THAILAND TAXONOMY

Agiculture Sector

May 2025

THAILAND TAXONOMY BOARD

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1. Introduction

As a country most directly impacted by climate change[1], Thailand needs to accelerate investment in both climate change mitigation and adaptation. The agriculture and forestry sectors are highly vulnerable to the impacts of climate change and a wide range of other environmental challenges exacerbated by climate change, such as biodiversity loss. Most of the crops grown in Thailand are dependent on the climatic situation[2], and its change can affect the sector in a very negative way. The same is true for the livestock and forestry sectors.

Agriculture (subdivided into plant cultivation, livestock production and aquaculture production) and forestry are combined within the ISIC classification into a single category, but in this taxonomy, the methodological approach to creating criteria for them differs significantly. Therefore, an overview will be given for both agriculture and forestry together, but methodologically, they will be considered in separate sections.

Agriculture

2. Agriculture background

Agricultural activities, including crop production, livestock production, and aquaculture production, play a pivotal role in Thailand's economy, food security, and rural livelihoods. Forestry is also an important economic sector for Thailand, with key exports including sawn wood, paper and paperboard, fibreboard, particleboard, wooden furniture, and furniture parts (mostly made from rubberwood)[3]. Together, the agriculture, forestry, and fishing sectors contributed 8.8% added value to Thailand's GDP in 2022, coming down from 36.4% in 1960.[4]

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[1] ReliefWeb, "Global Climate Risk Index," 2021, https://reliefweb.int/report/world/global-climate-risk-index-2021?gad_source=1&gclid=CjwKCAjwtqmwBhBVEiwAL-WAYZQyOQsMhUgutJQL5kjszGNOULPSLejOzOMRRQp1vc7b-1B_g7qI4RoCaooQAvD_BwE

[2] UNFCCC, "Thailand's Fourth National Communication under the United Nations Framework Convention on Climate Change," December 22, 2022, https://unfccc.int/sites/default/files/resource/Thailand%20NC4_22122022.pdf

[3] Only a very small volume of unprocessed logs (mostly plantation-grown teak) is exported each year by the Forest Industry Organization, which is the only legally authorised entity for exporting unprocessed logs (See Timber Trade Portal, "Overview of Timber Sector of Thailand," n.d., https://www.timbertradeportal.com/en/thailand/142/timber-sector.).

[4] World Bank Open Data. "World Bank Open Data," n.d. https://data.worldbank.org/country/thailand.

While the sector has seen a decline in contribution to the GDP, it remains a major source of employment for some 12.7 million workers, approximately 30% of Thailand's total labour force.[5] Labour shortage, lack of production planning and management, inequality of access to water resources, and climate change are among the key challenges facing the Thai agricultural sector.[6] There are about 7.4 million agricultural households in Thailand.[7] Land ownership situations in the Thai agricultural sector vary. Around 40% of farmers either own a small amount of land or no land.[8] However, Thai farmers who own land have an average of 3.2 ha of land, which is higher than in other countries of Asia.

2.1 Crop production

As of 2021, 46% of Thailand's land area is agricultural land.[9] In 2021, total agricultural production increased by 1.4%, recovering from a decline of 3.5% in 2020. Thailand has experienced substantial progress in increasing the value of productivity per labour unit and the gross income of small-scale agricultural producers. In 2019, the gross agricultural product was valued at USD 21.68 billion, compared to USD 17.25 billion in 2016. Thailand has increased the amount of sustainable agricultural land in the past four years, with increased government investment in the sector.[10] Thailand is a top-ten global producer of agricultural products, including rice, cassava, sugarcane, palm oil, coconut, pineapple, and natural rubber.[11] The country has become the world's 13th largest exporter of agricultural products after a more

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[5] International Labour Organization, "Working and employment conditions in the agriculture sector in Thailand," 2021, https://www.ilo.org/sites/default/files/wcmsp5/groups/public/@asia/@ro-bangkok/documents/publication/wcms_844317.pdf.

[6] International Labour Organization, "Working and employment conditions in the agriculture sector in Thailand," 2021, https://www.ilo.org/sites/default/files/wcmsp5/groups/public/@asia/@ro-bangkok/documents/publication/wcms_844317.pdf.

[7] Thailand Development Research Institute, "Thai Agriculture Needs a Shake-Up," November 2022, https://tdri.or.th/en/2022/11/thai-agriculture-needs-a-shake-up/.

[8] Digital Economy Promotion Agency (DEPA), "Agriculture Landscape In Thailand," 2020, https://www.depa.or.th/storage/app/media/file/investment-bulletin.pdf.

[9] World Bank, "Agricultural Land (% of Land Area) - Thailand," n.d., https://data.worldbank.org/indicator/AG.LND.AGRI.ZS?end=2021&locations=TH&start=1990&view=chart.

[10] UNFCCC, "Thailand's Fourth Biennial Update Report under the United Nations Framework Convention on Climate Change," November 29, 2022, https://unfccc.int/documents/624750.

[11] Thailand Board of Investment, "Food Industry,"n.d., https://www.boi.go.th/upload/content/Food%20industry_5aa7b40bd758b.pdf.

than 20% surge in agricultural trade in the first 11 months of 2022; the top three top agricultural products by revenue were fruits (164.79 billion baht), meat and fish (97.14 billion baht), and rubber (83.91 billion baht).[12] The following table shows the production statistics of major Thai agricultural crops.

Table 1 Production of major crops in Thailand (2022)

Crops	Yield (kg/Rai)	Production (ton)	Area harvested (Rai)	% of Area harvested
Rice	18,675	34,317,028	71,776,456	51%
Natural rubber	8,600	4,825,907	21,928,413	16%
Cassava	134,138	34,068,005	9,921,056	7%
Sugar cane	377,425	92,095,784	9,531,688	7%
Maise (corn)	28,563	4,895,904	6,695,188	5%
Oil palm fruit	121,063	19,061,392	6,150,375	4%

Source: The Food and Agriculture Organization.[13]

2.2 Livestock production

Livestock production in Thailand is on the rise.[14] Poultry, particularly broilers, make up the majority of the livestock population in the country. In 2022, the number of poultry was 1,460,708,000 animals, followed by the number of pigs at 11,827,495 animals and cattle at 1,185,348 animals.[15] The three product segments with the highest export growth are frozen meat (356,748 tonnes worth 48.07 billion baht, up 11.5% year on year); animal products, such as milk, eggs and canned food (98,066 tonnes worth 8.79 billion baht, up 5.4% year on year); and animal feed (105,461 tonnes worth 4.46 billion baht, up 11.7% year on year).[16] Thailand-based Charoen Pokphand Foods (CPF) group is the world's largest producer of feed and shrimp

[12] The Nation Thailand, "Thailand is now the world's 13th largest exporter of agricultural products: minister," January 20, 2023, https://www.nationthailand.com/thailand/economy/40024187.

[13] FAO, "FAOSTAT", https://www.fao.org/faostat/en/#data.

[14] The Livestock Production Index includes meat and milk from all sources, dairy products such as cheese, and eggs, honey, raw silk, wool, and hides and skins

[15] FAO, "FAOSTAT" – Crops and Livestock Products, https://www.fao.org/faostat/en/#data/QCL.

[16] The Nation Thailand, "Exports of livestock products are rising, with frozen meat leading the way," June 18, 2023, https://www.nationthailand.com/thailand/economy/40028622.

and is a global top-three producer of poultry and pork.[17] By value, Thailand is the world's biggest exporter of processed chicken and its 6th biggest exporter of frozen chicken.[18]

Table 2 The number of livestock and poultry farmers by region, 2023

Region	Farmer (person)	Livestock (animal)							
		Beef	Cow	Buffalo	Pig	Chicken	Duck	Goat	Sheep
Total	**3,551,607**	**9,655,380**	**774,461**	**1,784,160**	**11,172,465**	**519,520,597**	**31,928,467**	**1,568,059**	**136,539**
Northern	714,050	1,484,190	78,382	359,335	2,123,579	70,017,748	4,709,988	221,520	25,262
Northeast	1,916,654	5,405,876	242,569	1,283,137	2,378,066	107,835,466	7,693,411	338,779	12,314
Central	397,300	1,624,420	446,599	114,248	5,211,854	299,869,346	16,056,765	565,293	67,992
Southern	523,603	1,140,894	6,911	27,440	1,458,966	41,798,037	3,468,303	442,467	30,971

Source: Information on the number of livestock in Thailand 2023, Department of Livestock Development

Beef produced in Thailand has been produced exclusively for domestic consumption. Beef cattle are mainly in the northeast (55.99%), with 16.82% in The Central Region 15.37% in the Northern area and 11.82% in the Southern area (2023). The greatest proportionate increase has occurred in the Southern and Northern regions, where cattle numbers have increased by 12.8% and 9.5% per year (2013-2023), respectively.

2.3 Aquaculture

The aquaculture and fisheries sector in Thailand has long been a crucial component of the country's economy, providing significant contributions through the supply of aquatic products for both domestic consumption and export. The sector has gained increasing importance due to changing societal values, growing domestic demand for aquatic resources, and the decline in natural fishery production. As natural aquatic resources face degradation, aquaculture has emerged as a critical means to supplement and sustain the supply of aquatic products, vital for both food security and economic stability. Factors such as climate change, the loss of natural habitats, and rising demand for seafood have driven this shift, prompting the Fisheries

[17] Logistics Magazine, "CPF: The World's Largest Producer of Feed and Shrimp," September 2021, https://logisticsmag.net/%E0%B8%94%E0%B8%B9%E0%B8%9A%E0%B8%97%E0%B8%84%E0%B8%A7%E0%B8%B2%E0%B8%A1-103089-cpf-the-worlds-largest-producer-of-feed-and-shrimp.html#:~=CPF%20is%20the%20world's%20largest,brand%20in%20many%20international%20markets

[18] Suppakorn Kornboontritos, "Industry Outlook 2023-2025: Chilled, Frozen and Processed Chicken Industry", February 15, 2023 https://www.krungsri.com/en/research/industry/industry-outlook/food-beverage/frozen-processed-chicken/io/io-chilled-frozen-processed-chicken

Department of Thailand to align its strategies with national policies and long-term development goals.

1. Freshwater aquaculture

Freshwater aquaculture in Thailand includes a variety of farming methods, such as monoculture (single-species farming), polyculture (multi-species farming), and integrated farming, where fish farming is combined with other agricultural activities like livestock rearing, crop cultivation, or rice farming. Predominantly, herbivorous fish species are farmed, followed by carnivorous species.

Over the past decade (2013-2023), freshwater aquaculture has seen a steady increase in production and economic value, driven by several factors. The average annual number of freshwater aquaculture farms was 521,847, covering 818,962 rai, with an average production of 429,292 tons per year, valued at 25,526 million baht. This represents 45.17% of total aquaculture production and 27.51% of its economic value. Production and value have been increasing at annual rates of 0.42% and 1.52%, respectively.

The growth in freshwater aquaculture can be attributed to the increase in registered farmers, partly due to government assistance during natural disasters such as floods and unfavourable weather conditions. Additionally, rising market prices for aquatic products have encouraged farmers to expand their operations. The relatively low investment and short production cycles associated with freshwater aquaculture make it an attractive option for both household consumption and commercial sales. Furthermore, government policies and measures, such as promoting the use of technology to reduce production costs and expanding market channels, have supported continuous production and provided farmers with more opportunities to sell their products.

2. Coastal Aquaculture

Coastal aquaculture in Thailand primarily involves the farming of marine shrimp, brackish water fish, marine fish, various shellfish species (such as oysters, cockles, and mussels), and sea crabs. Among these, marine shrimp farming is the most prominent, accounting for approximately 60% of the total coastal aquaculture production. However, the sector has faced challenges, particularly due to the outbreak of Early Mortality Syndrome (EMS) in shrimp, which has significantly impacted overall coastal aquaculture production.

From 2013 to 2023, the number of coastal aquaculture farms averaged 40,816 annually, covering 439,984 rai. The average production from these farms was 521,003 tons per year, with an economic value of 67,266 million baht. Despite being a smaller portion of the overall number of farms (7.25%), coastal aquaculture contributed 54.83% of total aquaculture production and 72.49% of its economic value. The EMS outbreak has led to a downward trend in coastal aquaculture production, beginning in 2013, highlighting the vulnerability of this sector to disease outbreaks and other environmental challenges.

Moving forward, the sector's ability to adapt to changing conditions, improve disease management, and leverage new technologies will be critical to sustaining its growth and ensuring its contribution to Thailand's economy and food security.

This Taxonomy will focus on the scope of aquaculture practices. The seawater or freshwater fishery is not included in the scope of this Taxonomy due to its complexity and lack of science-based criteria. Gratitude is extended to the Department of Fisheries, Ministry of Agriculture and Cooperatives for initiating and developing aquaculture practices in Thailand Taxonomy, which have been fundamental to the advancement of this field.

3. Major climate and environment-related issues

Climate change affects the Thai agricultural sectors through key changes in parameters such as temperature and precipitation.[19] For example, some regions of Thailand are already experiencing average growing season maximum temperatures above 34C°, which is a temperature threshold above which rice yields can be negatively affected unless adaptation actions are taken. Changing precipitation patterns negatively affect rice farming, which is the backbone of the country's agriculture[20].

According to the studies, by 2050, changes in average temperatures and an increase in extreme events will result in losses to Thailand's agricultural sector, ranging from USD 17.83 billion to

[19] Asian Development Bank, "Climate Risk Country Profile: Thailand," 2021, https://www.adb.org/sites/default/files/publication/722251/climate-risk-country-profile-thailand.pdf

[20] Arunrat, Noppol, Nathsuda Pumijumnong, Sukanya Sereenonchai, Uthai Chareonwong, and Can Wang, "Assessment of Climate Change Impact on Rice Yield and Water Footprint of Large-scale and Individual Farming in Thailand,"2020, Science of the Total Environment 726 (July): 137864. https://doi.org/10.1016/j.scitotenv.2020.137864.

USD 83.83 billion, affecting all provinces of the country[21]. These negative impacts on agriculture are projected to have regional variation; the western, north-central and north-western regions are likely to suffer less negative impacts compared to the eastern, south-central, and north-eastern regions of the country[22]. To adapt to the impacts of climate change, research has shown that climate–smart varieties of rice, together with adjusted management practices, has led to significant increases in yield and sustenance of production in climate change stress-affected areas, including those inhabited by the most impoverished farming communities.[23]

The use of traditional agricultural practices involving biomass burning is one of the most serious problems in Thailand's forestry and agriculture sectors from an environmental perspective. Rice, sugarcane and maise are among the key crops involved in the field burning of agricultural residues, which is both a major source of agricultural CO_2 emissions and a serious air pollution (PM2.5) problem in Thailand. According to a report by the Thailand Environment Institute (TEI), it is estimated that burning is involved in 57% of harvested areas for off-season rice, 47% for sugar cane, 35% for maise and 29% for in-season rice, respectively.

Table 3 Calculation of burning areas and PM2.5 emissions of cash crops, 2021

Crops	Harvest area (1000 km^2)	Burning (%) / Area (1000 km^2)	Dry biomass (kg/ 1600 m^2)	PM2.5 (kg/ 1600 m^2)	Calculation	
					Dry biomass (million tons/year)	PM2.5 (ten thousand tons/year)
Sugarcane	11.46	47% / 5.39	4,272	17.60	23.03	9.49
Rice (in-season)	54.39	29% / 15.77	329	4.18	5.19	6.59
Rice (off-season)	6.33	57% / 3.61	329	4.18	1.19	1.51
Maise	5.85	35% / 2.05	330	3.09	0.68	0.63

Source: Thailand Environment Institute Foundation, 2021[24]

[21] Attavanich, Witsanu. “Effect of climate change on Thailand’s agriculture: New results,” MPRA Paper No. 118290, 2017, https://mpra.ub.uni-muenchen.de/118290/1/Attavanich%20%282017%29.pdf

[22] Asian Development Bank, “Climate Risk Country Profile: Thailand,” 2021, https://www.adb.org/sites/default/files/publication/722251/climate-risk-country-profile-thailand.pdf.

[23] CGIAR, "Climate-Smart Rice," Innovation Explorer, https://www.cgiar.org/innovations/climate-smart-rice/

[24] Thailand Environment Institute Foundation, "Management and Reduction of Burning Practice in Agricultural Areas and Policy Recommendations to Tackle PM25 in Thailand," 2022, https://www.tei.or.th/file/library/2022-ABM-ENG_76.pdf.

Another major problem affecting the sector is the excessive use of pesticides and herbicides by farmers, which has a negative impact on the health of the country's population[25]. Farmers themselves and their family members who work with them in the field are particularly at risk, which, given the proportion of people employed in agriculture, endangers more than a third of the country's population. Despite Thai governmental legislation to control pesticide use, many farmers continue to use banned pesticides, apply higher concentrations than recommended, and do not use adequate personal protective equipment[26].

Key sectoral climate policies

Thailand's Climate Change Master Plan (CCMP) (2015-2050) aims for Thailand to be resilient to the impacts of climate change and to achieve low carbon growth through sustainable development. The CCMP Strategy 2, "Mitigation and low carbon development" for agriculture, comprises actions and measures focusing on low-emission agricultural practices with environmental and financial co-benefits; it also increases the capacity of farmers to accommodate GHG reduction technologies and management systems.

Climate change mitigation actions for agriculture are further elaborated in Thailand's 2nd updated NDC[27] framework, which is similar to that of LT-LEDS. The LT-LEDS elaborates that mitigation actions in the agricultural sector will likely focus on those with multiple benefits, such as increasing climate resilience, resource efficiency, and productivity. These include better manure management, improved agriculture waste management, improved rice cultivation and practices, increased efficiency in water resource management, smart farming, high-efficiency plant cultivation and livestock, promotion of organic fertilisers, increased renewable energy uses (solar, biofuels and electrification), and energy efficiency in water pumping, threshing, and tilling. Two measures from the agricultural sector (*fixed dome digester*

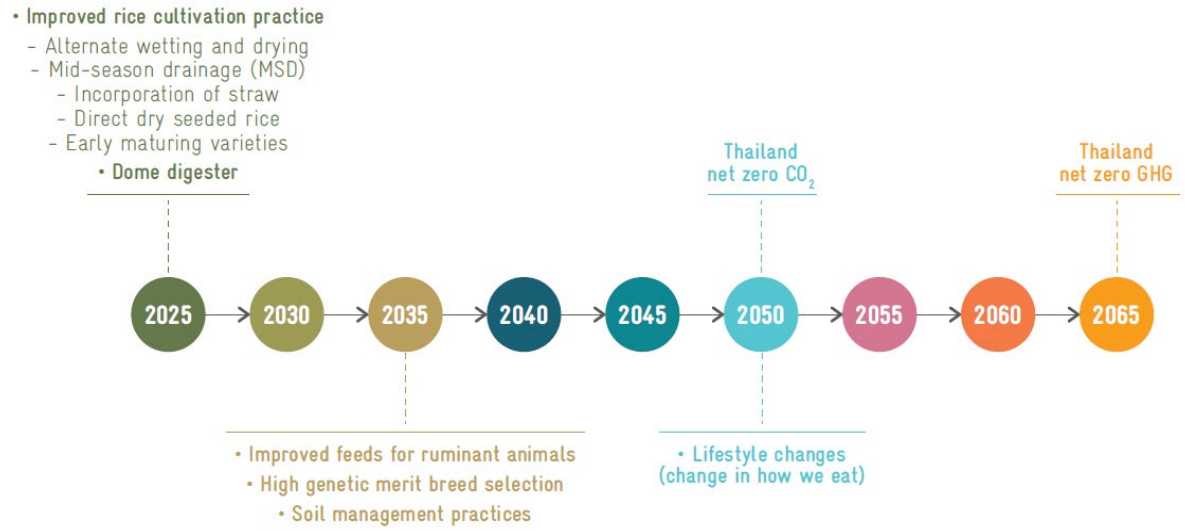
[25] Laohaudomchok, W.et al. (2021), "Pesticide use in Thailand: Current situation, health risks, and gaps in research and policy. Human and ecological risk assessment," HERA, 27(5), 1147–1169, 2021, https://doi.org/10.1080/10807039.2020.1808777

[26] Edward P. Rivera and other writers, "Health Risk Related To Pesticide Exposure in the Agriculture System in Thailand: a Systematic Review," Journal of Health Research 30 (2016): S71, https://doi.nrct.go.th//ListDoi/listDetail?Resolve_DOI=10.14456/jhr.2016.69

[27] The 2nd updated NDC is conducted with reference to the planned implementation goals of each relevant Ministry in the energy, industrial Processes and Product Use (IPPU), Agriculture, LULUCF, and waste management sectors.

biogas production measures and *improvements in rice farming to reduce methane emissions*) were also incorporated into the 2nd updated NDC goal and guidelines to reduce GHG emissions. All such measures have already been included in the list of eligible practices under the Thailand Taxonomy.

Figure 1 Net zero GHG emission timeline for the agriculture sector



Source: Office of Natural Resources and Environmental Policy and Planning (2022)[28]

In October 2023, the Ministry of Agriculture and Cooperatives launched the Climate Change Action Plan for Thai Agriculture (2023 – 2027)[29]**.** The plan incorporates a GHG reduction target of 1 million tons and includes the following measures:

- encouraging farmers to alternate between wet and dry rice farming;
- using waste from pig manure from the livestock sector to produce biogas to produce electricity;
- reducing the use of chemical fertilisers with the application of the Thai Soil Fertility Management;
- aggregating large plots to mix fertilisers for own use.

[28] United Nations Framework Convention on Climate Change, "Thailand Long-Term Low Greenhouse Gas Emission Development Strategy (Revised Version)," November, 2022, https://unfccc.int/sites/default/files/resource/Thailand%20LT-LEDS%20%28Revised%20Version%29_08Nov2022.pdf.

[29] Office of Agricultural Economics, *Climate Change Action Plan for Thai Agriculture (2023 – 2027)*, Bangkok: Office of Agricultural Economics, February 15, 2023, https://www.oae.go.th/assets/portals/1/files/jounal/2567/Artwork-ENG-04102567.pdf

It is expected that continued adoption of the above measures will reduce GHG emissions from the agricultural sector by up to 2.74 million CO2eq tons by 2030.[30]

Agricultural industry players also established industry-level climate action targets. For example, in February 2022, the Thai Livestock and Aquatic Consortium implemented a project on the Thai Livestock Technical Consortium for Climate Neutrality, which focuses on the reduction of GHG emissions in the Thai livestock industry chain and sets a target to achieve climate neutrality by 2040. Under the project, a joint working group of 2 parties are established and divided into four groups of selected products: maise, fishmeal, meat cattle and milk cow.[31]

4. Agricultural sub-activities climate materiality assessment

The table below contains information on the emission of activities within the agricultural sector based on data from the Thailand GHG Inventory. Inventory data is extrapolated to ISIC codes used in the Taxonomy. The cut-off line for the materiality of emissions for sectoral analysis is 1% of gross sectoral emission. Therefore, activities that contribute less than 1% to gross emissions are not included in the table.

Table 4 Agricultural sector emission profile

Subsector	IPCC 2006 Code	Agricultural sector GHG Emissions, total in GgCO2eq (share of total sectoral emission, %)	Corresponding proposed activities under the Thailand Taxonomy
Rice Cultivation	3I	33,631.60 (50.57%)	Cultivation of rice
Enteric Fermentation	3A	15,364.76 (23.10%)	Livestock production
Direct N2O Emissions from Managed Soils	3F	7,669.56 (11.53%)	Growing of perennial and non-perennial crops, incl. corn, mango, pineapples, banana etc. Growing of sugarcane Cultivation of rice

[30] OAE (2023): The agricultural sector sets a goal to reduce greenhouse gas emissions by 1 million tons and is preparing to announce the 5-year Agricultural Climate Change Action Plan by the end of this year (News No. 122/2566, dated 9 November 2023).

[31] UN Global Compact, "Thai Feed Mill Association – ComSummary of Thai Feed Mill Association's Policy and Action on the Environmental Sustainability Communication on Engagement | UN Global Compact," n.d., https://unglobalcompact.org/participation/report/cop/detail/479837.

Subsector	IPCC 2006 Code	Agricultural sector GHG Emissions, total in GgCO2eq (share of total sectoral emission, %)	Corresponding proposed activities under the Thailand Taxonomy
			Cultivation of rubber trees Cultivation of cassava Cultivation of palm oil trees
Manure Management	3B	3,472.08, (5.22 %)	Livestock Production
Indirect N2O Emissions from Managed Soils	3G	2,833.66 (4.26%)	Growing of perennial and non-perennial crops, incl. corn, mango, pineapples, banana etc. Growing of sugarcane Cultivation of rice Cultivation of rubber trees Cultivation of palm oil trees Cultivation of cassava
Field Burning of Agricultural Residues	3C	1,617.03 (2.43%)	Growing of perennial and non-perennial crops, incl. corn, mango, pineapples, banana etc. Growing of sugarcane Cultivation of rice Cultivation of rubber trees Cultivation of palm oil trees Cultivation of cassava
Urea Fertilisation	3E	1,294.18 (1.95%)	Growing of perennial and non-perennial crops, incl. corn, mango, pineapples, banana etc. Growing of sugarcane Cultivation of rice Cultivation of rubber trees Cultivation of palm oil trees Cultivation of cassava

Source: Thailand's First Biennial Transparency report[32]

[32] UNFCCC, "Thailand's First Biennial Transparency Report under the United Nations Framework Convention on Climate Change," December 26, 2024, https://unfccc.int/documents/645098

Rice cultivation, which accounts for the highest greenhouse gas emissions, is also included as a sub-activity in this Taxonomy. Furthermore, enteric fermentation and manure management are both covered under the **livestock production** activity in this Taxonomy. The remaining climate-material activities are related to emissions associated with soil tillage and fertiliser application. These two categories are relevant for all proposed plant-growing activities included in this Taxonomy, and relevant mitigation practices will be proposed for all types of agricultural activities. Fertiliser production itself is not covered by the Taxonomy, but the production of major chemical components of fertilisers (ammonia, nitric acid, and others) is covered by the basic chemicals' subsector of Manufacturing criteria.

It is also proposed that sugarcane, cassava, rubber tree cultivation and oil palm cultivation be identified as separate activities because of the special circumstances that set them apart from other crops. The unsustainable cultivation of these crops has become a particularly serious problem in Southeast Asia because, in past years, it has often resulted in the destruction of natural forests, damage to ecosystems, and destruction of biodiversity[33].

Furthermore, both the incineration of sugarcane waste and "slash and burn" practices significantly contribute to air pollution with higher PM 2.5 particle concentrations and negatively impact the overall environmental situation in Thailand[34]. Emissions associated with this practice also contribute to the category "Field Burning of Agricultural Residues" in **Table 3**.

Moreover, oil palm and rubber tree cultivation are also associated with deforestation[35] and the burning of agricultural residues is causing substantial environmental damage. Concurrently, local sustainability-minded industrial associations like Thailand Sustainable Palm Oil Alliance[36] are actively looking for ways to reduce potential negative impacts, while external actors like the European Union are introducing stringent regulations that could potentially limit the

[33] Kanokwan Saswattecha et al., "Assessing the Environmental Impact of Palm Oil Produced in Thailand," Journal of Cleaner Production 100 (August 1, 2015): 150–69, https://doi.org/10.1016/j.jclepro.2015.03.037.

[34] The Nation, "Crop Burning Shortening Average Life Expectancy," The Nation Thailand, September 15, 2023, https://www.nationthailand.com/thailand/general/40031056.

[35] Aruna Chandrasekhar, "Rubber Drives 'At Least Twice' as Much Deforestation as Previously Thought," Carbon Brief, November 1, 2023, https://www.carbonbrief.org/rubber-drives-at-least-twice-as-much-deforestation-as-previously-thought/.

[36] Fauzi Nash, "RSPO Launches the Thailand Sustainable Palm Oil Alliance With Five Partner Organisations," Press release, Roundtable on Sustainable Palm Oil (RSPO), November 29, 2022, https://rspo.org/press-release-rspo-launches-the-thailand-sustainable-palm-oil-alliance-with-five-partner-organisations/.

export potential of Thai rubber and palm oil if not dealt with properly. As a consequence, tailored practice lists for oil palm and rubber production will be separately developed for the Taxonomy to provide a set of tailored criteria that can address the sustainability challenges associated with the two crops.

Apart from the crops mentioned above, all other types of agricultural crops may be grouped under one generic activity in Taxonomy, i.e. "Sustainable perennial or non-perennial crops, incl. corn, mango, pineapples, banana, etc." because of the similarity of farming practices and sustainability challenges associated with them. This generic activity encompasses growing fruits and vegetables, coconuts, and all other crop types that do not fall into other crop-specific activity categories.

4.1 Agricultural criteria scope

The boundary of the eligible crop, livestock production, and aquaculture systems within Thailand Taxonomy is “farmgate to farmgate,” meaning that they cover everything that happens within the farm. These boundaries can include non-contiguous lands and production systems. The farm is treated as the **production unit** and thus includes areas such as any forest holdings linked to the agricultural production system by ownership or ecosystem function. Non-contiguous production activities are eligible if they are related to farm production prior to the sale of the product (such as storage, manure management, or composting) and managed by the production unit. These criteria are neutral regarding the future use of crops and livestock once they have left the agricultural production unit (except for the provision of traceability systems).

Users are expected to clearly define the land boundaries of the production unit. Normally, this will be the farm holding, including riparian buffer zones, conservation set-asides, grassland, or forest areas. For clarification, conservation and set aside areas may be considered as part of the agriculture production unit if they constitute part of the land property of the farm production unit owned or leased by the same unit as the production property and are not used as offsets for other GHG emissions sources.

In particular, the proposed criteria cover:

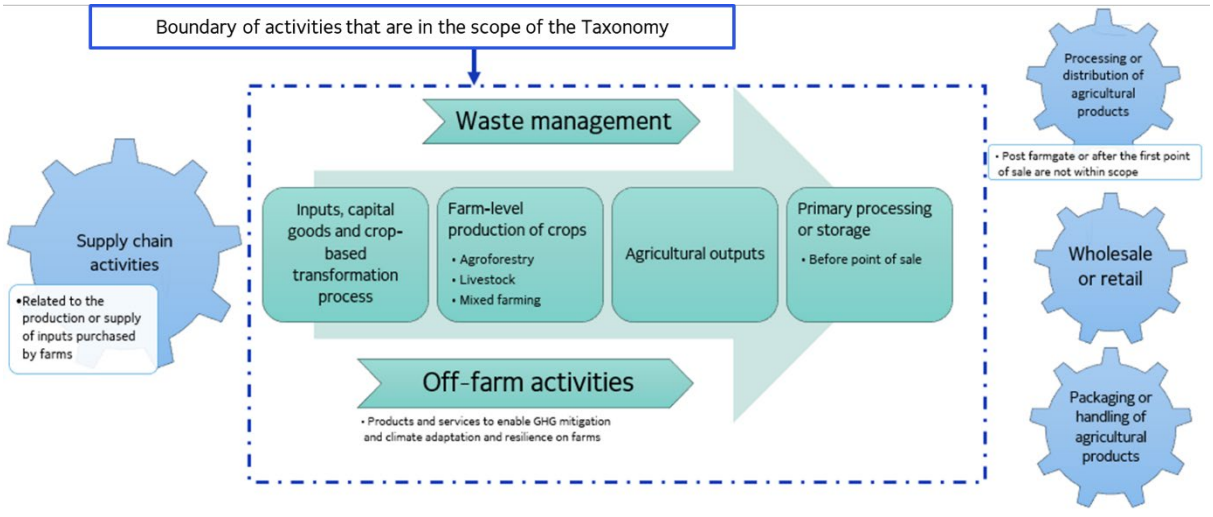
- farm-level production of crops (including agroforestry) and livestock, including mixed farming;
- activities off-farm that provide products or services to enable GHG mitigation and climate adaptation and resilience on farms;
- inputs, capital goods, crop-based transformation processes;
- agricultural outputs;
- waste management;
- primary processing or storage before the point of sale.

The proposed criteria do not cover:

- the production or supply of inputs purchased by farms;
- the processing or distribution of agricultural products post the farmgate or after the first point of sale;
- packaging or handling of agricultural products that left the farm (on-farm basic packaging and storage are included);
- wholesale or retail.

The scope defined above for agriculture sector criteria in Thailand's taxonomy is illustrated in Figure below.

Figure 2 Agricultural activities within the scope of Agricultural criteria



From the point of view of types of produce, agricultural criteria cover all crops, plants, livestock and aquaculture products of industrial importance to Thailand. The practices lists are added to Annex I include separate lists for rice, sugarcane, oil palm, rubber trees, cassava and all one general list of practices for other plants that are industrially planted in Thailand. Livestock criteria cover all major agricultural animals used in Thailand, including cattle, poultry, and other types of livestock. Meanwhile, aquaculture encompasses various aquatic species such as fish, shrimp, shellfish, and squid.

Eligible activities and associated assets and projects include those integral to the whole production unit (such as land purchase costs for an entire farm) or only a part of the production unit (such as equipment or infrastructure for particular aspects of production or the purchase of additional land for expansion of the farm). The criteria vary according to whether the use of proceeds covers the whole production system or a component of it.

4.2 Agricultural criteria methodological approach

The approach suggested for the agricultural sector in Thailand is different in mechanics from the traffic lights system used for other sectors of the taxonomy. This approach aligns with agricultural sector methodologies in other taxonomies and incorporates additional content to enhance the utility and applicability of the eligibility criteria within the country's context. The suggested approach is the culmination of extensive, multi-year research conducted by Climate Bonds. It has been developed on the basis of Climate Bonds Agricultural Criteria[37] and specifically tailored by the local consultants' team to ensure that it meets the unique needs and challenges of the agricultural sector in Thailand.

This approach is based on the understanding that, at present, collecting, analysing and evaluating accurate data on the impact of different practices on key agricultural climate indicators is extremely challenging, not only for individual farmers but also for government agencies. The lack of reliable, comparable data makes defining precise science-based boundaries for the green, amber and red categories virtually impossible without years of country-specific research. Against this background, the Climate Bonds Initiative has developed

[37] Climate Bonds Initiative. Climate Bonds Standard: Agriculture Criteria., https://www.climatebonds.net/files/files/standards/agriculture/Agriculture%20Criteria%2020210622v3.pdf.

a practice-based approach that enables farmers to make a significant contribution to agricultural sustainability without the need for overly complex and costly measurements.

Definition of Agricultural practice.

An agricultural practice refers to the methods and techniques used in farming to cultivate crops and rear animals. Practices can be sustainable or unsustainable, meaning that they can either contribute to taxonomy objectives (like the application of nature-based solutions[38]) or be harmful to them (like slash-and-burn practices). The taxonomy incentivises the application of sustainable practices given in Annex and disincentivises from applying unsustainable practices (addressed through **Table 6**).

The agricultural sector is also more heterogeneous in terms of its impact on the ecosystem and climate than other sectors, and therefore, sustainable practices proposed under a practice-based approach can contribute not only to the objective of climate change mitigation but also to the objectives of climate change adaptation, sustainable use and protection of marine and water resources, pollution prevention and control, protection and restoration of biodiversity and ecosystems and to circular economy promotion. In most cases, each recommended practice contributes to several objectives at once.

A practice-based model is constructed as a three-tiered system of basic, intermediate and advanced practices where practices grow in complexity and sophistication from one level to another. It is recommended that practices from the next tier should be implemented after all practices from the previous tier are adopted. In addition, the complementary adoptions section includes measures that can benefit any farm at any stage of development. Tiers differ in the following ways:

- **Basic practices**: measures that are relatively low-cost and not very complex. They generate benefits by enabling more efficient use of resources and environmental preservation with respect to the traditional extensive model.
- **Intermediate practices**: measures and technologies of greater complexity than the basic ones, incorporating greater technical knowledge and investment.

[38] Nature-based solutions are actions to protect, conserve, restore, and sustainably use and manage ecosystems in a way that addresses social, economic and environmental challenges while simultaneously benefiting human well-being and biodiversity. https://www.wri.org/insights/what-exactly-are-nature-based-solutions

- **Advanced practices**: changes that fundamentally modify the production model, integrating techniques, knowledge and inputs that allow for the highest productive and environmental yields.
- **Complementary adoptions**: these are specific technologies that are beneficial to any farm at any stage of its development. The manager of the farm may choose one of the complementary adoptions as one of the practices to implement under the transformation project.

The Taxonomy includes (under Annex) 8 lists of sustainable practices recommended for rice, sugarcane, oil palm, rubber tree, cassava, the remaining plants, livestock and aquaculture. It is important to note that rice, sugarcane, oil palm, rubber tree and cassava producers can also use the practices listed in the Annex (Sustainable perennial or non-perennial crops, incl. corn, mango, pineapples, banana etc.). The use of general practices for these crops will also be considered consistent with the Taxonomy, although they might be not so effective for a certain crop as specific practices from Tables in Annex.

The Taxonomy also allows to certify finished products that meet the requirements of Thai, regional and international organic, sustainable, and climate-focused agricultural certification labels (**Table 5**), which will ultimately facilitate the adoption of the Taxonomy by domestic users.

Taxonomy compliance also involves ensuring that the ecosystem of the production unit is not harmed, and a farm manager contributes to at least one of the objectives of the taxonomy. To meet these two conditions, **Table 6 and 7** were designed. **Table 6** is a Do-No-Significant-Harm section that is designed to ensure that at the time of the start of the transformational project and during it, a farm manager does not apply and does not plan to apply any practices that harm climate, environment, biosphere, or taxonomy objectives.

Table 7 is aimed at ensuring that the implementation of practices from Annex contributes to the achievement of at least one taxonomy objective by contributing to the achievement of a certain desired result described in the “Description of contribution” column of the table. As part of the preparation of an Integrated Farm Management Plan (IFMP), the farm manager must indicate to what result, indicated in this table, the application of practices from Annex, selected by the farm manager for the transformational project, leads. For further information on IFMP, please see section Integrated Farm Management Plan.

This structure aims to enhance the compatibility Thailand Taxonomy with other national taxonomies. The best practice approach on which the criteria are based is aligned with existing taxonomies in Rwanda, Colombia, Mexico, and Panama as well as (to a certain extent) Singapore. This facilitates data integration and comparison.

5. Taxonomy application scheme

The main application of the taxonomy in practice in the agricultural sector is its application to the **transformational project.** Such a project implies the transition of the farm from its current state to a more climatically and environmentally sustainable state through the application of sustainable practices, making a significant contribution to the objectives of the taxonomy and preventing harm to the ecosystem and biodiversity of the production unit.

There are two basic options under which the manager of the farm can align a transformational project with the Taxonomy:

Option 1: Through the preparation of the IFMP

Step 1. Provide a statement of the farm's compliance with the Thai national laws and regulations relevant to the farm.

Even though all activities across all sectors need to comply with national laws and regulations, the idea of this requirement in agriculture is to provide further guidance to financial sector users to check compliance against specific norms (e.g., the farm is not located in a forest or a protected area) before evaluating if it is sustainable.

The relevance of different laws and regulations is defined by the manager of the farm and assessed by the person or agency checking the validity of the alignment.

Step 2. Define the activity to be assessed.

A transformation project can be carried out for the following activities that are included under the Agricultural section of the Taxonomy: *(See the Tables in Annex)*

- Growing of perennial or non-perennial crops, incl. corn, mango, pineapples, banana etc.
- Growing of rice
- Growing of sugarcane

- Growing of oil palm
- Growing of rubber tree
- Growing of cassava
- Livestock production
- Aquaculture production

Crop-specific tables include practices that provide the best results for the specific crops, but **table 9** with general practices for perennial and non-perennial crops, incl. corn, mango, pineapples, banana etc. *(See the Tables in Annex)* can be utilised for these crops as well.

Step 3. Select at least two practices from Annex tables

For a transformation project to be aligned with the taxonomy, **at least two sustainable agricultural practices from the ones listed in the Annex tables including at least one non-basic (intermediate or advanced) practice needs to be selected for implementation** throughout it. Complementary adoptions are not considered practices and can not be counted towards compliance with this requirement (they are minor technological interventions that are not sufficient to qualitatively improve the situation on the farm, but can be useful as a supplement).

Each practice consists of three elements:

- **Title**. This title must be indicated in the IFMP.
- **Description**. The description includes all actions that must be implemented to consider the practice fully implemented.
- **Eligible inputs**. The procurement of these inputs is aligned with the taxonomy, meaning that they may be financed through green or sustainable debt or programmes tied to taxonomy-aligned agriculture. At present, only these inputs can be financed to implement a certain practice.

Step 4. Prepare and adopt an IFMP

An IFMP is a document that confirms that the farm manager:

- Has chosen at least two practices and is intended to implement them in a proper manner in order to achieve some results relevant to the objectives of the Taxonomy;

- has not now and will not, by implementing the transformation project, cause significant damage to the ecosystem of the production unit, climate, and the environment as a whole;
- will make a significant contribution to one or more of the objectives of the taxonomy as part of the transformation project.

An IFMP has no established structure (the structure might be defined either by the farm manager or by the institution verifying the compliance with the Taxonomy), but as a minimum, it includes the following sections:

- Objective of the transitional project;
- Current situation on the farm;
- The nature of transition;
- Expected results of the project;
- Environmental damage prevention measures taken by the farm manager;
- Taxonomy objectives and contribution actions will be taken by the farm manager throughout the project.

A detailed description of the IFMP content can be found in Section IFMP**.**

Option 2: Getting a credible international or national certification

Alternatively, the manager of the farm may choose to substitute the preparation of the IFMP with a credible international or national certification scheme from one of the recognised certification providers. These international certifications include sufficiently stringent requirements comparable in stringency to those required of the farm manager under Option 1. If the production of the farm or the farm itself is certified under one of these, the farm manager does not need to provide an IFMP but still needs to implement at least two practice from Annex tables. Here is the list of available certification schemes:

Table 5 List of eligible certification schemes

Certification scheme	Associated crops
Cocoa Certification — Conservation Alliance [39]	Cocoa
Certification Scheme for Organic Agriculture (Thailand)[40]	General perennial and non-perennial crops, incl. corn, mango, pineapples, banana etc.
Thai Agricultural Standard Organic Agriculture: The production, Processing, Labelling and Marketing Of Organically Produce And Products (TAS 9000-2021) [41]	General perennial and non-perennial crops, incl. corn, mango, pineapples, banana etc.
UTZ Certified and Rainforest Alliance[42]	General perennial and non-perennial crops, incl. corn, mango, pineapples, banana etc.
International Sustainability and Carbon Certification[43]	General perennial and non-perennial crops, incl. corn, mango, pineapples, banana etc.
Thai Quality Good Agricultural Practice (Q GAP)[44]	General perennial and non-perennial crops, incl. corn, mango, pineapples, banana etc.
Singapore Good Agricultural Practice (SG GAP) Certification[45]	General perennial and non-perennial crops, incl. corn, mango, pineapples, banana etc.
Global GAP [46]	General perennial and non-perennial crops, incl. corn, mango, pineapples, banana etc.;

[39] Conservation Alliance, "COCOA CERTIFICATION,", n.d., https://conservealliance.org/cocoa-certification/.

[40] Organic Agriculture Certification Thailand, "ACT Organic- Services,", n.d., https://www.actorganic-cert.or.th/

[41] National Bureau of Agricultural Commodity and Food Standards Ministry of Agriculture and Cooperatives, "Organic Agriculture: The Production, Processing, Labelling and Marketing of Organic Produce and Products", February 21, 2022, https://acfs-backend.acfs.go.th/storage/ProductStandards/Files/20240529155100_828699.pdf

[42] Rainforest Alliance, "UTZ Certification (Now Part of the Rainforest Alliance) | Rainforest Alliance," November 21, 2022, https://www.rainforest-alliance.org/utz/.

[43] ISCC, "ISCC System – Solutions for Sustainable and Deforestation Free Supply Chains," n.d., https://www.iscc-system.org/.

[44] National Bureau of Agricultural Commodity and Food Standards, "Thai Agricultural Standard Tas 9001-2013: Good Agricultural Practices for Food Crop," report, *National Bureau of Agricultural Commodity and Food Standards*, 2013, https://www.acfs.go.th/standard/download/eng/GAP_Food_Crop.pdf.

[45] Singapore Government Singapore Food Agency, "SFA | Singapore Good Agricultural Practice (SG GAP)," n.d., https://www.sfa.gov.sg/food-farming/quality-assurance-schemes/singapore-good-agriculture-practice-(sg-gap).

[46] "Global G.A.P- Global smart farm assurance solutions," GlobalG.A.P, n.d., https://www.globalgap.org

Certification scheme	Associated crops
	Livestock production; Aquaculture production.
Farm Sustainability Assessment (FSA)[47]	General perennial and non-perennial crops, incl. corn, mango, pineapples, banana etc.;
Singapore Clean and Green Certification [48]	General perennial and non-perennial crops, incl. corn, mango, pineapples, banana etc.
IFOAM Standard [49]	General perennial and non-perennial crops, incl. corn, mango, pineapples, banana etc.; Aquaculture production.
Organic label of the National Bureau of Agricultural Commodity and Food Standards[50]	General perennial and non-perennial crops, incl. corn, mango, pineapples, banana etc.
Proterra Foundation [51]	General perennial and non-perennial crops, incl. corn, mango, pineapples, banana etc.
RSB Standard [52]	General perennial and non-perennial crops, incl. corn, mango, pineapples, banana etc.
Climate Bonds Protected Agriculture and Water Infrastructure Criteria[53]	General perennial and non-perennial crops, incl. corn, mango, pineapples, banana etc.
USDA Organic Label[54]	General perennial and non-perennial crops, incl. corn, mango, pineapples, banana etc.

[47] SAI Platform: Farm Sustainability Assessment, https://saiplatform.org/fsa/

[48] Singapore Government Singapore Food Agency, "SFA | Singapore Clean and Green Urban Farms (SG C&G)," n.d., https://www.sfa.gov.sg/food-farming/quality-assurance-schemes/singapore-clean-and-green-urban-farms-(sg-c-g).

[49] "IFOAM - Organics International | Home," IFOAM, n.d., https://www.ifoam.bio/.

[50] "Labeling Organic Products | Agricultural Marketing Service," n.d., https://www.acfs.go.th/standard/list

[51] ProTerra Foundation, "The ProTerra Network | ProTerra Foundation," ProTerra Foundation, April 9, 2024, https://www.proterrafoundation.org/the-proterra-standard/.

[52] "Framework – RSB," n.d., https://rsb.org/framework/.

[53] "Protected Agriculture in Mexico," Climate Bonds Initiative, April 11, 2023, https://www.climatebonds.net/standard/protected-agriculture.

[54] "Labeling Organic Products | Agricultural Marketing Service," n.d., https://www.ams.usda.gov/rules-regulations/organic/labeling.

Certification scheme	Associated crops
Naturland Standards[55]	General perennial and non-perennial crops, incl. corn, mango, pineapples, banana etc.
EU Organic Regulations[56]	General perennial and non-perennial crops, incl. corn, mango, pineapples, banana etc.
Roundtable of Sustainable Palm Oil [57]	Palm oil
Indonesian Sustainable Palm Oil[58]	Palm oil
Malaysia Sustainable Palm Oil[59]	Palm oil
Palm Oil Innovation Group[60]	Palm oil
Forest Sustainability Council (FSC)	Rubber trees
Programme for the Endorsement of Forest Certification (PEFC)	Rubber trees
Sustainable Rice Platform[61]	Rice
T-VER-P-METH-13-08[62]	Rice
Climate-Friendly Rice Certification (AgriCapture)[63]	Rice
Thai Agricultural Standard for Sustainable Rice (TAS 4408-2022)[64]	Rice

[55] Minou Yussefi-Menzler, "Naturland Standards," Naturland, n.d., https://www.naturland.de/en/naturland/what-we-stand-for/quality/naturland-standards.html.

[56] "Organic Production and Products," Agriculture and Rural Development, March 4, 2024, https://agriculture.ec.europa.eu/farming/organic-farming/organic-production-and-products_en.

[57] Roundtable on Sustainable Palm Oil (RSPO), "A Global Partnership to Make Palm Oil Sustainable - Roundtable on Sustainable Palm Oil (RSPO)," May 17, 2024, https://rspo.org/.

[58] ISPO, "Indonesia Sustainable Palm Oil", n.d., https://www.indonesiapalmoilfacts.com/ispo/

[59] "About MSPO — MSPO," MSPO, n.d., https://mspo.org.my/about-mspo.

[60] "Palm Oil Innovation Group | a Journey Towards Responsible Palm Oil," n.d., https://poig.org/.

[61] "Sustainable Rice Platform", n.d., https://sustainablerice.org/

[62] "T-VER Enhanced Good Practices in Paddy Rice Field" https://ghgreduction.tgo.or.th/en/premium-t-ver-methodology/methodology/reduction-absorption-and-removal-of-greenhouse-gases-from-the-forestry-and-agriculture-sectors/item/5094-enhanced-good-practices-in-paddy-rice-field.html

[63] AgriCapture, "Climate Friendly RIce Certification", n.d., https://agricapture.com/certification/

[64] National Bureau of Agricultural Commodity and Food Standards et al., "THAI AGRICULTURAL STANDARD TAS 4408-2022 SUSTAINABLE RICE," *National Bureau of Agricultural Commodity and Food Standards*, May 17, 2022, https://www.acfs.go.th/files/files/commodity-standard/20221011102422_823691.pdf.

Certification scheme	Associated crops
Roundtable on Responsible Soy [65]	Soy
Bonsucro [66]	Sugarcane
Smartcane BMP [67]	Sugarcane
Aquaculture Stewardship Council[68]	Aquaculture production
Best Aquaculture Practices[69]	Aquaculture production
Premium T-VER[70]	
Agricultural Product Standards: Good Agricultural Practices[71]	Livestock production
Thai Agricultural Standard Organic Livestock[72]	Livestock production
Better Cotton Initiative (BCI)[73]	Cotton
Soy Sustainability Assurance Protocol (SSAP)[74]	Soy

If this option of chosen, steps 1, 2 and 3 are the same as in the Option 1, but the step 4 is replaced by obtaining one of the certificates mentioned above.

[65] "Roundtable on Responsible Soy", n.d., https://responsiblesoy.org/?lang=en

[66] "Bonsucro", n.d., https://bonsucro.com/

[67] "Smartcane BMP", n.d., https://smartcane.com.au/

[68] Aquaculture Stewardship Council." https://asc-aqua.org/

[69] Best Aquaculture Practices." https://www.bapcertification.org/

[70] Thailand Greenhouse Gas Management Organization, "Premium T-VER" https://ghgreduction.tgo.or.th/en/premium-t-ver.html.

[71] Agricultural Product Standards: Good Agricultural Practices, https://certify.dld.go.th/certify/index.php/th/2016-05-01-14-47-42/2016-05-03-02-04-15/1067-2019-09-02-03-31-36

[72] Thai Agricultural Standard TAS 9000-2005 https://www.acfs.go.th/standard/download/eng/Organic_Agriculture2.pdf

[73] Better Cotton Initiative, https://bettercotton.org/

[74] Soy Sustainability Assurance Protocol, https://ussec.org/resources/u-s-soy-sustainability-assurance-protocol-ssap-2022/

5.1 Eligible expenditures and produces

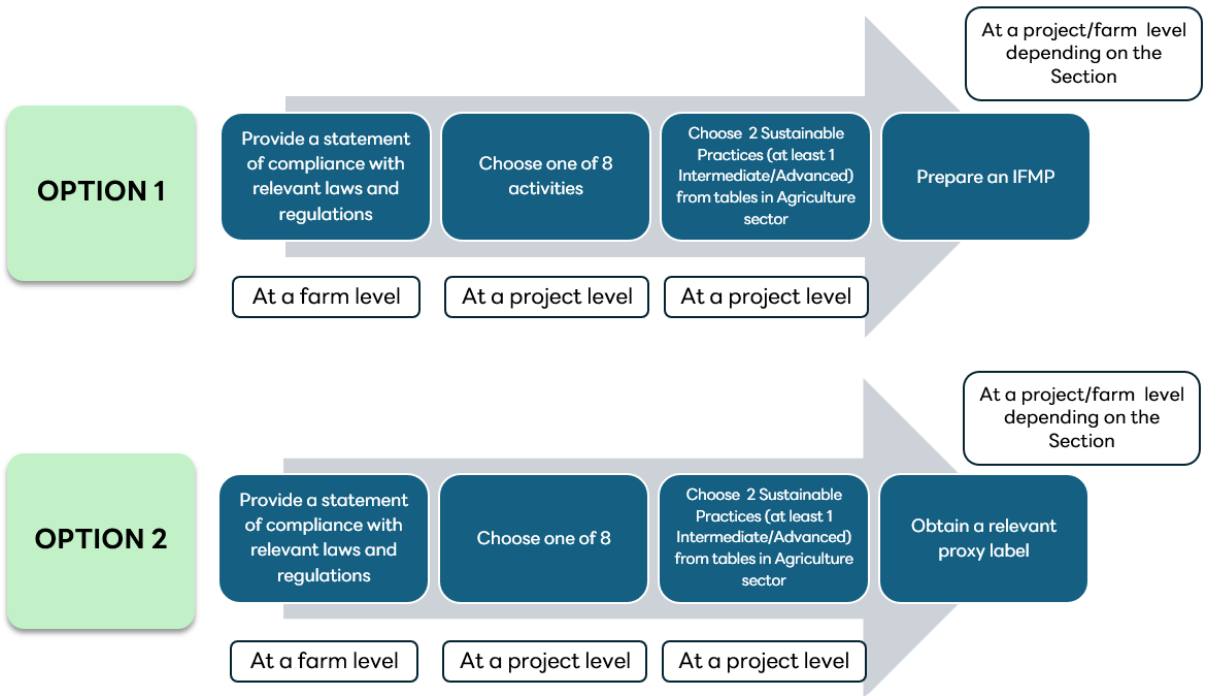
Regardless of the chosen option, alignment with the taxonomy allows to mark as taxonomy-aligned the following items and revenue streams:

- Expenditures required to implement the transformation project, including items and services from the "eligible inputs" column of each tables of Annex;
- Expenditures required to make substantial contribution to measures;
- Revenues coming from selling farm production **after** the transformation project was completed. Please note that only revenues from farm products that were transformed throughout the transformation project are considered taxonomy aligned. For example, if the farm grows corn and soy together and the manager carries out a transformation project aimed at increasing biofertiliser input for soy (or obtained Roundtable on Responsible Soy certification), only soy and revenues associated with selling soy are considered taxonomy aligned. This product taxonomy alignment lasts two years[75], counting from the date when the transformation project was fully implemented.

Do-No-Significant-Harm section measures from Table 6 must be implemented before the start of the transformation project and be continued throughout the project implementation process. Financial inputs required to provide them thus cannot be aligned with the Taxonomy.

[75]The two-year limitation is intended to incentivize farmers to adopt more sustainable practices. After this two-year period, farms can either repeat the same practices or implement at least two other practices to maintain their green revenue status.

Figure 3 Agricultural Criteria Application Scheme



5.2 Integrated Farm Management Plan

There is no standard template for the Farm Management Plan, and different formats[76] can be adopted depending on the institution requesting it (for example, a government agency that supports farmers whose projects and farm practices align with the Taxonomy). Regardless of what template is used, IFMP should include the following information:

- **Objectives of the transformational project**: a general description of what changes are planned to be achieved on the farm by implementing the practices from Annex of the tables and fulfilling the requirements of **Table 6 and 7**; what is the expected result of the project.

[76] For example, one can look at the IFMP templates from
South Africa: South Africa Environmental Management Plan, "Environmental Management Plan", n.d. https://view.officeapps.live.com/op/view.aspx?src=https%3A%2F%2Fsiza.co.za%2Fwp-content%2Fuploads%2F2023-Draft_Environmental-Management-Plan.docx&wdOrigin=BROWSELINK
New Zealand: New Zealand Farm Environment Plan templates, "Farm Environment Plan Templates," FAR Research, n.d., https://www.far.org.nz/resources/farm-environment-plan-templates.or
Australia: Australia Department of Agriculture, Generic Environmental Management Plan, n.d., https://agriculture.vic.gov.au/__data/assets/pdf_file/0004/925150/Broiler_Generic-Environmental-Management-Plan.pdf.

- **Current situation on the farm**: In this section, the farmer should describe his or her farm. The description of the farm should include a geophysical map of the area accompanied by supportive maps or GPS coordinates. It should also include information on the natural environment surrounding the farm, such as the presence of high-carbon or high-biodiversity ecosystems nearby. Additionally, it should include details about the production model yields. This part may also answer the following questions:
  - **Natural resources stocktake**. What natural resources (soil quality, vegetation, water sources, etc.) are available on the farm and in the surrounding area?
  - **Information about the fertilisers and pesticides the farm manager uses**. What kind of fertilisers are used, how and why? What amount of fertiliser per square metre is needed for your farm based on soil, climatic conditions, and crop type?
  - **Climate-relevant data**. Are any data on climate vulnerability or greenhouse gas emissions associated with your farm available?
  - **Existing practices**. Are there any conservation practices that have already been integrated into the production system?
- **The nature of transformation**: in this section, the farmer should indicate what changes will be implemented throughout the project based on the adoption of the selected practice(s), what agricultural inputs the selected practice(s) will require, and what the expected environmental impacts will be for the farm and its surrounding environment; what the expected changes in the farming system will be as a result of the adoption of the selected practices (i.e. lower fertiliser use, increase agricultural output, crop diversification, increased biodiversity, enhanced energy efficiency etc).
- **Environmental harm prevention**: this section should confirm that the transformational project will not result in any of the adverse effects reflected in **Table 6** or any other adverse effects that may be materially detrimental to the objectives of the Taxonomy.
- **Objectives contribution**: in this section, the farmer should describe how selected practices contribute to one of the objectives of the taxonomy described (in relation to the agricultural sector) in **Table 7**. Given that more than one practice can be chosen and many practices may contribute to more than one objective of the Taxonomy, the

specific wording of the contribution is always left to the farmer's discretion. The statement should, however, clearly reflect the relevance of the transformational project to the overall objectives of the Taxonomy. **Table 7** gives shortened examples how this contribution can be expressed for different objectives.

5.3 Do No Significant Harm Measures of Agriculture Sector

Table 6 Do No Significant Harm Measures: DNSH

Environmental objectives	Do-No-Significant-Harm Measures
Climate Change Mitigation	● The project should not lead to conversion of high carbon stock lands[77]. ● Any slash-and-burn practices or burning of agricultural residues must be avoided at any stage. ● Avoid overtelling, overgrazing and excessive application of fertilisers. ● Avoid unnecessary waste of food, maximise animal diet efficiency from the points of view of nutritional value and GHG emission reduction potential
Climate Change Adaptation	● Clear boundaries and critical interdependencies between the agricultural production unit and the ecosystem within which it operates must be identified. ● An assessment has been undertaken to identify the key physical climate hazards to which the production unit will be exposed and vulnerable over its operating life. ● The measures that have been or will be taken to address those risks mitigate them to a level so that the production unit is able to manage changing climatic conditions over its operational life.

[77] Definition of high carbon stock land: https://highcarbonstock.org/what-is-the-high-carbon-stock-approach/#:~:text=The%20'High%20Carbon%20Stock'%20in,carbon%20dioxide%20from%20the%20atmosphere. Can be proven by submission of maps (see Global Forest Watch maps), georeferenced photographs or satellite imagery of land use change and burning, for example. Forest inventory surveys or other formal government data can also be used.

Environmental objectives	Do-No-Significant-Harm Measures
	● **Aquaculture only**: Avoid using species that are intolerant and/or vulnerable to temperature fluctuations, salinity changes, and other climate-related stressors to reduce vulnerability to climate change impacts.
Sustainable use and protection of marine and water resources	● Protect riparian corridors, wetlands, and other water bodies. ● Control pollution of watercourses and avoid the discharge of sediments into water bodies, nutrients, and agrochemicals. ● Regulate the volume of water abstracted and returned to natural sources, improving the efficiency of use per unit of production. ● Maintaining appropriate stocking densities to reduce the pressure on local water resources and minimize the accumulation of waste and uneaten feed, which can lead to eutrophication.
Pollution prevention and control	● Prevent physical degradation, e.g., erosion and soil compaction. ● Prevent chemical degradation, e.g. salinisation, acidification, alkalinisation and pollution. ● Avoid biological degradation, e.g. loss of organic matter, imbalance of biological activity and mineralisation processes. ● Avoid uncontrolled discharge of wastewater into natural water bodies, uncontrolled and excessive release of nutrients, chemicals, and organic matter.
Protection and restoration of biodiversity and ecosystems	● Avoid habitat destruction: burning, felling or fragmentation of natural vegetation. ● Protect areas of natural forest. Set aside at least 40% of the forest for regeneration or conservation.

Environmental objectives	Do-No-Significant-Harm Measures
	• Avoid the introduction of non-native species. Native species are allowed. Naturalised species with proven benefits in restoration programmes are allowed. • Control the use of agrochemicals (fertilisers and pesticides) because, in excess, they cause the decline of populations of beneficial organisms in terrestrial and aquatic ecosystems.
Livestock-related DNSH (applicable to livestock only)	Provide reasonable level of animal welfare, avoid cruel and inhumane practices. Provide the animal with Five Freedoms.[78]
Aquaculture-related DNSH (applicable to aquaculture only)	Ensure minimal use of antibiotics in line with the latest FAO guidelines[79], SeaBOS[80] or scientific publications[81].

[78] National Archives, "The Five Freedoms," The UK Government Web Archive, https://webarchive.nationalarchives.gov.uk/ukgwa/20121010012427, http://www.fawc.org.uk/freedoms.htm

[79] Hernández Serrano, Pilar. *Responsible Use of Antibiotics in Aquaculture*. FAO Fisheries Technical Paper No. 469. Rome: Food and Agriculture Organization of the United Nations, 2005. https://openknowledge.fao.org/server/api/core/bitstreams/bf43d03e-11bf-47d1-83c2-fd02cc94baa4/content.

[80] SeaBOS Task Force III. *Antibiotics Stewardship Roadmap*. Stockholm: Stockholm Resilience Centre, October 2021. https://seabos.org/wp-content/uploads/2021/10/Antibiotics-Roadmap.pdf.

[81] P. Smith, *7 - Antibiotics in aquaculture: reducing their use and maintaining their efficacy*, Editor(s): Brian Austin, In Woodhead Publishing Series in Food Science, Technology and Nutrition, Infectious Disease in Aquaculture, Woodhead Publishing, 2012, Pages 161-189, ISBN 9780857090164, https://doi.org/10.1533/9780857095732.2.161.

Table 7 Examples of sustainable contribution to the objectives of Thailand Taxonomy

Environmental objective	Description of contribution	Examples of contribution
Climate change mitigation	Implemented measures lead to the reduction of GHG emission or prevent loss of carbon stocks	● Selected measures help to reduce methane emissions in treatment plants and water-intensive crops (e.g. rice, coffee). ● Selected measures help to increase the use of higher carbon fixing plant species, protect the forests, coastal and marine habitats (blue carbon). They involve introduction of agroforestry systems, reduction of methane emissions in agricultural waste management or reduce emissions from biomass burning. ● Selected measures help to increase and sequester carbon above and below ground, e.g. through good tillage practices and cover with improved pastures and woody species in livestock systems. They also decrease NO2 emissions in fertilised soils. ● Selected measures help to restore degraded areas that once were high-carbon stocks.
Climate change adaptation	Implemented measure improve production unit's resilience to the effects of climate change at the same time not harming the climate resilience of the ecosystems within which it is carried out.	● Selected measures help to improve the resilience of ecosystems to climate variability and enhance their climate regulating services (e.g. by protecting mangroves, forests, and wetlands). ● Selected measures help to reduce pressure on the biological balance and its climate resilience. Climate-tolerant agricultural varieties, breeds and forest species will be used.

Environmental objective	Description of contribution	Examples of contribution
Sustainable use and protection of marine and water resources;	Implemented measures protect water sources, optimise utilisation of water and prevent its contamination	● Selected measures help to increase the stabilisation of aquifer recharge areas. They help to reduce the sedimentation potential of reservoirs that allow water regulation. ● Selected measures help to adjust water planning criteria according to the assessment of climate scenarios and their adaptation to applicable climate adaptation plans. ● Selected measures help to protect and optimise water supply for other uses, such as protecting ecological minimum flows (for freshwater and coastal ecosystem functions), especially in periods of water scarcity. ● Selected measures help to manage runoff in times of excessive precipitation.
Protection and restoration of biodiversity and ecosystems;	Implemented measures help to protect or restore biodiversity and stability of the ecosystem where the production unit is situated	● Selected measures help to encourage the use of native species or species compatible with the original habitat. ● Selected measures help to combat pre-existing invasive species without deteriorating the biological balance. ● Selected measures help to increase species diversity and abundance, seeking to connect non-degraded fragments and recover already attenuated areas under a biological corridor and buffer zone approach. Involve planting and maintenance of vegetation:

Environmental objective	Description of contribution	Examples of contribution
		trees, shrubs, mangroves, and other natural ecosystems.
Pollution prevention and control;	Implemented measures prevent air, soil or ecosystem pollution	● Selected measures help to adequately collect, recycle, clean and dispose containers of pesticides and chemicals. ● Selected measures help to develop a contaminated water treatment system to treat waste and nutrients. ● Selected measures help to reduce or stop the burning of crops such as the management and processing of agricultural residues
Promotion of resource resilience and transition to a circular economy.	Implemented measures contribute to keeping agricultural biomass, waste and residues from agricultural activities as reusable resources	● Selected measures help to produce fertiliser and biogas from manure and other organic waste. ● Selected measures help to increase organic matter content in the soil by incorporating residues from crop production.

Forestry

6. Forestry background

As of 2021, the forest area in Thailand was estimated at 102,212,434 rai or 31.59% of the country's total area.[82] The majority of Thailand's forest land is characterised as naturally regenerating forests, followed by plantation forests.[83] Thailand's forest areas are categorized into three main types: conservation forests, national reserved forests, and mangrove forests.[84] Conservation forests account for approximately 64% of the total forest area in Thailand, national reserved forests make up about 34%, and mangrove forests constitute the remaining 2%.[85]

Some key underlying factors contributing to the loss of forest areas in Thailand are population growth, high economic value of timber, insecure land ownership and land rights, etc. At the sub-national level, 36 provinces out of 77 have less than 20% of total area under forest cover, 23 provinces have forest cover of 20-40%, 7 have 40-60%, and seven provinces have over 60% of forest cover. These latter seven provinces are Chiangmai, Nan, Phrae, Lampang, Mae Hong Son, Tak and Kanchanaburi, which are all located in the North and the West of the country.[86]

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[82] Forest Land Management Office, "Project to prepare the foundation of the forest in 2022," Ministry of Natural Resources and Environment (Royal Forest Department, n.d.), https://www.forest.go.th/land/wp-content/uploads/sites/29/2023/01/Forest-Area-2565-Full_compressed.pdf.

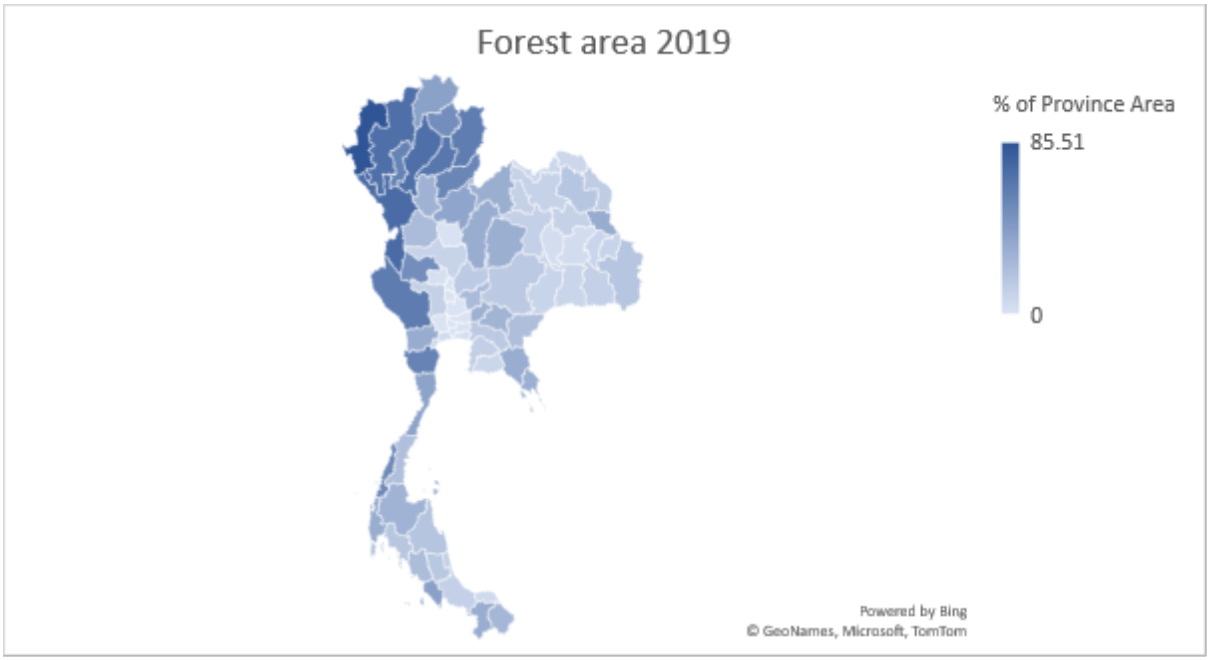
[83] FAO, " Global Forest Resources Assessment-Thailand," 2020, https://openknowledge.fao.org/server/api/core/bitstreams/8b3aa28e-5086-4548-b71a-fef4bc64d8c6/content

[84] Conservation Forests are managed by the Department of National Parks Wildlife and Conservation (DNP) and consist of National Parks, Wildlife Sanctuaries and other conserved forest classifications which historically were not subjected to active forest management practices; Forests outside conservation forests are managed by the Royal Forest Department (RFD) and consist of forest lands that have historically been subjected to active forest management activities, excluding mangrove forests, which are managed by the Department of Marine and Coastal Resources (DMCR).

[85]UNFCCC, "Thailand Forest Reference Emission Level (FREL) and Forest Reference Level (FRL) Report," 2020, https://redd.unfccc.int/media/thailand_frel_frl_report.pdf

[86] Ibid.

Figure 4 Thailand's Forest Area (% of Province Area), 2019



Source: Royal Forest Department

7. Major climate and environment-related issues

Deforestation is a key problem in the forestry sector and indirectly affects agricultural productivity. According to the Global Forest Watch, between 2001 and 2022, Thailand lost 15.06 rai (2.41 Mha) of tree cover, equivalent to a 12% decrease in tree cover or and 1.43 Gt of CO_2e emissions[87]. Since 1960s, total area of the country covered by forests decreased[88] from 53% to 36%. Historical deforestation has also exposed Thailand's soils to erosion and degradation and ultimately impacted negatively on biodiversity.[89]

Key sectoral climate policies

As for the forestry sector**,** the CCMP Strategy 2 focuses on creating carbon sinks via forest conservation, restoration, reforestation, and afforestation. The Strategy states that measures that affect communities in forested areas should be evaluated on the merits of their

[87] Vizzuality, "Thailand Deforestation Rates & Statistics | GFW," n.d., https://www.globalforestwatch.org/dashboards/country/THA/?location=WyJjb3VudHJ5IiwiVEhBIl0%3D.

[88] "Thailand | Forest Carbon Partnership," n.d., https://www.forestcarbonpartnership.org/country/thailand.

[89] Asian Development Bank, "Climate Risk Country Profile: Thailand," 2021, https://www.adb.org/sites/default/files/publication/722251/climate-risk-country-profile-thailand.pdf.

environmental and social impact via public hearings. Although the NDC target in 2030 excludes the LULUCF sector as part of its implementation, forest protection and conservation actions have been implemented continuously in Thailand.[90] The following actions were summarised in the LT-LEDS[91]:

- The National Forest Policy was adopted to ensure sustainable management of forests. To safeguard forests and enhance carbon sink, a target to increase green area cover to 55% (282,216 km2) of the total land area in 2037 has been adopted by the government, comprising 35% natural forest, 15% economic forest, and 5% urban and suburban green areas. Thailand aims to increase its green areas by 9% and plans to plant more trees in natural forests, economic forests, and urban areas.
- The involvement of local communities and private sectors is highlighted as a key strategy to protect Thai forests and enhance natural carbon sink. The Community Forest Act B.E. 2562 was adopted to empower local communities living in approximately 14,000 community forest areas to work with the government to manage and utilise natural resources in a sustainable way.
- To promote private sector participation in forest plantation, a voluntary carbon market for this sector known as Thailand Voluntary Emission Reduction Program for forestry and green space has been developed.

8. Forestry activities climate materiality assessment

Forestry and its associated activities are critical to the country's climate policy. Forests, peatlands, and wetlands store or absorb significant amounts of GHGs, which stabilise the ecosystem and provide climate regulation services. The proposed activities under this Taxonomy are related to the conservation of forests and associated ecosystems, which have the ultimate goal of maximising their ability to act as carbon sinks. These activities contribute not only to the main objective of climate change mitigation but also to the objective of protection and restoration of biodiversity and ecosystems.

[90] UNFCCC, “Thailand 2nd Updated NDC | UNFCCC,” n.d., https://unfccc.int/documents/620602.

[91] United Nations Framework Convention on Climate Change, "Thailand Long-Term Low Greenhouse Gas Emission Development Strategy (Revised Version)," November, 2022, https://unfccc.int/sites/default/files/resource/Thailand%20LT-LEDS%20%28Revised%20Version%29_08Nov2022.pdf

It is important to note that, according to the ISIC classification system, forestry is part of agriculture (and it will be treated as such in the Taxonomy), but in the IPCC 2006 classification system, forestry is part of the broader category that is called Land Use, Land-Use Change and Forestry (LULUCF). The table below shows the emissions of the most climate-material components of the LULUCF sector. The emissions of some activities in the LULUCF sector may be mitigated through practices currently included in the agriculture criteria of this Taxonomy.

Table 8 Land Use, Land-Use Change and Forestry sector emission profile

Subsector	IPCC 2006 Code	LULUCF sector GHG Emission and Sinks, total in GgCO2eq[92]	Corresponding proposed activities under the Thailand Taxonomy
Forest Land Remaining Forest Land	4A	-29,328.06	Sustainable forest management Forestry plantation Conservation, restoration, and maintenance of natural forests
Cropland Remaining Cropland	4B	-91,486.96	Sustainable perennial or non-perennial crops, incl. corn, mango, pineapples, banana etc. Growing of sugarcane Cultivation of rice Cultivation of rubber trees Cultivation of palm oil trees Cultivation of cassava
Land Converted to Cropland	4C	12,489.37	Sustainable forest management Sustainable perennial or non-perennial crops, incl. corn, mango, pineapples, banana etc. Growing of sugarcane Cultivation of rice Cultivation of rubber trees Cultivation of palm oil trees Cultivation of cassava

Source: Thailand's First Biennial Transparency Report[93]

[92] Negative value means the activity works as a sink for GHG emissions. The share of emission for each activity can't be given due to combination of positive and negative numbers

[93] UNFCCC, "Thailand's First Biennial Transparency Report under the United Nations Framework Convention on Climate Change," December 26, 2024, https://unfccc.int/sites/default/files/resource/THAILAND%E2%80%99S%20BTR1.pdf

The main objective of the Taxonomy in the forestry sector is to promote sustainable forest management practices, including forestry plantations, conservation, restoration, and maintenance of the existing forests, and to encourage certification schemes such as the Forest Stewardship Council[94] (FSC), the Program for the Endorsement of Forest Certification[95] (PEFC) or Premium T-VER[96]. Such certification schemes also prioritise aspects of biodiversity and highlight the imperative of supporting, conserving, and increasing biological diversity in forest ecosystems. The activities there are grouped as follows:

- **Sustainable forest management.** Forest management is the process of controlling the use or exploitation of forested land, including the extraction of timber and other forestry products. Sustainable forest management means the stewardship and use of forests and forest lands in such a way and at a rate that maintains their biodiversity, productivity, regeneration capacity, vitality and potential to fulfil, now and in the future, relevant ecological, economic and social, functions, at local, national, and global levels, and that does not cause damage to other ecosystems;
- **Forestry plantation**. A tree plantation, plantation forest, timber plantation or tree farm is a forest planted for high-volume production of wood, usually by planting one type of tree as a monoculture forest. Managed forests comprise trees that are planted (as opposed to naturally regenerated) which are of the same age and generally of the same species and are intended to maximise the production of timber and wood fibre;
- **Conservation, restoration, and maintenance.** Actions are needed to return existing natural forests to a healthy state and maintain them in this state. These include controlling invasive species, maintaining tree diversity, returning forest composition and structure to a more natural state, and pruning or removing underbrush that competes with trees.

As for the cropland-related sources of emission in **Table 4**, the activities that are proposed for addressing them in the taxonomy are covered by the agricultural section above, as well

[94] FSC, “Home | Forest Stewardship Council,” February 16, 2024, https://fsc.org/en.

[95] “PEFC - Programme for the Endorsement of Forest Certification,” n.d., https://www.pefc.org/.

[96] Thailand Greenhouse Gas Management Organization, "Premium T-VER," https://ghgreduction.tgo.or.th/en/premium-t-ver.html

as the “Sustainable Forest Management” activity and associated labelling schemes that will cover such emissions.

8.1 Forestry criteria scope

The Taxonomy has the following scope of objects and activities related to forestry[97]:

- **Natural or pristine forests -** natural forests are forest areas with many of the principal characteristics and key elements of a native ecosystem, such as complexity, structure, and biological diversity, including soil characteristics, flora, and fauna, in which all or almost all the trees are native species, not classified as plantations.
- **Plantation forestry** – planted forest that is intensively managed.
- **Sustainable forest management** – commercial management of natural forests in a sustainable manner for the production of timber.
- **Forest conservation** – non-commercial forestry activities designed to maintain the existing forest habitat in both area and quality. Activities will range from minimal interventions to active management and could include protection from deforestation risk, voluntary and mandatory set aside and active conservation efforts.
- **Forest restoration and rehabilitation** – non-commercial forestry activities designed to increase the area or improve the quality of existing forest habitat or to establish new forest stands. Activities will range from minimal interventions to active restoration including facilitating regeneration and restoration via natural or artificial means.

8.2 Forestry criteria methodological approach

Within the forestry sector, all activities were grouped into three large clusters, organised on the basis of their objectives, operations and application outcomes. The three groups of activities cover a wide range of practices within the forestry sector[98]:

- **Sustainable forest management.** Forest management is the process of controlling the use or exploitation of forested land, including extraction of timber and other forestry products. Sustainable forest management means the stewardship and use of

[97] Definition of forest can be found here: FAO, “SECOND EXPERT MEETING ON HARMONIZING FOREST-RELATED DEFINITIONS FOR USE BY VARIOUS STAKEHOLDERS,” n.d., https://www.fao.org/4/Y4171E/Y4171E10.htm.

[98] Monetary Authority of Singapore, “Singapore-Asia Taxonomy for Sustainable Finance,”2023, . https://www.mas.gov.sg/-/media/mas-media-library/development/sustainable-finance/singaporeasia-taxonomy-updated.pdf

forests and forest lands in such a way, and at a rate, that maintain their biodiversity, productivity, regeneration capacity, vitality and their potential to fulfil, now and in the future, relevant ecological, economic and social functions, at local, national, and global levels, and that does not cause damage to other ecosystems.

- **Forestry plantation**. A tree plantation, plantation forest, timber plantation or tree farm is a forest planted for high volume production of wood, usually by planting one type of tree as a monoculture forest. The type of managed forest in which the trees are planted (as opposed to naturally regenerated), of the same age and generally of the same species, and are intended to maximise the production of timber and wood fibre;
- **Conservation, restoration, and maintenance.** Actions needed to return existing natural forests to a healthy state and maintain them in this state. These include controlling invasive species, maintaining tree diversity, returning forest composition and structure to a more natural state, and pruning or removing underbrush that competes with trees.

The criteria have been designed to be applicable to granular green activities as well as to the wider level. For example, some of the criteria are suitable for green use of proceeds instruments, such as green bonds, where a bond is raised for a specific project or asset (e.g. nurseries), while others (e.g. the proxy certification standards) are applicable at the forestry project level and could be used as part of corporate disclosure to classify green revenues.

Compliance with the green threshold may be achieved by obtaining a recognised sustainable forest management certification label. This label is intended to confirm that the activities of the site operator will not lead to deforestation and that forest resources are used to the fullest extent and in the minimum amount necessary without disturbing the structure of the forest biosphere.

Eligible labels are as follows:

- **Thai Forest Certification Council (TFCC).** TFCC is a national Thai label for sustainable forestry aimed at promoting sustainable practices and combating climate change by preserving forests. Products bearing TFCC labels support the conservation of Thailand's diverse ecosystems and safeguard habitats crucial for biodiversity;
- **Forest Stewardship Council (FSC).** The FSC label promotes sustainable forestry practices ensuring that forests are managed appropriately. This allows the production

of timber, non-timber products and ecosystem services to maintain the forest's **biodiversity, productivity, and ecological processes**. Beyond environmental and ecosystem benefits, FSC-certified forest management also offers social advantages, providing long-term benefits to both local communities and society at large. It creates a significant incentive for local people to sustain forest resources (as referenced in the FSC Principles and Criteria for Forest Stewardship (FSC-STD-01-001 V5-3 EN)) FSC-certified forests prioritise the protection of endangered species and habitats, contributing to the overall health of ecosystems. Sustainable forestry practices endorsed by FSC labels reduce deforestation rates, helping to maintain the integrity of global carbon sinks;

- **Programme for the Endorsement of Forest Certification (PEFC)**. PEFC certification provides a mechanism to promote the sustainable management of forests and ensures that forest-based products reaching the marketplace have been sourced from sustainably managed forests.
- **Premium T-VER.** Premium T-VERs (Thailand Voluntary Emission Reductions) is a national labelling system for projects that reduce or remove greenhouse gas emissions. In the agriculture and forestry sectors these projects focus on sustainable land management, reforestation, afforestation, and improved agricultural practices that capture carbon or prevent emissions. Premium T-VERs undergo rigorous verification to ensure their environmental integrity and additionality, meaning they provide genuine emission reductions beyond business-as-usual activities.

If the certification is obtained, inputs indicated in green and amber categories are considered aligned with the Taxonomy.

Amber activities of the forestry sector of the Taxonomy are either not defined there is no need for them as there are no hard-to-abate activities that require gradual transition or for forestry plantations include certain activities that must be phased out by the Thailand Taxonomy sunset date (2040). These activities involve the use of chemical fertilisers, which is suboptimal compared to the use of organic or bio-fertilisers but may be an option if the latter are of limited availability.

Red activities are defined as either activities that directly threaten endangered or rare species, involve illegal harvesting, trigger deforestation, or are associated with the use of prohibited chemicals.

9. Forestry subsector criteria and thresholds

1. Sustainable forest management

Sector	Forestry
Activity	Sustainable forest management
ISIC Code	0200
	Management of planted and natural forests that ensures that forests supply goods and services to meet both present-day and future needs and contribute to sustainable development.
Objective	Climate change mitigation; Protection and restoration of biodiversity and ecosystems
Green	In order to be aligned with the green category of the Taxonomy, the forest manager must first obtain a valid certification (e.g., TFCC, FSC, PEFC, Premium T-VER) for an area where the management activity is taking place. If certification is obtained, the following activities or inputs are aligned with the Taxonomy as green[99]: ● Conservation, restoration, and maintenance of forest areas; ● Expenditures required to obtain the relevant certification; ● Creation and maintenance of nurseries[100] where seeds and seedlings are sourced from sustainably managed areas[101]; ● Adoption and maintenance of monitoring technology that enables the tracking of the forest extracts and their conservation status;

[99] At least one input should be selected for the alignment with the taxonomy

[100] Nurseries are defined any facility designated to produce tree seedlings grown under favourable conditions until they are ready for planting

[101] FAO, "Sustainable Forest Management," Food and Agriculture Organization of the United Nations, n.d., https://www.fao.org/sustainable-forests-management/en/.

	• Equipment and costs incurred by forest management activities – pre and post extraction, including primary processing that is either powered by renewable energy or appear amongst the most energy efficient in the country – as certified by local energy efficiency standards. • The use of diverse native plants that are suitable for the area to promote biodiversity. Community rights must be respected when implementing any of those practices[102].
Amber	N/A
Red	Exploitation of timber and non-timber products from any species would lead to or further its threatened conservation status is harmful to the objectives of climate change mitigation and protection and restoration of biodiversity and ecosystems.
Criteria reference	Climate Bonds Forestry criteria; Singapore Asia Taxonomy Criteria

2. Forestry plantation

Sector	Forestry
Activity	Forestry plantation
ISIC Code	0200
Description	Plantation of forests and associated activities
Objective	Climate change mitigation; Protection and restoration of biodiversity and ecosystems

[102] In line with the Regulation of the Community Forest Policy Committee on Governance, Maintenance, Utilization of Timber, and Utilization of Community Forest Areas B.E. 2566 (2023); The Regulation of the Community Forest Policy Committee on the Utilization of Products and Services from Community Forests B.E. 2566 (2023) and Community Forestry Act B.E. 2562 (2019).

Green	In order to be aligned with the green category of the Taxonomy, the forest manager must first obtain a valid certification (TFCC, FSC, PEFC or Premium T-VER) for an area where the forestry plantation activity is taking place[103]. If certification is obtained, the following activities or inputs are aligned with the Taxonomy as green[104]: ● Expenditures required to obtain the relevant certification; ● Use of organic and bio fertilisers; ● Use of physical and biocontrol of pathogens, pests, and weeds; ● Conservation, restoration, and maintenance; ● Creation and maintenance of nurseries[105] where seeds and seedlings are sourced in sustainably managed areas[106]; ● Adoption and maintenance of monitoring technology that enables the tracking of the forest extracts. ● Equipment and costs incurred by the above-mentioned activities (equipment must be powered by renewable energy or appear amongst the most energy efficient in the country – as certified by local energy efficiency standards); ● The use of nature-based solutions / integrated landscape management ● The use of diverse native plants that are suitable for the area to promote biodiversity

[103] Database for checking the suitable areas for planting forest in Thailand by The Royal Forest Department: https://site-matching.forest.go.th/

[104] At least one input should be selected for the alignment with the taxonomy

[105] Nurseries are defined any facility designated to produce tree seedlings grown under favourable conditions until they are ready for planting

[106] FAO, "Sustainable Forest Management," Food and Agriculture Organization of the United Nations, n.d., https://www.fao.org/sustainable-forests-management/en/.

	Community rights must be respected when implementing any of those practices[107].
Amber	In order to be aligned with the amber category of the Taxonomy, the forest manager must first obtain a valid certification (TFCC, FSC, PEFC or Premium T-VER) for an area where the management activity is taking place. The following activities or inputs are aligned with the Taxonomy as amber: ● Nutrient management plan[108] based solely on chemical fertilisers (available only until 2040) and all associated inputs; ● The phytosanitary management plan is based solely on chemicals (available only until 2040) and all associated inputs.
Red	● Use of chemicals listed in the Stockholm Convention 1a or 1b in the WHO classification of pesticides by hazard or not in compliance with the Rotterdam Convention is harmful to the objectives of climate change mitigation and protection and restoration of biodiversity and ecosystems; ● Operations on land that has been converted from high carbon stock (HCS55) after Jan 1, 2010 is harmful to the objective of climate change mitigation.
Criteria reference	Climate Bonds Forestry criteria; Singapore Asia Taxonomy Criteria

[107] In line with the Regulation of the Community Forest Policy Committee on Governance, Maintenance, Utilization of Timber, and Utilization of Community Forest Areas B.E. 2566 (2023); The Regulation of the Community Forest Policy Committee on the Utilization of Products and Services from Community Forests B.E. 2566 (2023) and Community Forestry Act B.E. 2562 (2019).

[108] A Nutrient Management Plan identifies actions and priorities that optimise the amounts, timing, and forms of nutrients used for optimal plant yield and minimises the potential for environmental impact: Government of Newfoundland and Labrador, "Nutrient Management Planning - Fisheries, Forestry and Agriculture," Fisheries, Forestry and Agriculture, August 10, 2021, https://www.gov.nl.ca/ffa/faa/agrifoods/land/soils/fertility/.

3. Conservation, restoration, and maintenance of natural forests

Sector	Forestry
Activity	Conservation, restoration, and maintenance of natural forests
ISIC Code	0200
Description	Actions needed to protect and assure that environmental services are provided by natural or pristine forests
Objective	Climate change mitigation; Protection and restoration of biodiversity and ecosystems
Green	In order to be aligned with the green category of the Taxonomy, the forest manager must first obtain a valid certification (TFCC, FSC, PEFC or Premium T-VER) for an area where the management activity is taking place. If certification is obtained, the following activities or inputs are aligned with the Taxonomy as green[109]: ● Expenditures required to obtain the relevant certification; ● Land acquisition with the purpose of conservation, restoration, and maintenance of natural forests; ● Any activities associated with the implementation of the Community Forests Act[110]; ● Any activity aimed at the restoration, protection, or proliferation of mangroves; ● Use of organic and biofertilisers for the purpose of restoration or replanting of natural forests; ● Use of physical and biocontrol of pathogens, pests, and weeds for the purpose of restoration or replanting of natural forests;

[109] At least one input should be selected for the alignment with the taxonomy

[110] Food and Agriculture Organization, "Land and Agricultural Reform Act B.E. 2518 (1975)," https://faolex.fao.org/docs/pdf/tha195322.pdf.

	• Nurseries[111] where seeds and seedlings are sourced in sustainably managed areas[112]; • Adoption and maintenance of monitoring technology that enables the tracking of natural forest extracts and their conservation status; • Equipment and costs incurred by the above-mentioned activities (equipment must be powered by renewable energy or appear amongst the most energy efficient in the country – as certified by local energy efficiency standards); • The use of nature-based solutions / integrated landscape management • The use of diverse native plants that are suitable for the area to promote biodiversity Community rights must be respected when implementing any of those practices[113].
Amber	N/A
Red	N/A
Criteria reference	Climate Bonds Forestry criteria; Singapore Asia Taxonomy Criteria

[111] Nurseries are defined as any facility designated to produce tree seedlings grown under favourable conditions until they are ready for planting.

[112] Food and Agriculture Organization, "Land and Agricultural Reform Act B.E. 2518 (1975)," https://faolex.fao.org/docs/pdf/tha195322.pdf.

[113] In line with the Regulation of the Community Forest Policy Committee on Governance, Maintenance, Utilization of Timber, and Utilization of Community Forest Areas B.E. 2566 (2023); The Regulation of the Community Forest Policy Committee on the Utilization of Products and Services from Community Forests B.E. 2566 (2023) and Community Forestry Act B.E. 2562 (2019).

Annex: Eligible agricultural practices

1. Sustainable perennial or non-perennial crops

Table 9 Eligible practices for Sustainable perennial or non-perennial crops, including corn, mango, pineapples, banana etc.

Title	Description	Eligible Inputs
Basic Practices		
Soil conservation	Carry out minimum soil preparation or tillage with permanent soil cover and use of green manures. On sloping soils, planting on contour lines through terracing, deep-rooting mulching, or other methods. Maintain soil biomass cover on at least 80% of the farm and prepare plots or soil according to soil conservation principles by reducing erosion or preventing soil degradation, preserving nutrient levels and soil properties. The goal is to maintain long-term soil fertility through practices such as cover cropping, crop rotation, contour planting, avoiding burning, and minimizing chemical use. Employ practices related to soil quality improvement and/or soil pH management, if applicable.	▪ Seeds, fertilisers, and light equipment for soil protection works ▪ Cover crops (seeds and seeding inputs) ▪ Living mulch ▪ Soil pH management ▪ The use of terracing techniques, either through rapid (radical) transformation or gradual (progressive) implementation, helps prevent soil erosion and enhances land use efficiency to boost productivity.
Irrigation management	Employ efficient irrigation methods such as drip or micro-sprinkler irrigation to deliver water directly to the root zone of perennial plants, minimizing water wastage and reducing the risk of foliar diseases. Schedule irrigation based on crop water requirements, soil moisture	Any inputs associated with implementing this practice.

Title	Description	Eligible Inputs
	levels, and weather conditions to optimise water use efficiency and prevent waterlogging or drought stress.	
Water management	Improve crop water productivity by comparing documented water yields per rai by crop type. OR Introduce water use efficiency in water systems in agricultural areas, irrigation (surface water and groundwater), and storage. Prevent water pollution with organic or chemical residues. Avoid excessive crop waterlogging with better drainage.	▪ Technologies for improvement of irrigation, storage, drainage systems, water remediation and treatment systems. ▪ Establishment of individual/community-based pumping system associated to small scale irrigation system solar energy powered with water saving technology like drip irrigation. ▪ Installation of efficient water management systems (rainwater harvesting systems, water rationing, reclaimed water and water recycling) ▪ Applying techniques of radical or progressive terraces against erosion and improving the efficient use of land for increased productivity
Fertiliser management	Nutrient management (including N-P-K) is carried out efficiently according to the needs of each crop (fertiliser type, quantity, method, and timing) and in line with soil quality. Organic or bio-fertilisers, or soil amendments, may be used, with an appropriate balance between chemical and organic fertilisers. Practical considerations are also taken into account (sources, available nutrients, and related transportation). The goal is to use organic fertilisers in	▪ Fertilisers in measured doses; ▪ Fertigation (a technique that allows the simultaneous application of water and fertilisers through the irrigation system), ▪ Fertiliser application equipment and materials that allow timely and efficient dosage (hardware and software). ▪ Soil fertility assessment such as Soil testing kits (LDD TEST KITS), laboratory analysis services, precision fertiliser application equipment, and training

Title	Description	Eligible Inputs
	combination with chemical fertilisers, while still considering crop yield.	programs on soil analysis and interpretation.
Pest and disease control	Apply Integrated Pest Management[114] (IPM) for pest and weed control. It is a selection of various pest control methods that are used together correctly at the right time, appropriate to the situation and area conditions. Employ IPM techniques, from planting to harvest, including disease- and pest-resistant crop varieties, planting at appropriate densities, releasing natural enemies, using traps, applying biological control agents, and using chemical pesticides correctly. This approach reduces incidence of insect pest, soil-borne and foliar diseases, and judicious use of pesticides to manage pests while minimizing environmental impact and reducing risk to people. Use bio-inputs, bio-pesticides, bio-fertilisers, and conservation biocontrol for organic production. In order to avoid biodiversity loss, the minimum number of chemical pesticides (if required) shall be used. Utilize automated laser weeding machines to reduce the use of chemical herbicides.	▪ Inputs for biological and physical pest and disease control, e.g., repellent plant seeds, traps, or nets; laser-based weed eliminators and blacklight traps; ▪ Disease-resistant plant varieties and seedlings
Management and processing of agricultural residues	▪ Avoid open field burning of agricultural biomass or residues after harvest during every	▪ Equipment for removal and collection of agricultural residues (e.g. straw balers, combined harvesters) and

[114] European Commission, "Integrated Pest Management (IPM)," EU - Food Safety, n.d., https://food.ec.europa.eu/plants/pesticides/sustainable-use-pesticides/integrated-pest-management-ipm_en

Title	Description	Eligible Inputs
	production cycle (in particular for rice, sugar cane and maise). Open field causes air pollution, fine particulate matter, greenhouse gas emissions, and destroys organic matter and nutrients in the soil. ▪ Incorporation into the soil if residues are allowed to degrade aerobically (min 30 days before flooding), removal, transport, storage, and processing of residues. Potential use of residues for composting and fertiliser production, mushroom production (rice straw), bioenergy and biogas production, animal feed, paper and pulp production.[115] ▪ Additionally, straw and stubble can be fermented using microorganisms to decompose the rice straw or processed into products like pelletized biomass[116], biochar, or charcoal.	transport, processing (increasing density) of residues, equipment for paper and pulp production from rice straw. ▪ The use of animal (cattle) feed needs to be assessed for potential life cycle CH4 emissions.
Compliance with agricultural standards	Implement actions required to obtain sustainable agriculture certification from Table: List of eligible certification schemes. (**Table 5**)	Inputs required to transform the farm in line with the requirements for the said certifications
Crop rotation (in transient or short-cycle crops)	Crop rotation is essential to prevent the buildup of pests and diseases in the soil. Rotating crops helps break	Seeds, seedlings, equipment, and labour to enable crop rotation.

[115] IRRI, "Rice Straw Management," International Rice Research Institute, May 31, 2019, https://www.irri.org/rice-straw-management.

[116] Technology Catalog Contributing to Production Potential and Sustainability in the Asia-Monsoon Region https://www.jircas.go.jp/sites/default/files/TechCatalog_v3.0_en.pdf

Title	Description	Eligible Inputs
	pest cycles, improves soil structure, and balances nutrient availability. In short-cycle crops, rotations are carried out according to a periodic programme depending on the region. Establish associated crops (including nitrogen fixation crops) for moisture management, fertility, and biological activity. Rotation with green manure to improve productivity can also be carried out.	
Intermediate Practices		
Utilize Agrimap for zoning agricultural land based on various factors such as soil type, crop suitability, and climate conditions	Agrimap is a tool that helps in dividing agricultural land into different zones based on specific criteria such as soil properties, topography, water availability, and historical yield data. This zoning allows for tailored management practices in each zone, optimizing input use and improving overall farm productivity. By understanding the unique characteristics of each zone, farmers can apply precise amounts of fertilisers, water, and other inputs, reducing waste and environmental impact.	Access to Agrimap software, training on using Agrimap, soil and climate data collection tools, GPS equipment for accurate mapping, and data analysis services.
Land levelling	Land levelling is a technology used to level fields by removing soil from high points of the field and depositing it in low points of the field. It improves crop establishment and enables crops to mature uniformly.	Electric, hybrid or biofuel-based equipment and machinery for laser land levelling (scraper and laser guidance system), LLL services

Title	Description	Eligible Inputs
	It reduces greenhouse gas emissions by saving energy, reducing cultivation time, and improving input-use efficiency. In a level field, water is distributed evenly, thus reducing the amount of time and volume of water needed for irrigation. Fertiliser use is more efficient as nutrient runoff from high points to low points in the field is less. Prior to using alternate wetting and drying, LLL avoids too much drying of high points in the field, resulting in a yield penalty during the AWD process.[117]	
Water harvest technologies (NBS)	Harvesting activities of rainwater to keep it for agriculture and livestock while fighting erosion. Improve solar energy use in irrigation to fight the effect of drought.	Knowledge, skills and equipment
Composting, organic and bio-fertilisers	▪ Utilise compost and organic fertilisers derived from plant residues, animal manure, or other organic sources. It enhances soil fertility and reduces dependence on chemical fertilisers. ▪ Utilise bio-fertilisers. This approach improves soil structure and microbial activity over time. ▪ If the use of inorganic fertilisers is unavoidable, it is crucial to apply them in prescribed doses, at the appropriate time, and precisely	▪ Equipment for soil improvement with organic and bio-fertilisers. ▪ Compost production equipment

[117] International Rice Research Institute, "Laser land leveling", n.d., https://ghgmitigation.irri.org/mitigation-technologies/laser-land-leveling

Title	Description	Eligible Inputs
	where the plants need them, to avoid excessive environmental contamination.	
Integrated weed management	Employ mulching, manual weeding, and integrated weed management techniques to control weed growth without relying solely on herbicides, which can have adverse effects on soil health and beneficial organisms. Weed control also help to reduce number of host plants for pests and plant diseases, or the accumulation of pests in the field.	Any inputs associated with implementing this practice.
Laser-based weed eliminators	Use of autonomous laser-based weed eliminators to cut the use of herbicides	Any inputs or technical assistance required to implement the practice
Implement precision agriculture technologies and practices	Precision agriculture involves using technology to monitor and manage field variability in crops. Techniques such as GPS-guided equipment, drones, sensors, and data analytics are used to optimize field-level management regarding crop farming. This approach enhances efficiency, productivity, and sustainability by ensuring that crops receive the precise number of inputs they need, such as water, fertilisers, and pesticides.	GPS and GNSS systems for field mapping and equipment guidance; auto-steering systems for tractors and harvesters; Variable Rate Technology (VRT) for site-specific application of seeds, fertilisers, and pesticides; remote sensing tools such as drones, satellites, and multispectral cameras for crop health monitoring and field analysis; yield monitoring systems installed on combines to generate yield maps during harvest; soil sensors and probes for real-time soil moisture and nutrient monitoring, precision sprayers with electronically controlled valves for targeted chemical application; smart irrigation systems including drip and automated sprinklers for optimized water management; data collection and analytics platforms (farm management

Title	Description	Eligible Inputs
		software) for decision support; artificial intelligence and machine learning tools for robotic operations and data-driven recommendations. Training for farmers on precision agriculture technologies.
Waste management and treatment of water contaminated with organic wastes	Appropriate collection, recycling, cleaning, and disposal of containers of pesticides and chemicals. Use post-harvest residues in the plantation. Develop a contaminated water treatment system to treat waste and nutrients.	Equipment, tools, inputs, and labour.
Traceability and certification	Traceability is a mechanism to ensure transparency in monitoring the environmental, economic, health and social consequences of agricultural production. It also allows exporters to quickly identify and withdraw any product with sanitary or phytosanitary problems or non-compliance with protocols. Certification of products can further enhance their safety, value and marketing potential.	Certification costs, technical assistance, monitoring systems, and internet connection costs
Advanced Practices		
Biodigesters	Implement biodigesters for compost and methane (biogas) production. The production of fertiliser and biogas from animal manure and other organic waste involves supporting collection areas for those in need of large biogas digesters. This can be achieved by gathering manure from multiple farmers and small-scale farms.	Equipment, supplies, and labour, *fixed dome digester,* including construction, improvement, and machinery for efficient wastewater treatment, such as sludge dewatering machines

Title	Description	Eligible Inputs
Improvement of genetic material in seeds and reproductive material. Biotechnology in agricultural production chains	Use improved seeds[118] and newly developed germplasm to increase yields and resilience to climate variability (these already exist for rice, maize, beans, and cassava). Use biotechnology for the production of agricultural inputs derived from residual crop biomass (e.g. biofertilisers and bio fungicides), as well as for the development of extracts and oils with pharmaceutical, food, cosmetic, industrial, etc. applications.	Inputs of these materials and technical assistance, including disease-resistant plant varieties.
Introduction of polycultures or intercropping of permanent crops	Introducing polycultures or crops associated with compatible species (preferably native timber, banana, or fruit trees) protects the soil, increases carbon and nitrogen fixation, diversifies production, and increases resilience to climate variability.	Seeds, seedlings, material for nursery development, and other inputs (equipment and labour).
Shift from transient crops or pasture to agroforestry systems (e.g. fruit or forestry) and agroforestry systems (NBS)	Shift land use towards systems with higher carbon sequestration (such as agroforestry systems), with better soil protection and congruence with its vocation.	Seeds, seedlings, material, including for nursery development, and other inputs (equipment and labour).
Payment for Environmental Services (PES)	Payment for Environmental Services (PES) is an advanced practice that involves compensating landowners or resource managers for maintaining or enhancing ecosystem services, such as water purification, carbon sequestration, or biodiversity	Technical assistance, costs of certification, costs of MRV

[118] Including new breeding technologies (GMO and others)

Title	Description	Eligible Inputs
	conservation. This mechanism creates financial incentives for environmental stewardship, aligning economic interests with conservation goals and promoting sustainable land management. PES helps ensure the long-term viability of natural ecosystems by embedding ecosystem service values into market structures	
Complementary adoptions		
Parametric Insurance for mitigating climate risks	Parametric insurance or insurance based on climatic indexes are contracts that stipulate compensation based on the occurrence of specified climatic events (severe cyclones, heatwaves, floods, landslides, mudslides among others).	Insurance based on climatic indexes – for e.g., estimated rainfall and temperature based on satellite imagery.
Capacity building on sustainable agriculture models	Strengthen training and capacity building of farmers on the nexus between the agriculture sector and climate change, financial literacy, and sustainable agriculture models that build adaptive capacity to climate impacts.	Reinforcement of capacity building programmes on sustainable agriculture models; promotion of technological development agreements with the private sector and human capital formation; training on green business.
Nature-based water management (NBS)	Nature-based[119] water management for water resources management involve the planned use of ecosystem services to improve water quantity and quality and increase resilience to climate change.	▪ The activity is identified as a flood risk reduction or a drought risk reduction measure either in a water use and protection management plan at the river basin scale. ▪ The activity identifies and address the risks of environmental degradation

[119] World Bank Group, "What You Need to Know About Nature-Based Solutions to Climate Change," World Bank, May 17, 2022, https://www.worldbank.org/en/news/feature/2022/05/19/what-you-need-to-know-about-nature-based-solutions-to-climate-change

Title	Description	Eligible Inputs
	Including measures to help prevent and protect against floods or droughts or phytoremediation.	related to the preservation of water quality and the prevention of water stress and deterioration of the status of affected water bodies to achieve good water status and ecological potential. ▪ The activity includes nature restoration or conservation actions that demonstrate specific ecosystem co-benefits, which contribute to achieving good water status. Local stakeholders are involved from the outset in the planning and design phase. The activity is based on the principles outlined by the IUCN Global Standard for nature-based solutions. Note 1: the activity takes into account National Biodiversity Strategies and Action Plans for the setting of nature conservation and restoration targets and for the description of the measures to achieve these targets. Note 2: A monitoring programme is in place to evaluate the effectiveness of a nature-based solution scheme in improving the status of the affected water body, achieving the conservation and restoration targets and in adapting to changing climate conditions.
Energy saving and clean energy	▪ Improve energy efficiency and use renewable sources, such as biogas and solar energy. ▪ Ensure adequate maintenance of equipment and improve energy efficiency. Replace traditional hydrocarbons-fuelled agricultural	Installation of renewable energy systems. Equipment maintenance services to improve efficiency. Procurement of electric, hybrid or biofuel-based agricultural machinery.

Title	Description	Eligible Inputs
	machinery with biogas-fuelled or electricity-fuelled	

2. Sustainable rice production

Table 10 Eligible practices for sustainable rice production

Title	Description	Eligible inputs
	Basic Practices	
Alternative wetting and drying	AWD entails periodic draining of the field to a certain threshold, usually 15 cm below the soil surface, and re-flooding. A perforated tube placed in the soil enables the farmer to monitor the water level below the soil surface to determine when to irrigate. The AWD technology has also been proven to effectively mitigate greenhouse gas emissions, specifically methane, from rice production by 30-70% without causing a yield reduction. During the dry phases, the methane-producing bacteria are inhibited, thus setting a condition to reduce GHG emission[120].	Equipment, Inputs, Labour, Monitoring equipment or services for water levels, installation of improved water management systems and tools, efficient irrigation systems
Soil conservation	Reduce machinery passes and apply minimum tillage to the soil. Tillage with adequate moisture and equipment. Manage cultivated areas according to the land conditions. For flat areas, ensure that paddy fields are levelled evenly. In gently sloping areas, plough along contour lines to prevent soil erosion, and plough when the soil has the right level of moisture. Practices like leaving rice stubble after harvest can also be implemented.	Seeds, fertilisers, and light equipment for soil work.
Water resources management	- Effective and efficient use of water and irrigation in rice reduces wastage. - Rainwater harvesting.	Membranes will cover the canal, flow meters, irrigation

[120] IRRI, "Alternate Wetting and Drying," IRRI- GHG Mitigation in Rice, n.d., https://ghgmitigation.irri.org/mitigation-technologies/alternate-wetting-and-drying; Technology Catalog Contributing to Production Potential and Sustainability in the Asia-Monsoon Region https://www.jircas.go.jp/sites/default/files/TechCatalog_v3.0_en.pdf

Title	Description	Eligible inputs
	- Alternate Wetting and Drying (AWD)[121] irrigation	systemisation, control, and water quality equipment. Storage tanks and ponds.
Pest and disease control	▪ Plants live fences with native species as biological barriers. Integrated pest and disease management. ▪ Biological control.	Plant material, seeds, native seedlings. Materials required in biological control.
Prolonged midseason drainage	Mid-season drainage involves the removal of surface flood water from the rice crop for about seven days towards the end of tillering. Mid-season drainage reduces methane emissions of paddy fields, with reductions ranging from 7 to 95%	Drainage infrastructure, canals and associated tools
Crop diversification and rotation	▪ Rotation crops to be planted before or after rice (including e.g. mung beans, corn, potato, and others) ▪ Switch to perennial crops, e.g. in line with Thailand's 3R policy	▪ Inputs for rotation crops or inter cropping including seeds, labour, harvesting and other services covering the full crop cycle ▪ Inputs for switch to perennial crops to follow self sufficient economy philosophy, covering seedlings, labour, establishment costs, etc covering full crop cycle.
Intermediate Practices		
Rice variety diversification (drought- and heat-tolerant strains and short-duration varieties)	Diversification of sow-certified rice seed varieties including new authorized RD varieties with increased resilience towards climate impacts, shorter growing duration or higher yield	Certified and high-quality seeds and related inputs

[121] IRRI, "Alternate Wetting and Drying," IRRI- GHG Mitigation in Rice, n.d., https://ghgmitigation.irri.org/mitigation-technologies/alternate-wetting-and-drying

Title	Description	Eligible inputs
Laser land levelling	Laser land levelling (LLL) is a laser-guided technology used to level fields by removing soil from high points of the field and depositing it in low points of the field. It improves crop establishment and enables crops to mature uniformly. It reduces greenhouse gas emissions by saving energy, reducing cultivation time, and improving input-use efficiency. In a level field, water is distributed evenly, thus reducing the amount of time and volume of water needed for irrigation. Fertiliser use is more efficient as nutrient runoff from high points to low points in the field is less. Prior to using alternate wetting and drying, LLL avoids too much drying of high points in the field, resulting in a yield penalty during the AWD process[122].	Electric, hybrid or biofuel-based equipment and machinery for laser land levelling (scraper and laser guidance system), LLL services
Dry Direct-Seeded Rice (DSR)	In this technology, rice is directly seeded in the main plot with 2- or 4-wheel tractor/power tiller-drawn seed drills. DSR can be readily adopted by small farmers as well as large farmers, provided that the required machinery is locally available. The technology has a lower water requirement for crop establishment as puddling is not required in this method. The soil in DSR remains aerobic most of the time during the season, which reduces methane emissions as well as increases resilience to drought and high yields.	Electric, hybrid or biofuel-based machinery, equipment, and services required to implement the practice as well as knowledge and skills.

[122] International Rice Research Institute, "Laser land levelling", n.d., https://ghgmitigation.irri.org/mitigation-technologies/laser-land-leveling

Title	Description	Eligible inputs
Composting, organic and bio-fertilisers	▪ Utilise compost and organic fertilisers derived from plant residues, animal manure, or other organic sources. It enhances soil fertility and reduces dependence on chemical fertilisers. ▪ Utilise bio-fertilisers. This approach improves soil structure and microbial activity over time. If non-organic fertilisers are unavoidable, keep in mind that they should be applied in measured doses when and where the crop requires them, avoiding excessive contamination of the environment.	Equipment for soil improvement with organic and bio-fertiliser. Equipment for composting.
Machinery and accessories providing alternatives to burning waste	Adopt machines and methods of processing residues that allow to completely eliminate burning of agricultural residues.	Tools, labour, and electric, hybrid or biofuel-based machinery/accessories provide alternatives to burning waste, such as electric, hybrid or biofuel-based mechanised harvesters.
Advanced Practices		
Biodigesters	Implement biodigesters for compost and methane (biogas) production. The production of fertiliser and biogas from animal manure and other organic waste involves supporting collection areas for those in need of large biogas digesters. This can be achieved by gathering manure from multiple farmers and small-scale farms.	Equipment, supplies, and labour, *fixed dome digester,* including construction, improvement, and machinery for efficient wastewater treatment, such as sludge dewatering machines
Straw and stubble management (SSM)	▪ Straw and stubble collection and removal for valorization purposes ▪ Incorporating straw and stubble into the soil while allowing sufficient time for aerobic decomposition	▪ Harvesting and baling services for straw collection including equipment cost, labour, transport and storage ▪ Costs for incorporation services and equipment

Title	Description	Eligible inputs
	▪ Decomposition in the field using effective microorganisms (EM) for compost and methane (biogas) production ▪ For removal options, selling the straw and stubble to buyers or own use, including e.g. the following ▪ Composting of straw ▪ Mushroom production from straw ▪ Industrial uses of straw (e.g. pulping or conversion into biofuels) and biomass-to-energy uses	▪ Costs for effective microorganisms (EM) inputs and related costs for application services, labour for decomposition of straw and stubble in-field ▪ Inputs for compost production from rice straw including equipment, services, labour, manure for mixing, biodigesters ▪ Inputs for value added products, such as biomass, packaging, and mushroom production and processing from rice straw, e.g. sheds and equipment pieces, labour, substrate and fungal strains and other inputs
Drones for agricultural use	Employ unmanned aerial vehicle used in agriculture operations, mostly in yield optimization and in monitoring crop growth and crop production. Agricultural drones provide information on crop growth stages, crop health, and soil variations.	Drones, auxiliary equipment, training
Precision agriculture equipment	Precision agriculture is a farming management strategy based on observing, measuring and responding to temporal and spatial variability to improve agricultural production sustainability. It is used in both crop and livestock production. Precision agriculture often employs technologies to automate agricultural operations, improving their diagnosis, decision-making or performing. The goal of precision agriculture research is to	Any precision agriculture equipment contributing to the objectives of the Taxonomy. (Please refer to **Table 9** under Precision Agriculture Practices.)

Title	Description	Eligible inputs
	define a decision support system for whole farm management with the goal of optimizing returns on inputs while preserving resources.	
Agro-met advisory services	▪ Targeted advisory service and data in connection with farm and weather advisory ▪ GIS or drone-based analysis and monitoring for agricultural recommendations	▪ Farm planning with Agro-met information and smart farm management systems, smart sensors ▪ Data services and subscription fees for climate-smart agricultural advisory services
Agrosilvopastoral systems (NBS)	Implement integrated farming systems that combine tree crops, annual crops, and livestock production on the same area of land. These systems aim to maximise the productivity and sustainability of land use by harnessing complementary interactions between different components.	Seeds, seedlings, fertilisers, animals, and other supplies.

Complementary Adoptions	
▪ **Rice harvesters** ▪ **Infrastructure and equipment to produce bio-inputs in general.** ▪ **Establishment of forest plantations (NBS)** ▪ **Maintenance of forest plantations (NBS)**	▪ Efficient engines ▪ Efficient pumping systems ▪ Modernisation of the cooling systems ▪ Energy saving and clean technology

3. Sustainable sugarcane production

Table 11 Eligible practices for sustainable sugarcane production

Title	Description	Eligible inputs
	Basic Practices	
Conservation tillage	Practice minimum tillage or no-till farming to improve soil structure, reduce erosion, and enhance organic matter content. Covering cropping during fallow periods helps protect the soil and improve its fertility. Minimising soil disturbance through techniques like no-till or reduced tillage helps to retain soil moisture, prevent erosion, and maintain soil structure, leading to improved soil health and reduced carbon emissions.	Seedlings, seeds, fertilisers, light equipment for soil work, planting materials such as stem cuttings
Pest and disease control	▪ Plants live fences with native species as biological barriers. ▪ Integrated pest and disease management. ▪ Biological control.	▪ Plant material, seeds, native seedlings. ▪ Materials required in biological control. ▪ Insect pest control
Water resources management	Enhance water use efficiency in sugarcane production management by comparing the effectiveness of water use per unit area. Introduce water use efficiency in irrigation. Prevent water contamination with organic or chemical residues. Avoid excessive crop waterlogging with better drainage. Manage wastewater using natural based solution like constructed wetland.	▪ Systemisation of irrigation, control, and water quality equipment. ▪ Storage tanks and ponds. ▪ Efficient water control systems tailored to the available water supply, including quality water management equipment. ▪ Natural water sources (canals, natural ponds) and constructed water sources (reservoirs, shallow wells, boreholes).

Title	Description	Eligible inputs
Crop rotation	Crop rotation is essential to prevent the buildup of pests and diseases in the soil. Rotating crops helps break pest cycles, improves soil structure, and balances nutrient availability. Implement rotations according to a periodic program based on the region; then, establish associated crops for moisture management, fertility, and biological activity.	Seeds, seedlings, equipment, and labour for crop rotation.
Intermediate Practices		
Land levelling	Land leveling is a process used in agriculture to create a uniformly flat or gently sloping surface. This technique involves reshaping the natural contours of the land to eliminate variations in elevation, thereby ensuring that the surface is even and suitable for specific purposes. The levelled ground makes it easier to use electric, hybrid or biofuel-based agricultural machinery for harvesting sugarcane.	Any input associated with the implementation of the practice.
Composting, organic and bio-fertilisers	▪ Utilise compost and organic fertilisers derived from plant residues, animal manure, or other organic sources. It enhances soil fertility and reduces dependence on chemical fertilisers. ▪ Utilise bio-fertilisers. This approach improves soil structure and microbial activity over time. If non-organic fertilisers are unavoidable, keep in mind that they should be applied in measured doses when and where the crop requires them, avoiding excessive contamination of the environment.	● Equipment for soil improvement with organic and bio-fertiliser. ● Equipment for composting. ● Tools and additives for composting practices
Replacement of slash and burn with	Adopt chop and mulch systems or mechanised sugarcane harvesting. Manage	Tools, labour, and electric, hybrid or biofuel-based

Title	Description	Eligible inputs
sustainable practices	sugarcane leaves and tops by selling them to processing operators, chopping into the soil, or use them as mulch to avoid burning.	machinery/accessories provide alternatives to burning waste, such as mechanised harvesters.
Advanced Practices		
Biodigesters	Implement biodigesters for compost and methane (biogas) production.	Equipment, supplies, and labour, *fixed dome digester,* including construction, improvement, and machinery for efficient wastewater treatment, such as sludge dewatering machines
Genetic improvement of seedlings and reproductive material	Plant-certified varieties adapted to the region.	Certified and adapted plant material.
Drones for agricultural use	Employ unmanned aerial vehicle used in agriculture operations, mostly in yield optimization and in monitoring crop growth and crop production. Agricultural drones provide information on crop growth stages, crop health, and soil variations.	Drones, auxiliary equipment, training
Precision agriculture equipment	Precision agriculture is a farming management strategy based on observing, measuring and responding to temporal and spatial variability to improve agricultural production sustainability. It is used in both crop and livestock production. Precision agriculture often employs technologies to automate agricultural operations, improving their diagnosis, decision-making or performing. The goal of precision agriculture research is to define a decision support system for whole farm	Any precision agriculture equipment contributing to the objectives of the Taxonomy. (Please refer to **Table 9** under Precision Agriculture Practices.)

Title	Description	Eligible inputs
	management with the goal of optimizing returns on inputs while preserving resources.	
Agrosilvopastoral systems (NBS)	Implement integrated farming systems that combine tree crops, annual crops, and livestock production on the same area of land. These systems aim to maximise the productivity and sustainability of land use by harnessing complementary interactions between different components.	Seeds, seedlings, fertilisers, animals, and other supplies.
Complementary Adoptions		
▪ Infrastructure and equipment to produce bio-inputs in general. ▪ Efficient pumping systems ▪ Energy saving and clean technology		▪ Efficient engines ▪ Modernisation of the cooling systems ▪ Establishment of forest plantations (NBS) ▪ Maintenance of forest plantations (NBS)

4. Sustainable oil palm production

Table 12 Eligible practices for sustainable oil palm production

Title	Description	Eligible inputs
Basic Practices		
Soil conservation	Reduce machinery use. Reduce any potential disturbance to the soil.	Light equipment for soil works.
Intercropping, cover cropping and mulching	Intercropping refers to the practice of growing different crops together to optimize land use, improve soil health, and enhance overall farm productivity. Planting cover crops or using mulch between palm oil rows helps to suppress weeds, retain soil moisture, and improve soil health. This reduces the need for herbicides and synthetic fertilisers while promoting natural nutrient cycling.	Seeds, fertilisers and other supplies, oil palm fronds, empty fruit bunches
Pest and disease control	Integrated pest and disease management. Biological control.	Materials required in biological control.
Intermediate Practices		
Composting, organic and bio-fertilisers	▪ Utilise compost and organic fertilisers derived from plant residues, animal manure, or other organic sources. It enhances soil fertility and reduces dependence on chemical fertilisers. ▪ Utilise bio-fertilisers. This approach improves soil structure and microbial activity over time. If non-organic fertilisers are unavoidable, keep in mind that they should be applied in measured doses when and where the crop requires them, avoiding excessive contamination of the environment.	▪ Equipment for soil improvement with organic and bio-fertiliser. ▪ Equipment for composting.
Machinery and accessories providing	Adopt machines and methods of processing residues that allow to completely eliminate burning of agricultural residues.	▪ Tools, labour, and electric, hybrid or biofuel-based machinery/accessories

Title	Description	Eligible inputs
alternatives to burning agricultural residues	Option: Pyrolysis of agricultural residues to produce biochar, which enhances soil quality and contributes to carbon sequestration.	provide alternatives to burning waste, such as mechanised harvesters. ▪ Machinery or kilns designed for the pyrolysis of agricultural residues to produce biochar. Such machines and kilns must have integrated emission reduction measures.
Traceability and certification	Traceability is a mechanism to ensure transparency in monitoring the environmental, economic, health and social consequences of agricultural production. It also allows exporters to quickly identify and withdraw any product with sanitary or phytosanitary problems or non-compliance with protocols. Certification of products can further enhance their safety, value and marketing potential.	Certification costs, technical assistance, monitoring systems, and internet connection costs
Advanced Practices		
Biodigesters	Implement biodigesters for compost and methane (biogas) production.	Equipment, supplies, and labour, fixed dome digester, including construction, improvement, and machinery for efficient wastewater treatment, such as sludge dewatering machines
Biodiversity conservation	Preserving and restoring natural habitats within and around oil palm plantations promotes biodiversity conservation and ecosystem resilience. This can include maintaining riparian buffers, establishing wildlife corridors, and planting native tree species.	Seedlings, fertilisers, equipment, and other supplies.
Plant genetic improvement	Certified plant varieties that have been developed and adapted to specific environmental conditions.	Plant materials that are certified and improved for suitability to the environment.

Title	Description	Eligible inputs
and propagation materials		
Drones for agricultural use	Employ unmanned aerial vehicle used in agriculture operations, mostly in yield optimization and in monitoring crop growth and crop production. Agricultural drones provide information on crop growth stages, crop health, and soil variations.	Drones, auxiliary equipment, training
Precision agriculture equipment	Precision agriculture is a farming management strategy based on observing, measuring and responding to temporal and spatial variability to improve agricultural production sustainability. It is used in both crop and livestock production. Precision agriculture often employs technologies to automate agricultural operations, improving their diagnosis, decision-making or performing. The goal of precision agriculture research is to define a decision support system for whole farm management with the goal of optimizing returns on inputs while preserving resources.	Any precision agriculture equipment contributing to the objectives of the Taxonomy. (Please refer to **Table 9** under Precision Agriculture Practices.)
Agrosilvopastoral systems (NBS)	Implement integrated farming systems that combine tree crops, annual crops, and livestock production on the same area of land. These systems aim to maximise the productivity and sustainability of land use by harnessing complementary interactions between different components.	Seeds, seedlings, fertilisers, animals, and other supplies.
Complementary Adoptions		
Nature-based water management (NBS)	▪ The activity is identified as a flood risk reduction or a drought risk reduction measure either in a water use and protection management plan at a river basin scale. ▪ The activity identifies and address the risks of environmental degradation related to the preservation of water quality and the prevention of water stress	

Title	Description	Eligible inputs
	and deterioration of the status of affected water bodies to achieve good water status and ecological potential. ▪ The activity includes nature restoration or conservation actions that demonstrate specific ecosystem co-benefits, which contribute to achieving good water status. Local stakeholders are involved from the outset in the planning and design phase. The activity is based on the principles outlined by the IUCN Global Standard for nature-based solutions. Note 1: the activity takes into account National Biodiversity Strategies and Action Plans for the setting of nature conservation and restoration targets and for the description of the measures to achieve these targets. Note 2: A monitoring programme is in place to evaluate the effectiveness of a nature-based solution scheme in improving the status of the affected water body, achieving the conservation and restoration targets and in adapting to changing climate conditions.	
▪ **Infrastructure and equipment to produce bio-inputs in general** ▪ **Establishment of forest plantations (NBS)** ▪ **Maintenance of forest plantations (NBS)** ▪ **Efficient engines** ▪ **Efficient pumping systems** ▪ **Modernisation of the cooling systems** ▪ **Energy saving and clean technology**		

5. Sustainable rubber trees production

Table 13 Eligible practices for sustainable rubber trees production

Title	Description	Eligible inputs
Basic Practices		
Soil conservation (NBS)	Implement erosion control measures such as contour planting, terracing, or vegetative barriers to prevent soil erosion and maintain soil fertility. Conserving soil health is critical for long-term rubber productivity.	Light equipment for soil works.
Responsible chemical use	When synthetic pesticides and fertilisers are necessary, use them judiciously and follow best management practices to minimise environmental impact and human exposure. Proper storage, handling, and disposal of chemicals are essential to prevent contamination of soil and water resources.	Precision equipment, storage facilities, disposal systems and other supplies.
Pest and disease control	Integrated pest and disease management. Biological control.	Materials required in biological control.
Intermediate Practices		
Composting, organic and bio-fertilisers	▪ Utilising compost and organic fertilisers derived from plant residues, animal manure, or other organic sources enhances soil fertility and reduces dependence on chemical fertilisers. ▪ Utilise bio-fertilisers. This approach improves soil structure and microbial activity over time. If non-organic fertilisers are unavoidable, keep in mind that they should be applied in measured doses when and where the crop requires them, avoiding excessive contamination of the environment.	Equipment for soil improvement with organic and bio-fertiliser. Equipment for composting.
Water resources management	Efficient water management practices, such as drip irrigation or rainwater harvesting,	▪ Drip irrigation and drainage systems.

Title	Description	Eligible inputs
	help optimise water use and minimise water wastage (loss). This is particularly important in regions where water resources are limited or prone to drought.	▪ Storage tanks and ponds.
Traceability and certification	Implement traceability systems and obtain certification from reputable organisations such as the Forest Stewardship Council (FSC) or the Rainforest Alliance. Certification ensures compliance with sustainability standards and demonstrates a commitment to responsible rubber production.	Verification and compliance costs.
Machinery and accessories providing alternatives to burning waste	Adopt machines and methods of processing residues that allow to completely eliminate burning of agricultural residues.	Tools, labour, and electric, hybrid or biofuel-based machinery/accessories provide alternatives to burning waste, such as mechanised harvesters.
Advanced Practices		
Biodigesters	Implement biodigesters for compost and methane (biogas) production.	Equipment, supplies, and labour, *fixed dome digester,* including construction, improvement, and machinery for efficient wastewater treatment, such as sludge dewatering machines
Biodiversity conservation	Preserving and restoring natural habitats within and around rubber plantations to promote biodiversity and ecosystem resilience. This can include maintaining riparian buffers, establishing wildlife corridors, and planting native tree species.	Seedlings, fertilisers, equipment, and other supplies.
Genetic improvement of reproductive material	Plant certified seedlings varieties adapted to the region.	Certified and adapted plant material.

Title	Description	Eligible inputs
Drones for agricultural use	Employ unmanned aerial vehicle used in agriculture operations, mostly in yield optimization and in monitoring crop growth and crop production. Agricultural drones provide information on crop growth stages, crop health, and soil variations.	Drones, auxiliary equipment, training
Precision agriculture equipment	Precision agriculture is a farming management strategy based on observing, measuring and responding to temporal and spatial variability to improve agricultural production sustainability. It is used in both crop and livestock production. Precision agriculture often employs technologies to automate agricultural operations, improving their diagnosis, decision-making or performing. The goal of precision agriculture research is to define a decision support system for whole farm management with the goal of optimizing returns on inputs while preserving resources.	Any precision agriculture equipment contributing to the objectives of the Taxonomy. (Please refer to **Table 9** under Precision Agriculture Practices.)
Agrosilvopastoral systems (NBS)	Integrate rubber cultivation with other crops, trees, and livestock to enhance biodiversity, soil health, and ecosystem resilience. Agroforestry systems can provide additional income sources for farmers while reducing the risk of soil erosion and nutrient depletion.	Seeds, seedlings, fertilisers, animals, and other supplies.
Complementary Adoptions		
Nature-based water management (NBS)	▪ The activity is identified as a flood risk reduction or a drought risk reduction measure either in a water use and protection management plan at a river basin scale. ▪ The activity identifies and address the risks of environmental degradation related to the	

Title	Description	Eligible inputs
		preservation of water quality and the prevention of water stress and deterioration of the status of affected water bodies to achieve good water status and ecological potential. ▪ The activity includes nature restoration or conservation actions that demonstrate specific ecosystem co-benefits, which contribute to achieving good water status. Local stakeholders are involved from the outset in the planning and design phase. The activity is based on the principles outlined by the IUCN Global Standard for nature-based solutions. Note 1: the activity takes into account National Biodiversity Strategies and Action Plans for the setting of nature conservation and restoration targets and for the description of the measures to achieve these targets. Note 2: A monitoring programme is in place to evaluate the effectiveness of a nature-based solution scheme in improving the status of the affected water body, achieving the conservation and restoration targets and in adapting to changing climate conditions.
▪ Infrastructure and equipment to produce bio-inputs in general. ▪ Establishment of forest plantations ▪ Maintenance of forest plantations		▪ Efficient engines ▪ Efficient pumping systems ▪ Modernisation of the cooling systems ▪ Energy saving and clean technology

6. Sustainable cassava production

Table 14 Sustainable practices for cassava production

Practice	Description	Eligible inputs
Basic Practices		
Soil conservation and contour planting	Implementing contour planting helps reduce soil erosion and water runoff in sloped areas, improving soil moisture retention. This practice involves planting cassava along natural land contours, slowing down water movement and preventing nutrient loss. It is a cost-effective approach to maintaining soil structure and long-term productivity.	Contour mapping tools, basic training for farmers, and stakes for marking planting rows.
Organic mulching	Applying organic mulch, such as crop residues or leaves, around cassava plants helps retain soil moisture, suppress weeds, and enhance soil organic matter. Mulching reduces temperature fluctuations, minimizing stress on plants and improving root development.	Crop residues, dried leaves, coconut husks, or straw.
Timely and balanced fertilization	Using appropriate amounts of organic and inorganic fertilisers at key growth stages ensures optimal cassava development while preventing nutrient imbalances and soil degradation. Proper fertilization enhances root yield and improves soil fertility over time.	Compost, farmyard manure, NPK fertilisers, and soil testing kits.
Intermediate Practice		
Intercropping with legumes	Growing cassava alongside nitrogen-fixing legumes (such as peanuts or cowpeas) improves soil fertility and reduces the need for synthetic fertilisers. This practice also enhances biodiversity and reduces the risk of pests and diseases by disrupting monoculture cycles.	Legume seeds, knowledge of compatible planting arrangements, and basic irrigation management.
Improved pruning techniques	Improved pruning techniques in cassava can enhance root quality and potentially increase tuber size and starch content by directing the plant's energy toward root development. Pruning also facilitates better air circulation and light penetration, reducing disease risk and supporting healthier plant growth. Additionally, timely pruning can	High-quality pruning tools, such as pruning saws and loppers. Demonstration plots to teach pruning techniques.

Practice	Description	Eligible inputs
	make harvesting easier and extend the shelf-life of cassava roots by minimizing postharvest deterioration.	Access to professional pruning services for initial farm setup.
Cover cropping	Growing cover crops, such as legumes or grasses, during the off-season helps prevent soil erosion, suppress weeds, and enhance soil organic matter. This practice also improves soil moisture retention and reduces the risk of pests and diseases by creating a more resilient soil ecosystem.	Cover crop seeds (e.g., cowpea), land preparation tools, and knowledge of rotation schedules.
Advanced Practice		
Precision agriculture and digital monitoring	Using remote sensing, drones, and soil sensors allows farmers to monitor crop health, detect nutrient deficiencies, and apply inputs precisely where needed. This approach optimizes yields while minimizing resource waste and environmental impact.	Drones, GIS software, soil sensors, and farmer training programs.
Bioinput-based pest and disease management	Implementing integrated pest and diseases management (IPM and IDM) using biopesticides, beneficial insects, and microbial inoculants reduces reliance on chemical pesticides. This practice enhances soil health and prevents pest resistance while supporting biodiversity in cassava fields.	Biopesticides, beneficial insect breeding stations, microbial inoculants, and training for farmers on IPM techniques.
Agroforestry systems	Integrating cassava cultivation with trees and shrubs enhances biodiversity, improves soil health, and provides additional income sources through diversified products. Agroforestry systems also help mitigate climate risks by increasing carbon sequestration and improving microclimate conditions.	Agroforestry species, tree seedlings, knowledge of planting arrangements, and pruning tools.
Complementary Adoptions		

Practice	Description	Eligible inputs
■ Establishment and strengthening of organizations for implementing basic sustainable practice. ■ Energy savings and clean energy ■ Electric, hybrid or biofuel-based machinery and accessories for minimum and conservation tillage ■ Biodigester machinery and equipment	■ Efficient engines ■ Efficient pumping systems ■ Modernization of cooling systems ■ Live fences ■ Conservation tillage ■ Silvopastoral systems	

7. Sustainable livestock production

Table 15 Eligible practices for Sustainable livestock production

Title	Description	Eligible Inputs
Basic Practices		
Compliance with agricultural standards	Implement actions required to obtain sustainable agriculture certification from **Table 5**.	Inputs required to transform the farm in line with the requirements for the said certifications
Efficient management and protection of water sources	Collect, store, and conserve water to provide livestock with a clean and reliable source during seasonal and climatic variations. Harvest water and build livestock aqueducts.	Drinking troughs, hoses, floats, buoys, pumps, storage tanks and piping; construction of water ponds, reservoirs, water storage tanks, or other systems that promote efficient water use, enabling production to continue during water shortages.
Water management	Protect natural water sources from direct access by livestock, e.g. by isolating riparian forest areas, planting native species for stream restoration, preventing diversion of rivers and streams, and preserving springs and wetlands.	Inputs required to implement the practice
Intermediate Practices		
Animal welfare (excluding health aspects)	Following the above practices provides a favourable environment for livestock, through sufficient and varied diet, shade, accessible watering places, natural windbreaks, vaccination for livestock and space for herd social activities.	Technical assistance on animal welfare, vaccination, and related inputs.
Organic and green manures, manure, and effluent utilisation	Seize good management of manure, urine, and other organic residues (especially on specialised dairy farms) under a manure management plan.	Equipment, material, tools, and inputs (e.g. composting, seedlings, seeds, labour, vermicomposting).

Title	Description	Eligible Inputs
	Use cover crops and crops (sorghum, maise, potato) as green manure. Instant dung loads on grassland, together with fodder trees and shrubs, promote soil biodiversity (e.g. dung beetles, earthworms, etc.); incorporating faeces and urine fertilises and decompacts the soil. Decrease nitrous oxide and methane emissions from manure. Reduce accumulation in animal manure pits, focusing on minimizing contamination at the initial stage before it enters the treatment system.	
Pasture and fodder management	Improve the quality and quantity of pastures and forages with nutritional and metabolic benefits for livestock (FAO principles / tailored to the type of livestock being raised). Stable native pastures allow natural regeneration through rotational grazing. Where conditions are more degraded, new grasses and varieties of grasses and legumes should be introduced to increase forage supply. Incorporate shrubs and trees that provide browseable (edible) fruits and leaves for livestock, accelerating soil recovery and favouring the wildlife population. If pasture cover is less than 80% of the land and there is minimal tree and shrub cover, the soil is considered degraded. With pasture and forage management, an increase in average annual yield of at least 30% per rai is expected within three years compared	Purchase and sowing of seeds of improved or natural varieties of grasses and native creeping legumes, selected according to soil and climatic conditions in the region. Network of nurseries (including on-site nurseries) of native or focal tree material for protection. ▪ Soil suitability with composted material ▪ Irrigation systems, if applicable.

Title	Description	Eligible Inputs
	to the baseline scenario, using the supply calculation based on gauging (i.e. in kg dry biomass per m2 per year).	
Balanced nutrition and local feed sources	Providing a well-balanced diet with locally available feed ingredients optimizes growth rates and feed conversion efficiency while reducing dependency on imported feed. Using alternative protein sources such as cassava meal or insect-based feeds can lower costs and environmental impacts.	Locally sourced grains, mineral supplements, feed formulation guidelines, and feed mixers.
Advanced Practices		
Biodigesters, aquatic plant and aquaculture channels, oxidation ponds, composting and vegetative systems	Integrated management of manure and urine from livestock barns and enclosures with biodigesters, composting, and other technologies, thus avoiding pollution, effectively managing waste and minimising methane emissions. Produce gas, fertilisers, and compost from manure and other organic waste.	Biodigesters, *fixed dome digester,* supplies and installation. Construction, upgrade, and procurement of machinery to enhance wastewater treatment efficiency, such as sludge dewatering presses.
Capacity building on sustainable livestock models	Strengthen training and capacity building of farmers on sustainable livestock models, including through farmers' field schools	Reinforcement of capacity-building programmes on sustainable livestock models; promotion of technological development agreements with private sector and human capital formation
Crop residues utilisation	Crop residue utilisation in livestock feeding is an important climate-smart agricultural practice, especially for	Crop residue utilisation in livestock feeding

Title	Description	Eligible Inputs
	farmers doing integrated crop production and livestock.	
Fodder hedges	Plant shrub species at high densities in linear rows, which act as fodder for livestock while retaining soil and soil moisture. They are often combined with live fences in the division of paddocks.	▪ Planting of hedges of proven species (e.g. Sesbania, Leucaena, Erythrina, Pterocarpus, and Gliricidia, among others). ▪ Drought-tolerant fodder crops ▪ Fodder conservation by: - Silage technology - Hay technique - Hydroponic fodder systems
Improved breeds	Genomic-based improvement of cattle and other livestock in response to climate change can contribute to the increase of productivity, resiliency, and reduction of GHG.	Genomic improvement programs: genetically improved cattle or other livestock whose improvement is aimed at limiting climate footprint
Intensive silvopastoral systems (SSPI)	Encourage a more integrated agroforestry arrangement, combining the practices mentioned above, such as forage hedges and trees in high densities under fixed rotation patterns. Fodder banks, mixed fodder banks, and fodder hedgerows are types of arrangements that allow for a greater variety of species, high protein benefits, nutrient recycling, soil moisture retention, and biodiversity.	Purchase and planting of species proven in various regions and conditions (e.g. Leucaena), adaptation of paddocks, watering troughs and related inputs.
Live fences	Establish lines of trees or shrubs to delimit a property in place of poles; this provides by-products such as fodder, firewood, timber, flowers for honey, fruit, etc. Based on experience,	Seeds, seedlings, planting, pruning equipment, and inputs for tree care.

Title	Description	Eligible Inputs
	the recommended distance between trees is 3 metres or more in the case of wide canopy species.	
Mixed fodder banks	Designate an area of the farm where forage material is sown to feed livestock throughout the year, which can be "saved" and conserved for use during critical periods (such as storms and droughts) that affect pasture production on the farm. In this area, intensive crops are established in which herbaceous, arboreal, and shrub species of high nutritional value are associated with obtaining high-quality fodder that is rich in proteins, minerals, sugars, fibre, and vitamins for animal feed.	Planting of fodder, materials, equipment, and labour for storage, including inputs for silage and other forms of fodder conservation.
Reducing methanogens and improving animal diet	Incorporating a reasonable share of carbohydrates and/or amino acid-containing feed in a cattle diet, increasing feed intake, processing forages, and offering a diet that includes unsaturated fat may contribute to reducing methanogens or other microbes involved in methanogenesis. The same is achieved through immunisation against methanogens, use of special feed additives (such as cattle methane suppression feed containing cashew nut shell liquid (CNSL) and general changes in a cow's diet. Enhance food quality for easier digestion.	Carbohydrates, amino acid-containing feed, dietary supplements, immunisation materials; *precision nutrition diet*

Title	Description	Eligible Inputs
Scattered paddock trees	Strengthen the presence of trees by natural regeneration or direct planting that provides shade and feed for livestock. Ensure the maintenance and development of the trees. This practice protects pastures and crops from the wind, increases decompaction and nutrient recycling, strengthens organic matter, biogenesis, and runoff and prevents wind erosion. Based on successful projects, minimum densities of 30 trees per 6.25 rai in the low and middle tropics and up to 25 trees per 6.25 rai in the high tropics, with a minimum height of 2 metres, are recommended.	Network of nurseries and dissemination of native species at the territorial level. Awareness-raising is needed in the management of material identification, planting, and pruning for the formation of plant material.
Improved housing and ventilation	Ensuring proper housing with adequate space, ventilation, and temperature control reduces stress, improves animal welfare, and prevents respiratory diseases. Well-ventilated housing also reduces ammonia buildup, lowering the risk of infections and improving overall productivity.	Fans, ventilation systems, shading materials, and appropriate stocking density guidelines. Introduction of evaporative house (EVAP) farm system
Complementary adoptions		
Clean energies (solar, wind, gravity) and energy efficiency	Harness renewable energy sources, such as photovoltaic cells and biogas from biodigesters. Optimise the use of energy and fuels in equipment and machinery with good maintenance and usage control.	Gas-fired generators are derived from biodigesters, as well as photovoltaic and wind power systems.
Nature-based water management	Nature-based solutions (NBS) for water resources management involve the planned use of ecosystem services to improve water quantity and quality and increase resilience to climate change.	▪ The activity is identified as a flood risk reduction or a drought risk reduction measure either in a water use and

Title	Description	Eligible Inputs
	Including measures to help prevent and protect against floods or droughts.	protection management plan at a river basin scale. ▪ The activity identifies and address the risks of environmental degradation related to the preservation of water quality and the prevention of water stress and deterioration of the status of affected water bodies to achieve good water status and ecological potential. ▪ The activity includes nature restoration or conservation actions that demonstrate specific ecosystem co-benefits, which contribute to achieving good water status. Local stakeholders are involved from the outset in the planning and design phase. The activity is based on the principles outlined by the IUCN Global Standard for nature-based solutions. Note 1: the activity takes into account National Biodiversity Strategies and Action Plans for the setting of nature conservation and restoration targets and for the description of the measures to achieve these targets. Note 2: A monitoring programme is in place to evaluate the effectiveness of a nature-based solution scheme in improving the

Title	Description	Eligible Inputs
		status of the affected water body, achieving the conservation and restoration targets and in adapting to changing climate conditions.
Parametric Insurance for mitigating climate risks	Parametric insurance or insurance based on climatic indexes are contracts that stipulate compensation based on the occurrence of specified climatic events (hurricanes, floods, among others).	Insurance based on climatic indexes
Weather monitoring and forecast systems	Satellite analysis systems and aerial systems have been put in place. Monitoring, control systems and warning protocols for early warning actions.	Early warning systems, software, hardware, analysis services, drones, licenses, and communication equipment, including real-time data collection

8. Sustainable aquaculture production

Table 16 Eligible practices for sustainable aquaculture production

Title	Description	Eligible inputs
	Basic Practice	
Compliance with agricultural standards	Implement actions required to obtain sustainable agriculture certification from Table: List of eligible certification schemes. (**Table 5**)	Inputs required to transform the farm in line with the requirements for the said certifications
Aquatic animal bank	The aquatic animal bank project aims to restore biodiversity in water sources, allowing local communities to catch aquatic animals for use. This reduces fishing in natural water sources and conserves species that are important to the ecosystem and at risk of extinction. It also mitigates the impacts of climate change that threaten the survival of certain species in changing environments.	Costs for Improving Community Water Sources, Fry Nursery Cages, Agricultural Materials
Biosecurity system	Implement biosecurity systems for aquaculture facilities such as hatcheries, nurseries, and farms to mitigate the risks of disease outbreaks and emerging infectious diseases that are becoming more severe due to climate change.	Hatcheries, management and quarantine facilities, disinfection systems, filtration and water treatment systems, monitoring tools and equipment, and cleaning and sterilization materials.
Closed-system aquaculture technology with recirculating water and wastewater management	Closed Recirculating Aquaculture Systems (RAS) are a method of farming aquatic animals in confined space. This approach, encompassing both indoor and outdoor RAS, combines with water quality control through recirculating systems that reuse water. This helps to reduce water resource consumption and minimizes wastewater discharge into the environment. Consider implementing simple water reuse practices.	Greenhouses, pond, heat domes, RAS System (Recirculating Aquaculture System), Water Filtration and Treatment Systems, Water Quality Testing Equipment

Title	Description	Eligible inputs
Disease control and monitoring in aquaculture farms	Reducing the risk of aquatic animal diseases in aquaculture farms by enhancing the efficiency of disease control and monitoring systems. This involves the establishment of laboratories and disease tracking systems to manage potential widespread and severe outbreaks that may be exacerbated by climate change due to global warming.	Scientific instruments for aquatic animal laboratories, reagents and chemicals for analysis, and reporting and monitoring systems.
Mobile hatchery	Using mobile hatcheries to breed fish in both natural and community water sources reduces the need for fuel energy in transporting fry from hatcheries. It also increases the survival rate of fry that can be directly released into the water, helping to restore aquatic resources depleted by overuse and conserve species in these water sources.	Costs for Materials and Equipment for Mobile Hatcheries
Production of microorganisms for biological aquaculture	Producing high-quality microorganisms for aquaculture helps farmers reduce production costs by decreasing the use of drugs and chemicals. It also aids in maintaining appropriate water quality, reducing energy costs for water exchange, and lowering hidden costs associated with aquatic animal diseases. Farmers who consistently use these microorganisms achieve greater success in aquaculture and lower the risk of antibiotic-resistant infections.	Scientific Materials, Agricultural Materials, Laboratories, Microbial Culture Production Center, Microbial Cultures
Intermediate Practice		
Energy saving and the use of clean energy (Solar cells)	Using solar cells in aquaculture farms allows for the generation of electricity from solar energy during the day to power aeration machines and various electrical equipment within the farm. This helps farmers significantly reduce energy costs. To	Install Solar Cell Systems, Equipment Maintenance Services to improve efficiency, Automatic Aerator Control Systems (Smart Aerator Control), Install Energy Storage Systems (Batteries),

Title	Description	Eligible inputs
	store solar energy for nighttime use, additional batteries for energy storage are required. This approach represents a development in environmentally friendly technology and innovation, reducing reliance on coal energy, which contributes to global warming.	Purchase High-Efficiency Electrical Equipment to save energy for use on the farm
Improving aquatic animal breeds to withstand environmental conditions	Improving aquatic animal breeds using environmental data from the farming location, such as temperature, salinity, and disease resistance, helps produce resilient strains that can withstand diseases and climate changes caused by global warming.	Greenhouses, Breeding Stock, Biosecurity Systems, Water Treatment Systems, Breeding Feed, Aquatic Disease Testing Tools, Laboratories, Sterile Natural Feed Production Greenhouses, Other Production Factors
Integrated multi-trophic aquaculture (IMTA) system	Integrating aquaculture systems by farming various species together, such as marine fish with seaweed and shellfish, shrimp with freshwater snails, or farming shrimp with tilapia, and other combinations like grass carp with other plant-eating fish.	Greenhouses, Ponds, Production Factors, Aquatic Species, Agricultural Materials, Tools, Materials and Equipment
Production and feeding to produce low-carbon aquatic animals	Improving food production methods and reducing fossil fuel use in feed manufacturing helps lower greenhouse gas emissions. This includes producing low-protein food, using alternative ingredients, supplementary feed, prebiotics, and enhancing feeding methods in aquaculture farms through automatic feeders, food intake tracking systems, and growth monitoring systems to reduce greenhouse gas emissions from aquaculture.	Capital expenditure for Feed Manufacturing: Alternative Energy Systems, Clean Energy, Feed Production Equipment, Raw Materials, Feed Production Plants, Raw Material Silos, Research Investment, Prototype Factory Construction Investment Expenses for Aquaculture Farms: Raw Materials, Automatic Feeders, Systems and Materials, Equipment, Tools
Promotion of aquatic animal health	Practices to ensure the health of aquatic animals and reduce mortality within farms, such as vaccinating animals, feeding with	Knowledge in Vaccine Production and Immune Stimulators, Scientific Materials and Equipment, Vaccine

Title	Description	Eligible inputs
	immune-boosting additives, or using probiotics during cultivation.	Production Centers, Immune Stimulators and Probiotics
Traceability and quality certification standards for aquatic products	Using traceability systems and certification standards for aquatic products to ensure consumer confidence in purchasing products with verified sources and environmental friendliness. This includes improving production processes for efficiency and standards to reduce production losses and greenhouse gas emissions, while avoiding harmful chemicals that affect consumers and the environment.	Expenditure for Traceability Systems, Expenses for Certification, Inspection, and Compliance, Expenses for Farm Improvements, Aquaculture Systems, Waste Treatment Systems
Transportation of live aquatic animals	▪ **Option 1: Live Aquatic Animal Transport for Aquaculture**: Developing live aquatic animal transport technology to reduce the use of plastic bags for packing and transporting animals by switching to environmentally friendly packaging, such as aerated transport tanks with temperature control systems. ▪ **Option 2: Live Aquatic Animal Transport for Consumption**: Developing live aquatic animal transport technology to control and maintain animal quality by using electric vehicles with temperature control for transport.	Aquatic Animal Transport Tanks with aeration and temperature control systems, Electric Vehicles for Transport, Environmentally Friendly Packaging
Advanced Practice		
Aquaculture insurance	Aquaculture insurance covers risks related to diseases and emerging diseases, which may be caused by climate change.	Aquatic Product Insurance for damage caused by aquatic animal diseases, Development of Aquatic Insurance Prototypes
Aquaculture warning system	Aquatic animals are sensitive to environmental changes. Climate variability can cause damage and loss of property	Early Warning Systems, Database Management Systems, Network Systems, Computers, Software,

Title	Description	Eligible inputs
	because farmers are unable to anticipate and prepare for potential hazards. The application of various detection systems (sensors) to measure parameters affecting aquaculture, combined with machine learning and artificial intelligence (AI), along with satellite imagery and external data sources, allows for predicting environmental conditions impacting aquaculture. This helps in providing early warnings so that farmers can prepare for and mitigate potential damage.	Hardware, Analytical Services, Drones, Licenses and Communication Equipment, Real-Time Data Collection
Precision aquaculture system	Utilizing IoT technology to connect data between sensors, devices, and users helps in controlling aquaculture systems. For instance, smart aerators, automatic feeders, real-time water quality measurement devices, and surveillance cameras in aquaculture ponds represent innovations using sensors to monitor real-time changes in water quality. These systems can control aerator operation to ensure optimal performance, with notifications sent via smartphones or sound alarms when oxygen levels or water quality fall below critical thresholds. This optimizes aerator operation to avoid unnecessary energy consumption, thus reducing energy use and costs.	Various Detection Systems (Sensors), Electrical Equipment, Equipment for System Installation, Internet of Things (IoT) Technology, Artificial Intelligence (AI) Systems