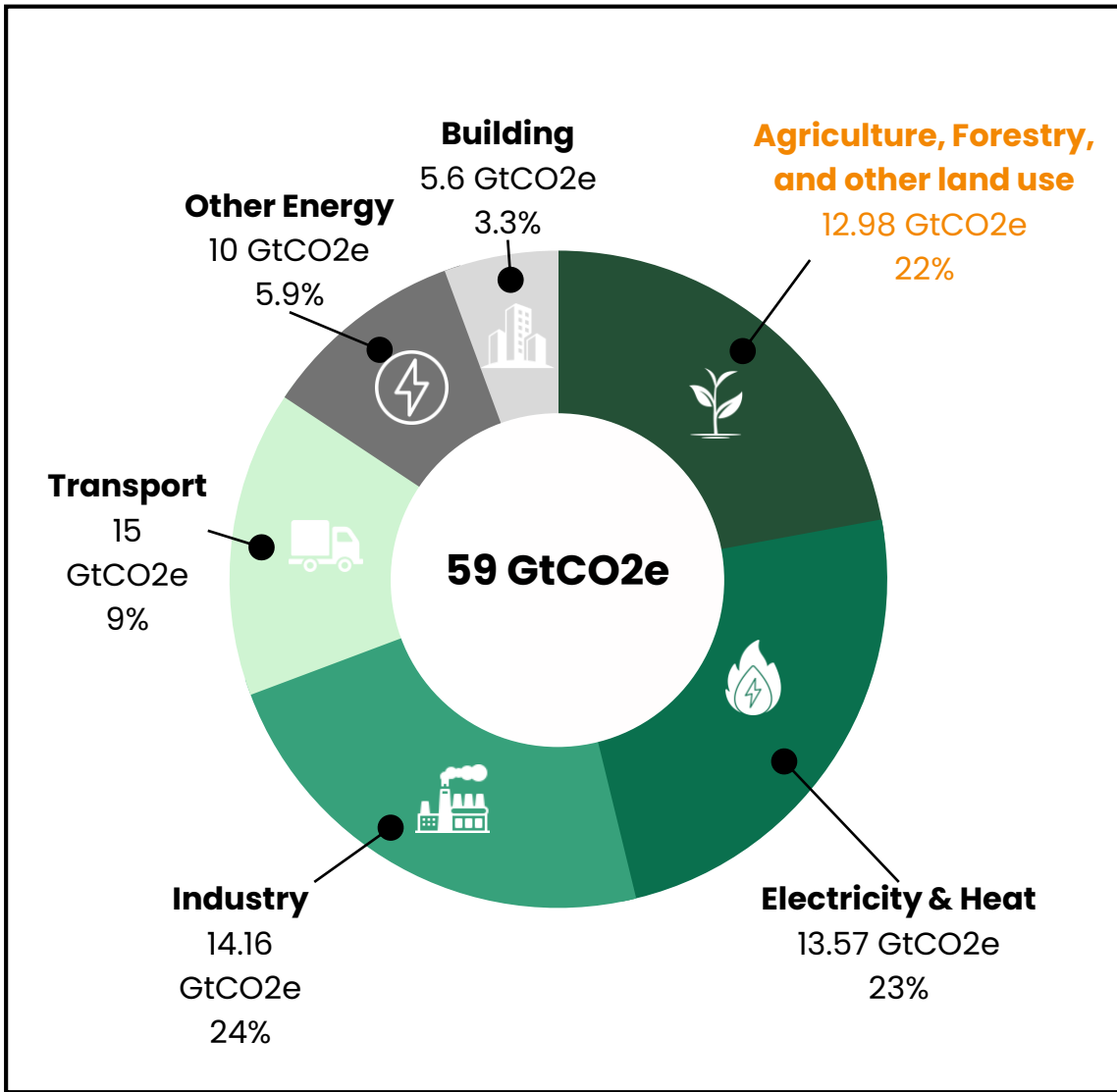


~140
Billion Baht Estimated fund to support AWD farmers from 2024-2030
~20 Billion Baht / year

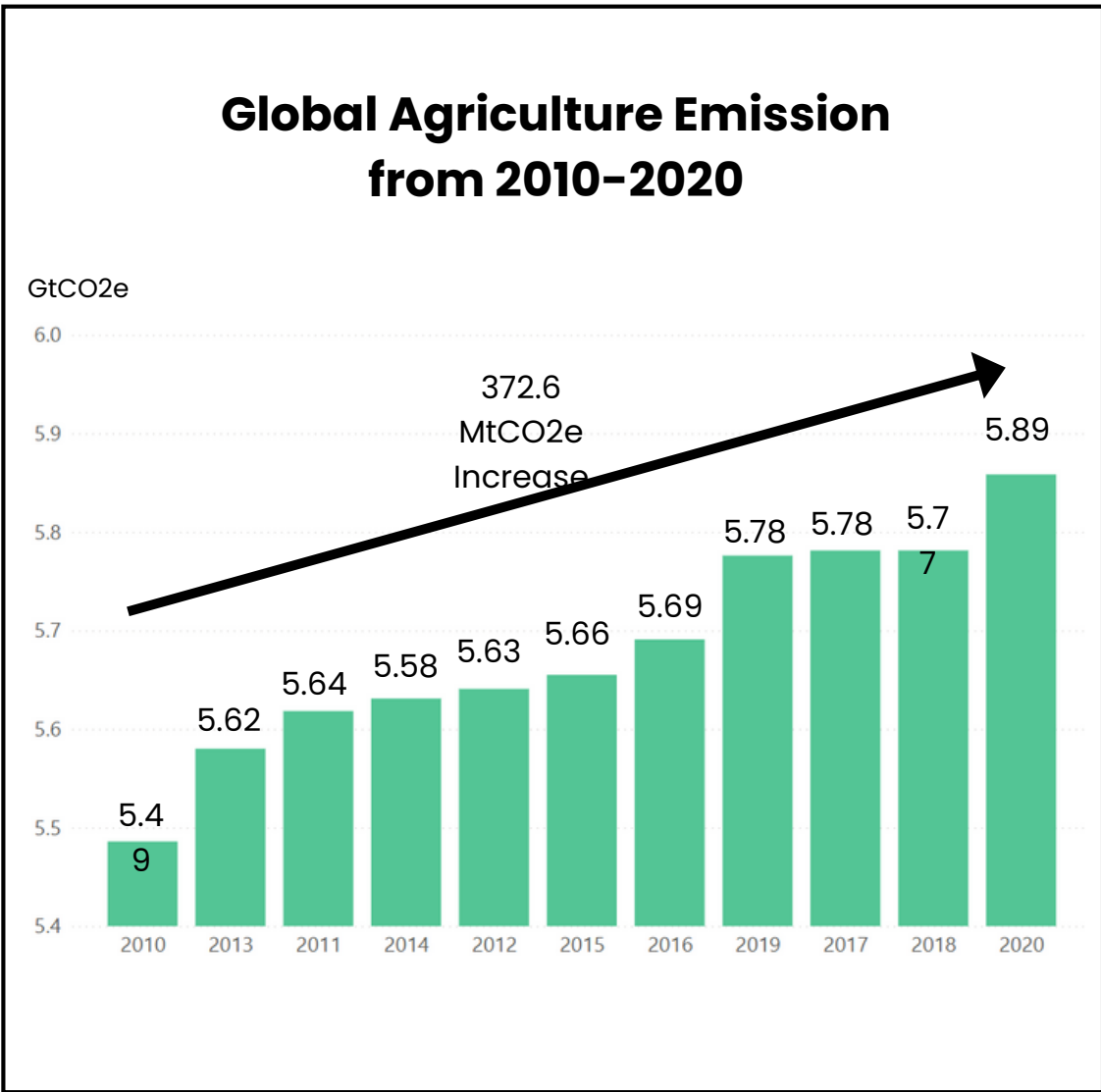
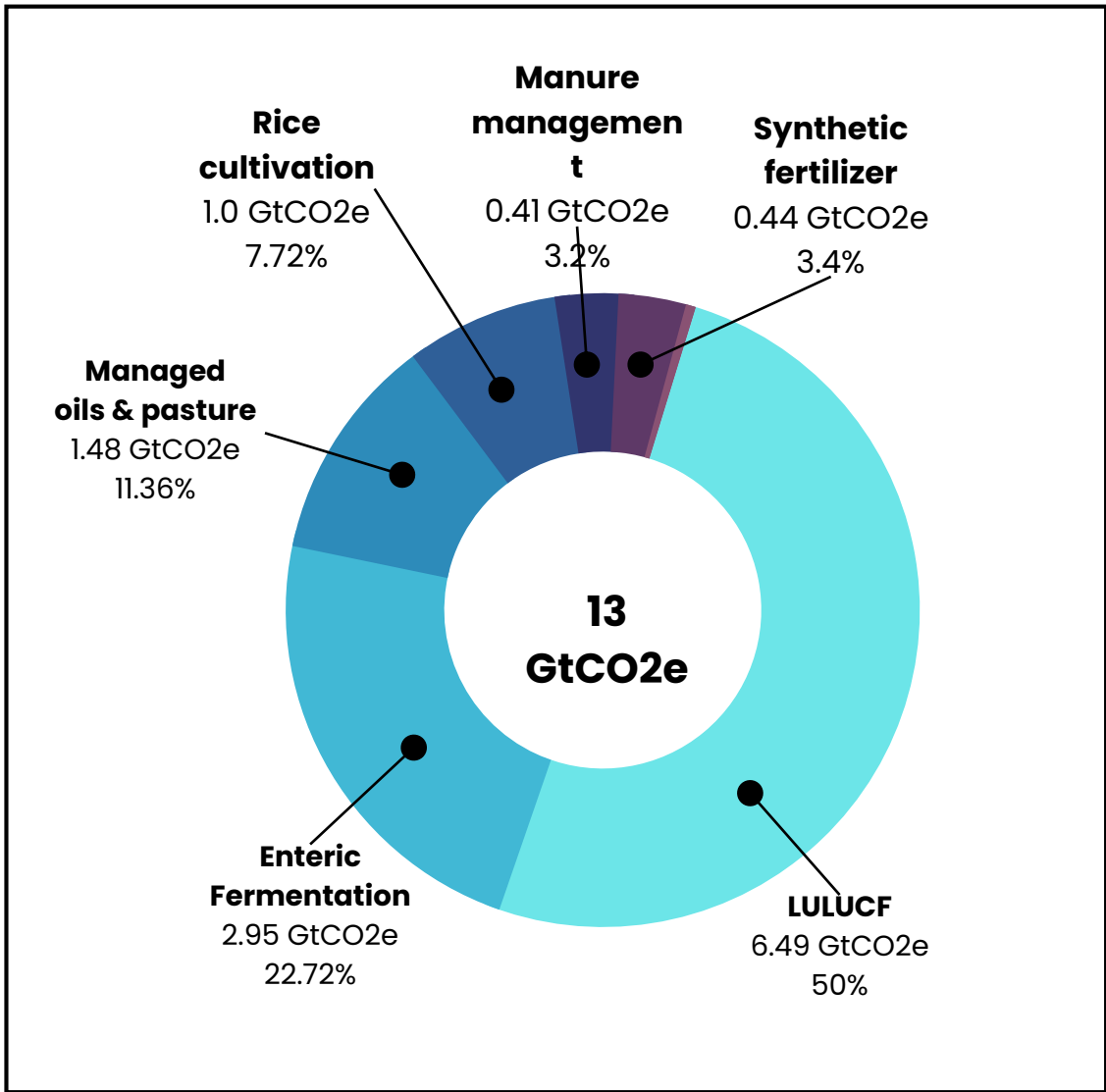
GLOBAL GREENHOUSE GAS EMISSION SITUATION



Global GHG Emission in 2019



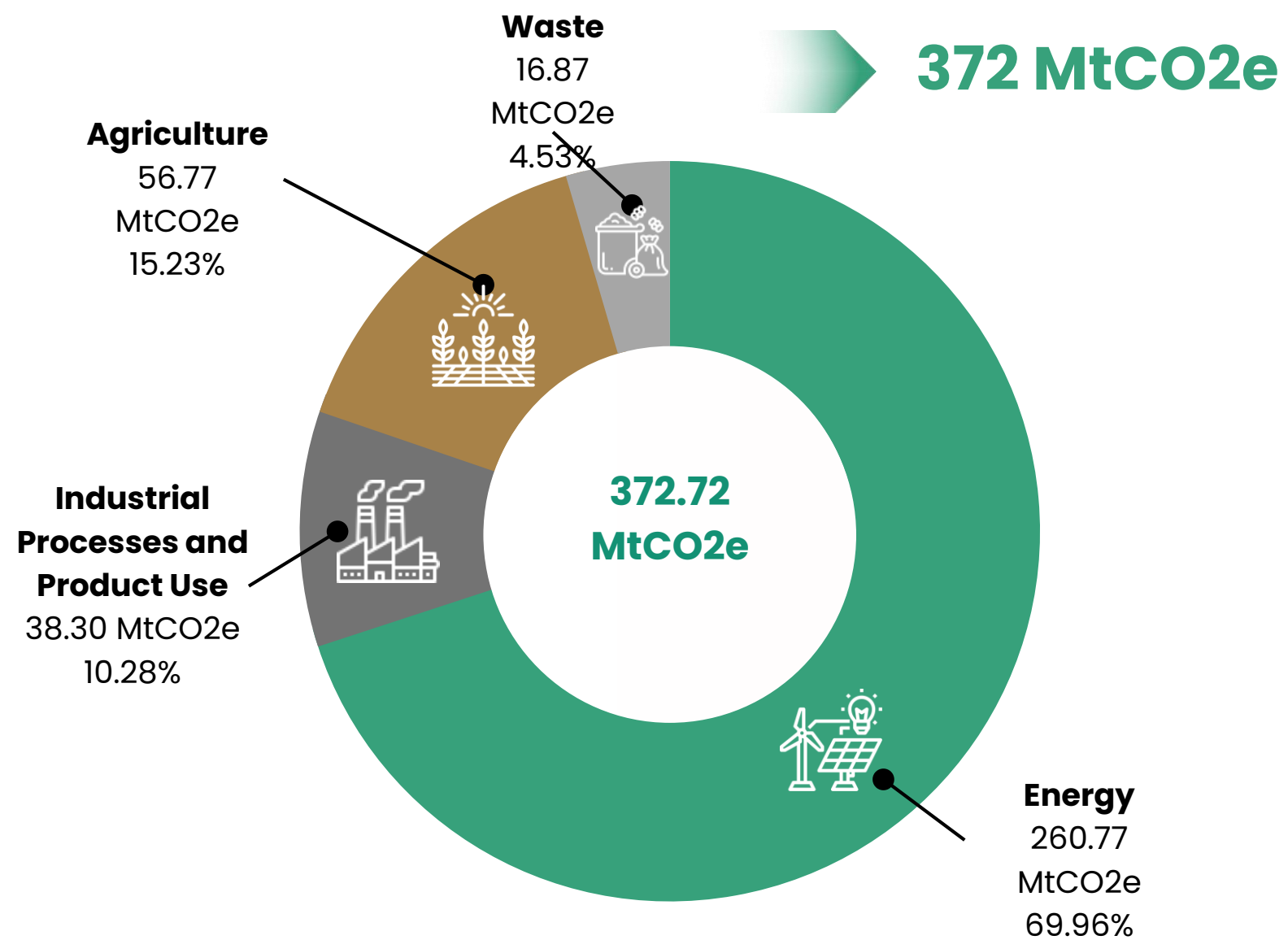
Global GHG Emission in Agriculture sector



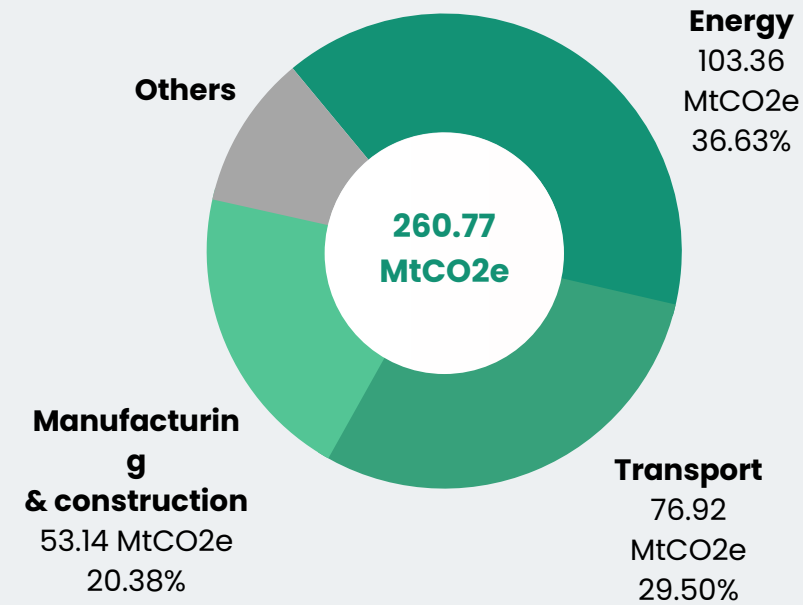
GREENHOUSE GAS EMISSION SITUATION IN THAILAND



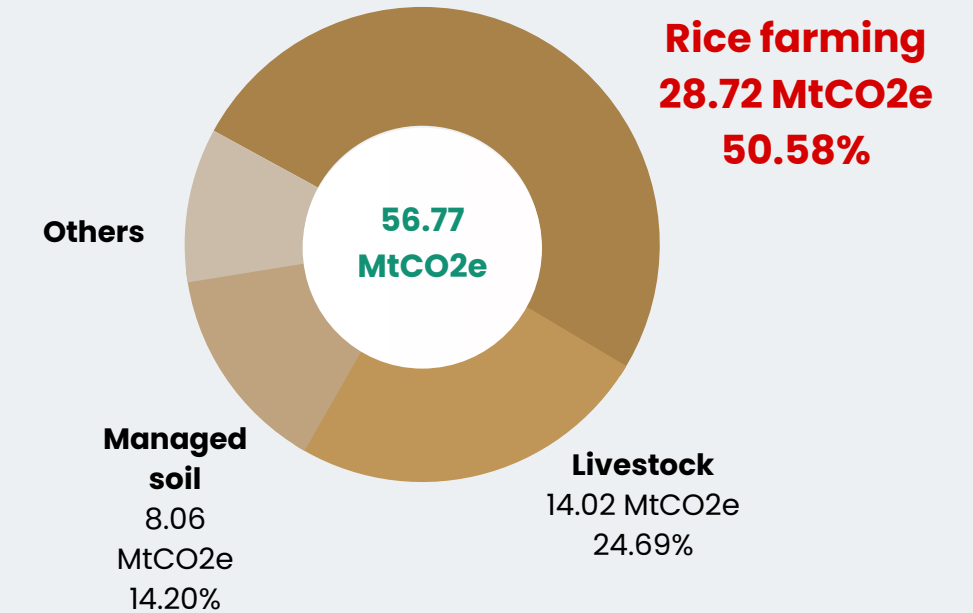
Total GHG Emission in Thailand in 2019



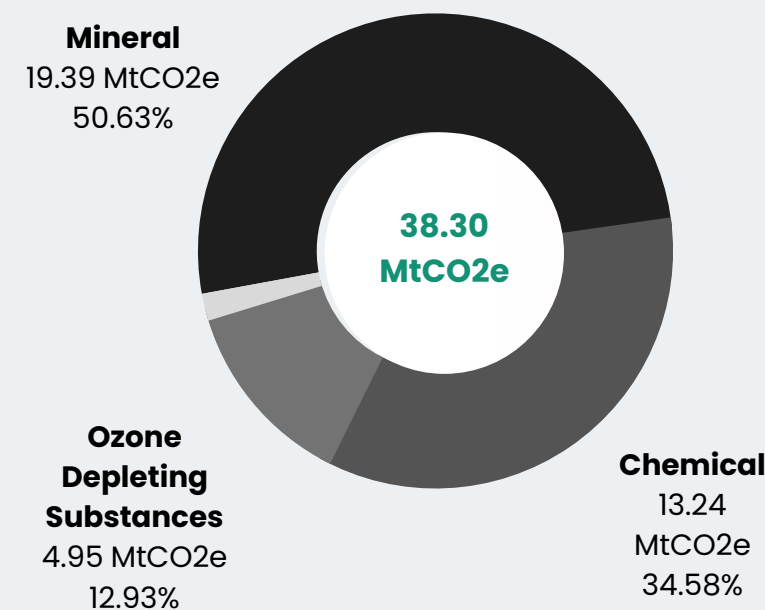
Energy



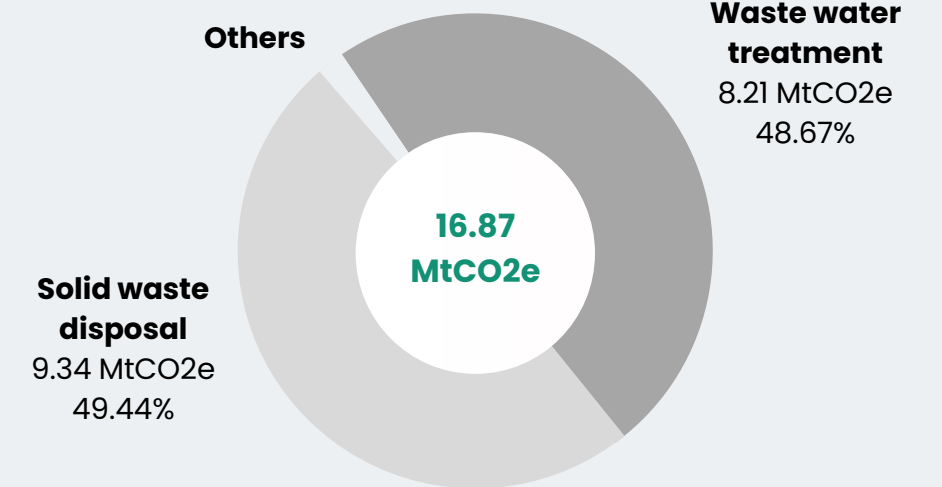
Agriculture



Industrial Processes



Waste



IMPORTANCE OF REDUCING RICE CULTIVATION EMISSION



Rice plays an important role for Thai people, yet it represents a large portion of GHG emissions

#2
Second **largest rice exporter** in the world behind India

#2
Thailand agriculture crops with second **largest export value**

4.7M
Households with rice cultivation as main income

Rice cultivation as main GHG contributor in Thailand's Agriculture sector

56.1M rai
Suitable rice cultivation area: 17.5% of total area in Thailand

28.72 MtCO₂e
GHG emission in 2019

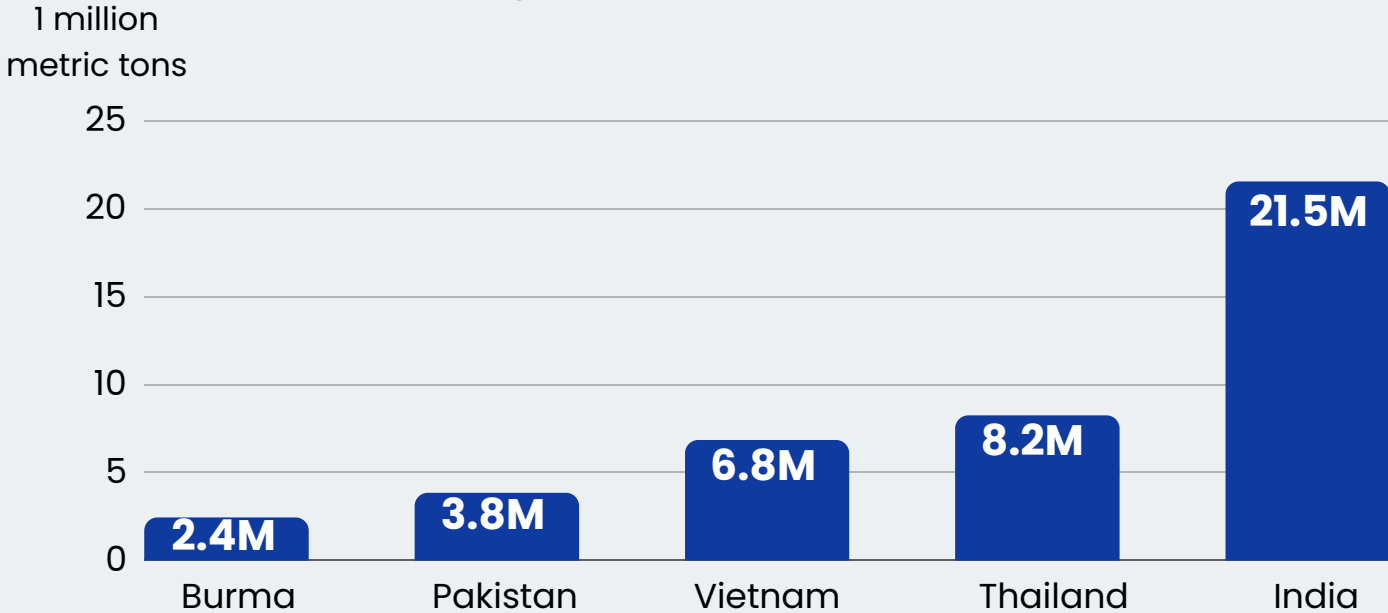
#2
highest GHG emission sector behind energy sector in Thailand

50.6%
of total emission from the agriculture sector in 2019

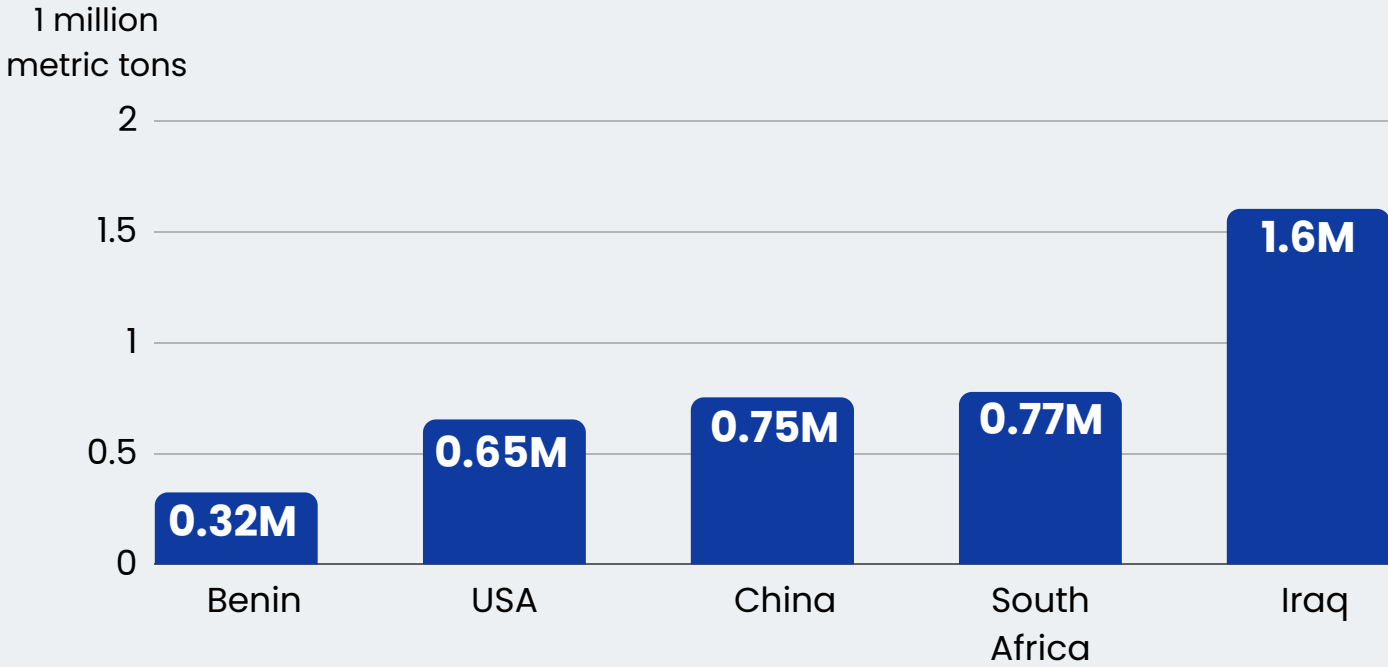
15%
of overall emission in Thailand in 2019

#4
largest emitter of CO₂ from rice farming behind China, India, Indonesia

Top 5 largest rice exporters (2022)



Top 5 largest rice importers from Thailand (2022)

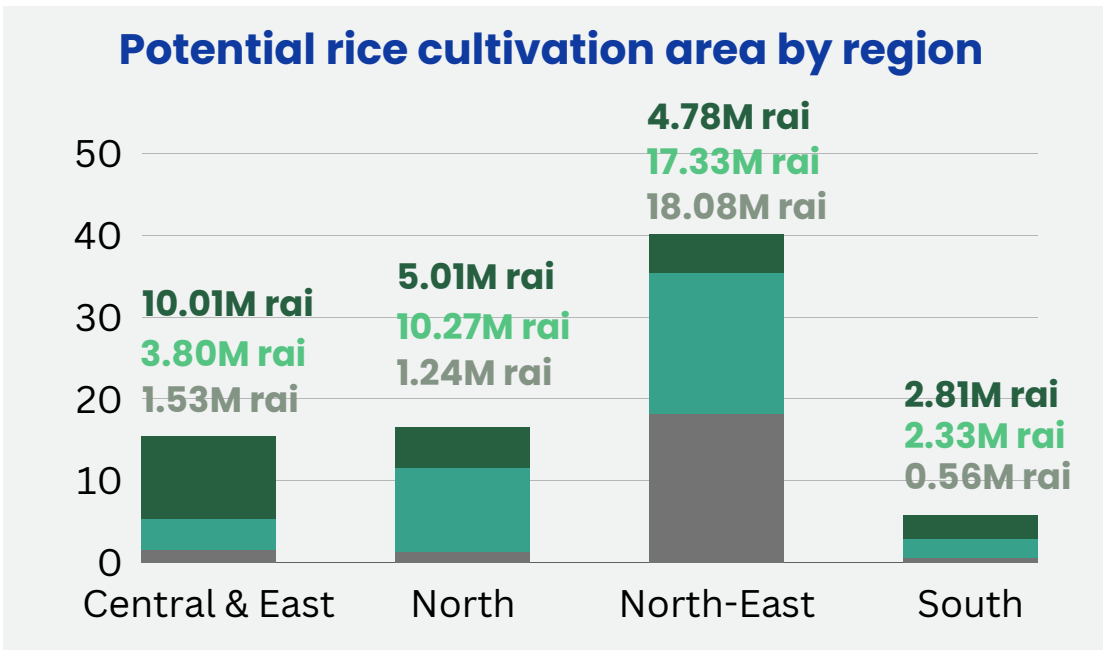
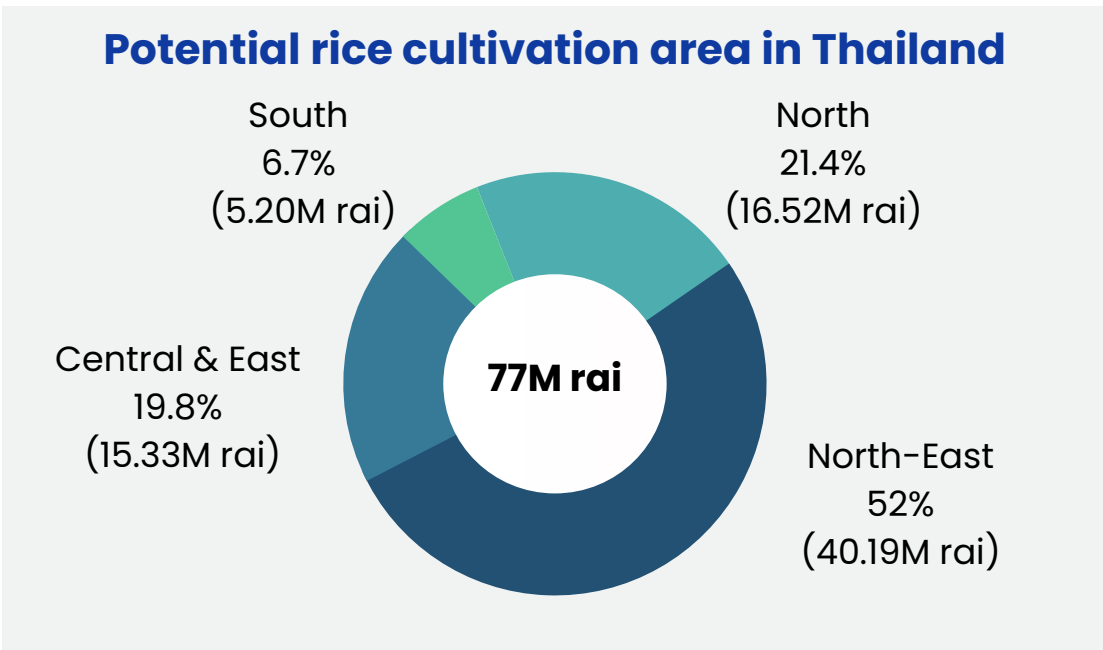


Source: [Land Development Department](#), [Bangkok Post](#), [Statista](#)

CULTIVATION AREA OF RICE IN THAILAND



Critical rice cultivation clusters in Thailand



High quality cultivation land

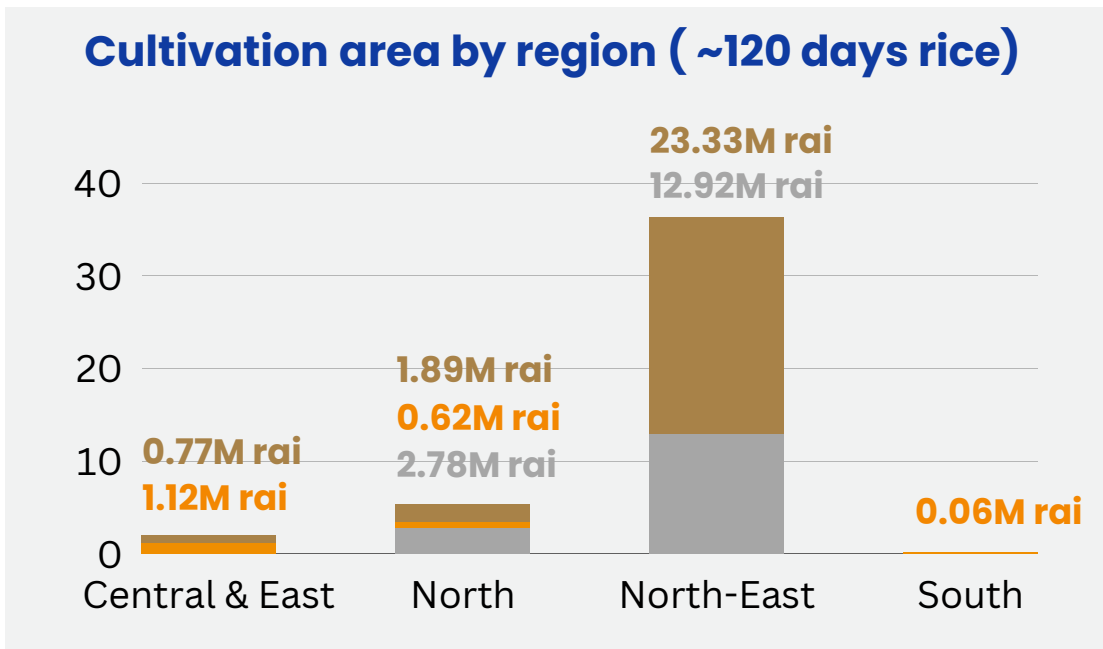
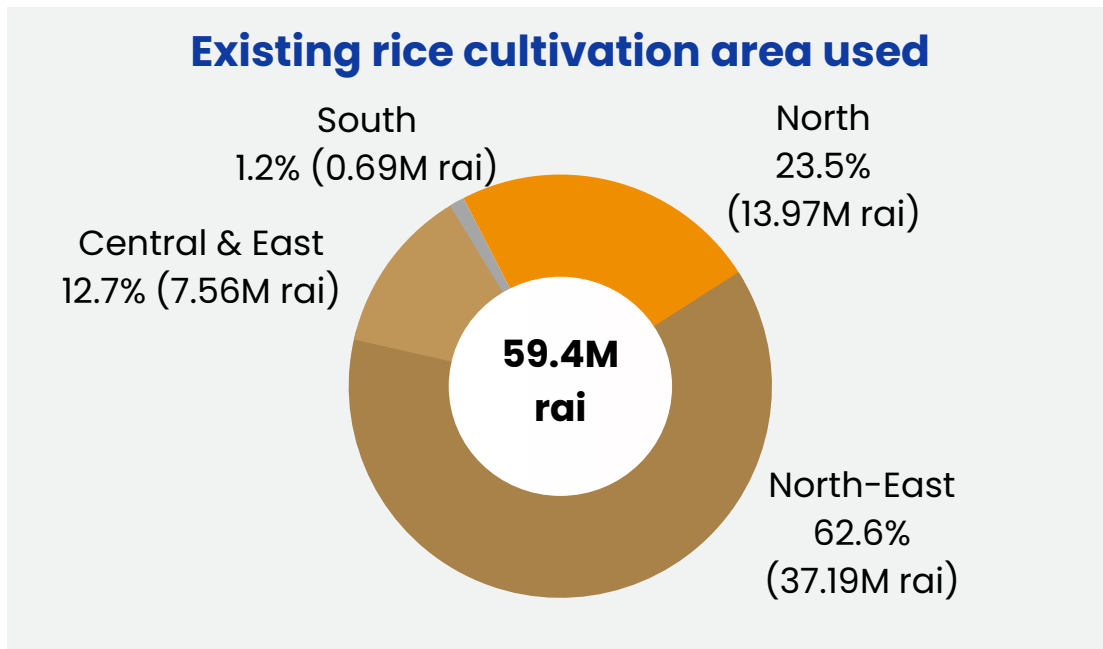
- Smooth & low-land area
- Accessible irrigation system and infrastructure
- High production outputs
- Most areas can have >1 crop rotation

Medium quality cultivation land

- Smooth and low-land area
- Potential for irrigation system and agriculture infrastructure development
- Mid-high production outputs

Low quality cultivation land

- Unsuitable land for cultivation
- The output is not worthwhile for the investment
- The area is highly subject to natural disaster risks



Rice with ~120 days duration

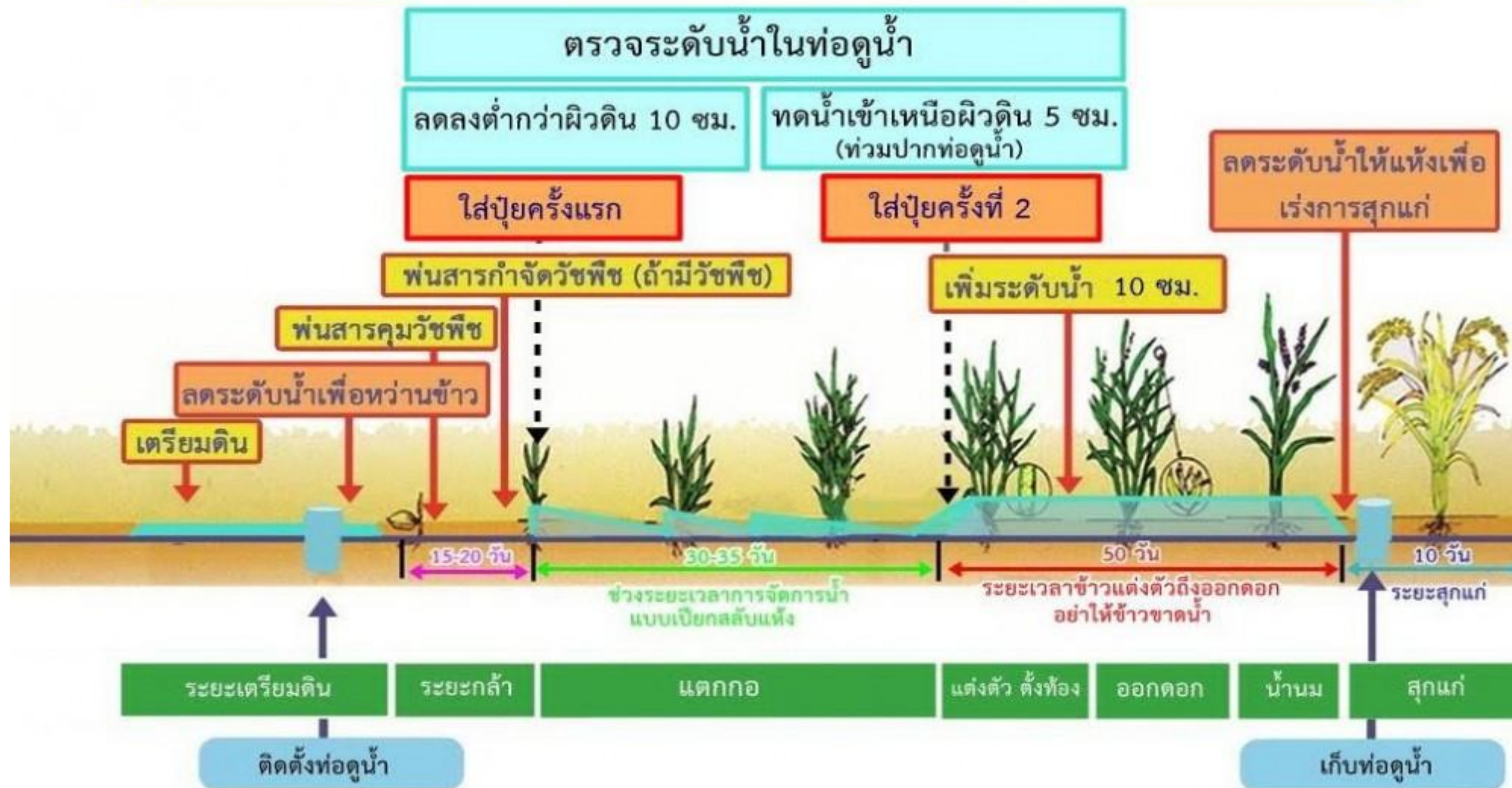
Jasmine rice ข้าวหอมมะลิ	Aromatic rice ข้าวหอมไทย	Glutinous rice ข้าวเหนียว
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Source: [Land Development Department](#), [Rice Department](#)

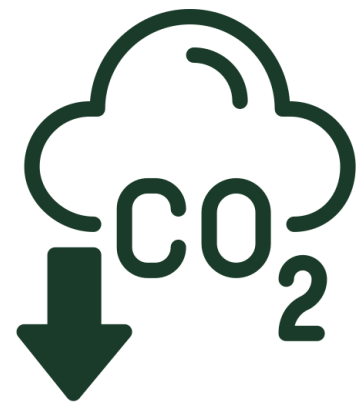
Alternative wetting and drying (AWD)



เทคนิคการจัดการน้ำอย่างประหยัดแบบเปียกสลับแห้ง



KEY RESULTS OF OUR AWD PROJECT



45%



**0.55
tCO2e/rai**



44.5%



19.4%



70%



10%

**GHG
emission
reduction**

**Carbon
credits
acquired**

**Production
yield
increase**

**Production
cost
reduction**

**Water
usage
reduction**

**Fertilizer
usage
reduction**

CURRENT ISSUES IN AWD IMPLEMENTATION IN THAILAND



Key existing issues that obstruct proper AWD implementation in Thailand



Farmers	Funding Organizations	Government Agencies & Public Sector
<p>Farmers' lack of understanding of AWD impacts</p> <ul style="list-style-type: none"> Without proper AWD knowledge, farmers still prefer to use their original cultivation method 	<p>Lack of financial support for AWD</p> <ul style="list-style-type: none"> Financial institutions (e.g., BAAC) do not have proper loan products to incentivize farmers to adopt AWD Farmers rely on loan shark to fund their cultivation process 	<p>Government policy discourages farmers to adopt AWD</p> <ul style="list-style-type: none"> The government provides major fund to support farmers which cultivate short-duration rice (< 100 days) Certified AWD rice for GHG emission reduction based relevant standards (e.g., T-VER, VERRA) has to be 120 days-duration rice
<p>Farmers' lack of required capabilities in implementing AWD</p> <ul style="list-style-type: none"> Farmers lack capabilities to control water level in lowland Farmers cannot manage irrigation process properly 	<p>High interest rate on loan from the private sector</p> <ul style="list-style-type: none"> High interest rate on loan that farmers need to repay the private sector prevents them from adopting AWD 	<p>Public sector's lack of AWD knowledge</p> <ul style="list-style-type: none"> There are insufficient organizations to educate farmers Public sector cannot properly train farmers to adopt AWD. They still prefer the farmers to use the original method Farmers do not know how to implement AWD properly
<p>Farmers' preference on short-duration rice (< 100 days)</p> <ul style="list-style-type: none"> Farmers prefer short-duration rice as they can cultivate their crops and repay the debt quickly 	<p>Farmers' requirements to follow lenders' cultivation instructions</p> <ul style="list-style-type: none"> Farmers are required to follow the cultivation instructions from their lenders (e.g., rice mill, fertilizer shops, etc.) 	<p>Lack of clear support on AWD implementation</p> <ul style="list-style-type: none"> Government agencies at both sub-district, district, and provincial level do not properly support AWD

ALTERNATE WETTING & DRYING (AWD) SITUATION IN THAILAND



Farmers in Thailand have implemented AWD method to produce low carbon rice over the past years

Thailand Rice Department works with German International Cooperation (GIZ) to support farmers to reduce GHG emission from rice cultivation in Thailand



Thai Rice NAMA
to support farmers to implement AWD pilot project

Target	Large farmers
Funding	14.9 million Euro
Duration	5 years (2018-2023)
Covered areas	6 provinces 2.8 million rai

Strong positive impact from AWD to farmers

- ~50% methane reduction from ~1.2 tCO₂e per rai
- 20-30% production increase
- 2x farmer income per rai



Going forward

- Seek additional funding support from Green Climate Fund (GCF)
- Expansion of covered areas to 21 provinces (4.5 million rai)
- 2.4 MtCO₂e GHG emission target



Royal Irrigation Department

- Support AWD implementation since 2015, targeting 100,000 households and 2.8 million rai in 2023

National Electronics and Computer Technology Center

- Develop AWD monitoring system (e.g., water level, soil moisture, temperature, weather) to support AWD implementation in 2022

Thailand Rice Department

- Conduct research to develop climate-vulnerable rice that is suitable for AWD method

Project developers

- Spiro Carbon: Conduct MRV process on AWD
- WAVE BCG: Develop AWD pilot project in Pathumthani in 2023

Green Climate Fund (GCF)

The world's largest climate fund under the UN aiming to support AWD implementation in Thailand

Other farming implementation

Advanced tech for land levelling, fertilizer selection / usage, rice straw management, and MRV system

LOW CARBON/SUSTAINABLE RICE



Top exporting countries which engage in Low Carbon Rice Project

Country	Project Name	Target Area (Hectare) in 2030	Funding
India	National Mission for Sustainable Agriculture	100 million	Indian government
China	National Low Carbon Agriculture Program	10 million	Chinese government
Indonesia	Indonesia Low Carbon Rice Project (ILCROP)	0.9 million	International Rice Research Institute
Thailand	THAI RICE Nationally Appropriate Mitigation Action (NAMA)	0.5 million	German government
Vietnam	Vietnam Low-Carbon Rice Project (VLCRP)	1 million	World Bank

Source: [NMSA](#), [The Sino-German Agricultural Centre](#), [Mongabay](#), [GIZ](#), [Australian Government](#)

Sustainable Rice (SRP)



“Golden Sun” sustainable rice reach the European markets

Indian rice manufacturer works closely with 1,045 farmers to ensure that they:

- Adopt new wetting techniques
- Reduce the use of pesticides
- Stop burning rice straw

Sustainable Rice Impact 🌱

<p>20% Water use reduction</p>	<p>10% Increase in farmer income</p>	<p>50% GHG emission reduction</p>	<p>4% Premium price</p>	
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Source: [Preferred by nature](#)

ROLES & RESPONSIBILITIES OF RELEVANT STAKEHOLDERS FOR AWD



Ministry of Agriculture and Cooperatives	Rice Department	Department of Agriculture	Royal Irrigation Department	Department of Land Development	Department of Agricultural Extension
<ul style="list-style-type: none"> Identify water sources and develop irrigation system Support and improve farmer capabilities, cooperative system, and agricultural process & products 	<ul style="list-style-type: none"> Prepare national rice policies and strategies Develop rice varieties & production technology and improve rice quality standard Inspect & verify rice standard Support value-added products Disclose relevant rice information to farmers 	<ul style="list-style-type: none"> Develop effective agriculture practice and process Inspect and verify agricultural crop standard Disclose relevant agriculture data Ensure that all parties follow relevant agriculture regulations 	<ul style="list-style-type: none"> Develop national water usage and management policy Manage and control water resources for agriculture Mitigate risks from water transportation in the irrigation area 	<ul style="list-style-type: none"> Analyze and classify soil and land condition Prepare policy for land usage and development Provide advice on soil, water, and fertilizer usage on land Disclose relevant land/soil information to farmers and relevant parties 	<ul style="list-style-type: none"> Support and improve farmer capabilities and agriculture organization & community Develop effective production and management of agricultural products



Ministry of Natural Resources & Environment	Department of Climate Change & Environment	Ministry of Commerce	Department of Foreign Trade	Department of International Trade Promotion	Department of Trade Negotiations
<ul style="list-style-type: none"> Prepare national resource management policies and guidelines Research and share resource and environment information with relevant parties 	<ul style="list-style-type: none"> Propose and develop strategies, plans, and guidelines on climate change and greenhouse gas reduction Coordinate with public and private agencies on climate change issues Assess Thailand climate change risks 	<ul style="list-style-type: none"> Monitor and control prices of agricultural products and farmer incomes Guard the rights of consumers and protect intellectual properties Promote and develop businesses in both goods and services 	<ul style="list-style-type: none"> Manage import-export activities of products Supervise the standards of import-export products 	<ul style="list-style-type: none"> Proactively support and promote products and services of Thailand Provide information and insights & consultation on Thai products/services to assist international buyers 	<ul style="list-style-type: none"> Follow the development of related climate change laws/measures in various countries (ETS, CBAM, etc.) Develop fair trade policies to deal with climate problems Study carbon footprint to analyze trends and impacts on Thailand trade

ROLES & RESPONSIBILITIES OF RELEVANT STAKEHOLDERS FOR AWD



กรมโรงงานอุตสาหกรรม
DEPARTMENT OF INDUSTRIAL WORKS

Ministry of Finance	Revenue Department	Treasury Department	Ministry of Industry	Department of Industrial Promotion	Department of Industrial Works
<ul style="list-style-type: none"> Manage the budget, taxes, and funding of Thailand Address domestic economical growth and policy Handle international financial matters 	<p>Provide tax incentives on projects that support the green economy</p> <ul style="list-style-type: none"> Tax exemption on income (including carbon credit sale) from GHG emission reduction projects 	<ul style="list-style-type: none"> Supervise and verify the treasury reserve accounts Engage in state property, the minting of coins, currency administration, management of valuable national assets, and asset appraisal 	<ul style="list-style-type: none"> Expand the agriculture industries, value-added farm-product industries, and food processing industries Cultivate entrepreneurs' strength and competitiveness in the global market Promote environmentally friendly production 	<ul style="list-style-type: none"> Develop plans & guidelines to increase industrial capabilities with innovation, future technology, and cultural capital Strengthen SMEs capacities and services with Digitalization 	<ul style="list-style-type: none"> Enhance, promote data and knowledge of machinery, production, environment, safety, hazardous substances, energy and corporate social responsibility for industrial business development



United Nations

giz Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH

WAVE BCG

varuna

GISTDA

SPIRO CARBON

Financial Institutions	International Collaboration	Project Developers & MRVs
<ul style="list-style-type: none"> Green loans: Offer green loans with reasonable interest rate to farmers and SMEs who transition to sustainable agriculture practice 	<ul style="list-style-type: none"> Financial support: Mobilize funds to developing countries to take proper climate actions (e.g., Green Climate Fund, Loss and Damage Fund, blue bond) Coordination with NGOs: Work with NGOs to provide funds and knowledge to support sustainable agriculture 	<ul style="list-style-type: none"> Project development: Develop projects to encourage and train farmers to implement agriculture tech and sustainable practices Agriculture technology: Provide relevant tools to support monitoring, reporting, & verification (MRV) process, and sustainable practices (e.g., satellite, drone, analytics platform, monitoring sensor, etc.) Collaboration with other stakeholders: Work with public sector to provide funds and knowledge to more farmers to adopt AWD Research & development: Conduct research and analysis to support AWD implementation

SUPPORT NEEDED TO ACHIEVE CARBON NEUTRALITY GOAL



Government Policies and Regulations

Clear Emission Reduction Targets

- The government should set clear and ambitious emission reduction targets in line with the Paris Agreement's goals

Carbon Pricing System

- Implement carbon pricing mechanisms (e.g., carbon taxes or cap-and-trade system) to incentivize emission reductions

Energy Efficiency Improvement Policy

- Develop and enforce regulations to improve energy efficiency in industries, transportation, and buildings

Promotion of Afforestation & Reforestation

- Support initiatives for reforestation and afforestation to capture and store carbon

Supportive Renewable Energy Policy

- Promote policies that encourage the adoption of renewable energy sources, including solar, wind, and hydropower

Central Coordinating Body

Lead and oversee climate mitigation and adaptation efforts across the country

- Strategic Coordination
- Policy Formulation
- Resource Allocation
- Monitoring and Reporting

- Stakeholder Engagement
- Innovation and Research
- International Engagement
- Public Awareness

Substantial Green Funding

Climate Finance & Green funding

- Support climate adaptation and mitigation projects in developing and vulnerable countries
- Help finance renewable energy projects, reforestation, climate-resilient infrastructure, and sustainable agriculture practice

Supportive Initiatives

Tax incentives on green projects

Attractive green loans with lower interest rate and larger loan amount

Farmer privilege of implementing AWD
(Funding, agriculture materials & tools)

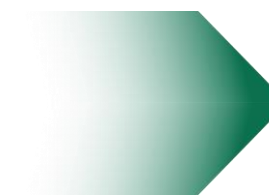
Market for low carbon or sustainable rice

Low carbon rice verification parties

POSITIVE IMPACTS FROM GHG REDUCTION IN AGRICULTURE SECTOR



Proper initiatives to reduce GHG emission in agriculture sector would benefit various stakeholders in the supply chain



Farmers

- Additional revenue to farmers from increasing production yields
- Reducing rice cultivation cost
- Value-adding rice products
- Upskilling of Thai rice farmers

Private Sector

- Organization and product carbon footprint reduction
- Increasing competitiveness at the global level
- Improving company image on sustainability field

Thailand

- Market leader in low carbon rice
- Decreasing GHG emission from the second largest source
- Protecting the environment
- Achieving carbon neutrality and Net Zero GHG emission
- Increase reliability of sustainable products from Thailand

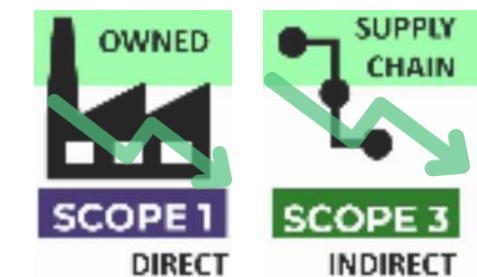
IMPACT OF AWD ON GLOBAL STANDARDS



Global sustainable development and sustainable development goals (SDGs)

By implementing the alternate wetting and drying rice cultivation (AWD) practice, it would result in an improvement in rice cultivation, product quality, as well as farmer well-being

This would support the SDG for Global Sustainability in these seven areas

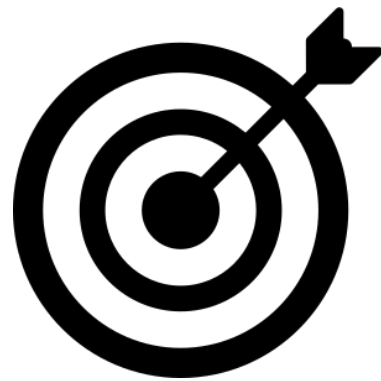


The AWD practice would help reduce direct carbon emission from companies (scope 1) and indirect carbon emission from other parties in the same supply chain (scope 3)

IMPACT FROM PROJECT IMPLEMENTATION

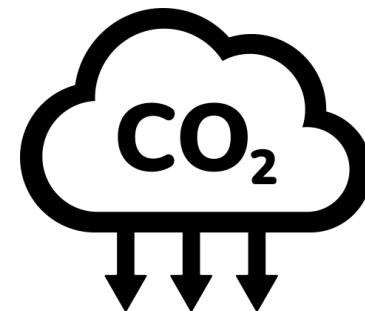


AWD implementation would enable Thailand to achieve its carbon emission goal in 2030



↓ 166
MtCO₂e

Emission reduction target in 2030



↓ 20
MtCO₂e

Emission reduction from AWD in 2030
~12% of overall target



~140
Billion Baht

Estimated fund to support AWD farmers from 2024-2030
~20 Billion Baht / year

Thailand aims to reduce GHG emission from 555 MtCO₂e baseline in 2030

- The target represents a reduction of 30% from the baseline

AWD implementation leads to a significant reduction in GHG emission

- 1 tCO₂e per rai per year
- 20 million rai potential area for AWD implementation in Thailand

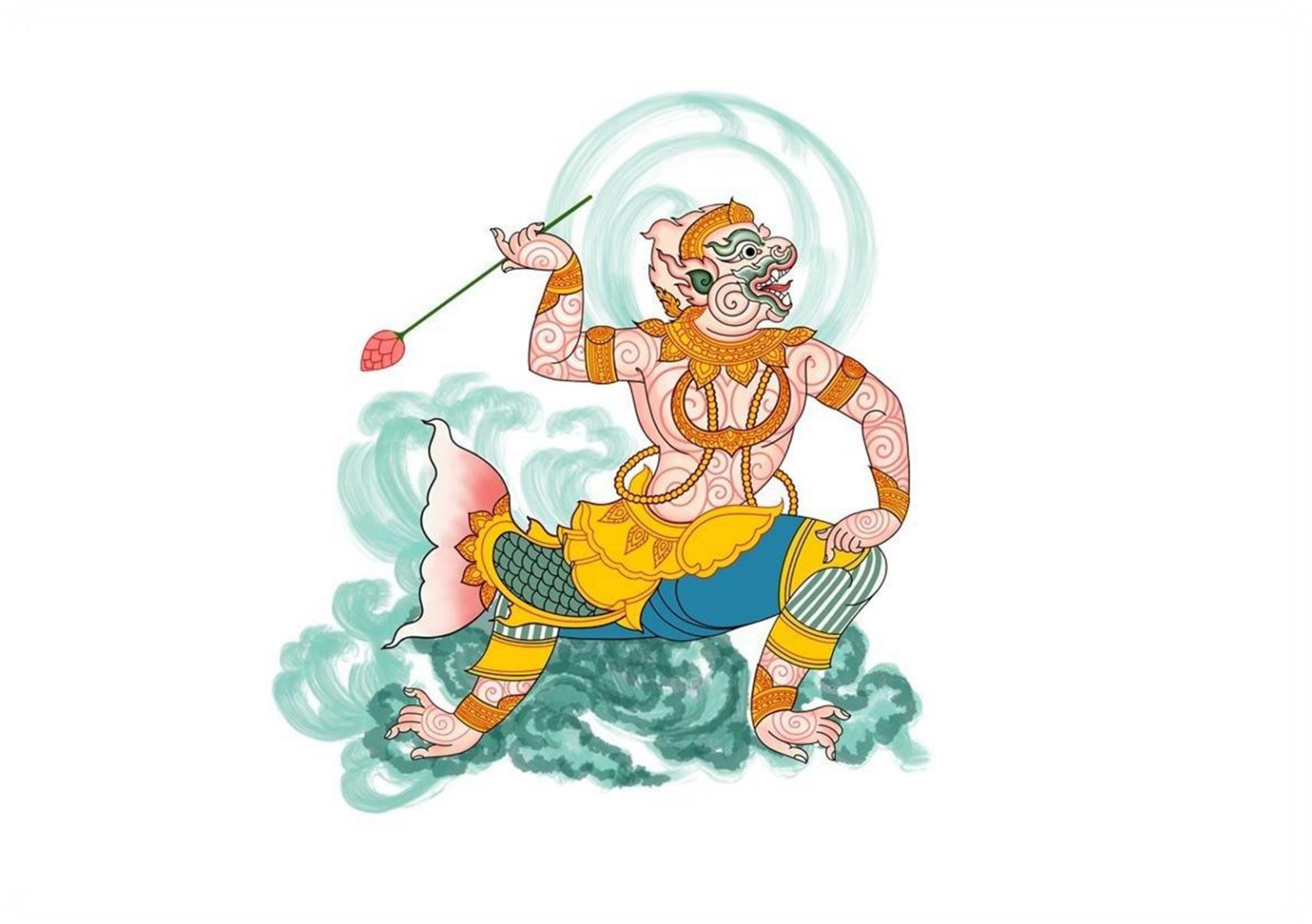
Proper funding is required to support farmers to adopt AWD process

- Estimated 1 million participated farmers
- THB 20,000 fund per rai to farmers

ขอขอบพระคุณทุกท่าน



วทส.4



กลุ่มมัชฌานู