

Co -benefits Report

Project	Carbon sequestration and greenhouse gas emission reduction in rubber Plantations Buriram Province using Cryptocurrency, Blockchain and satellite technology
Project format	Bundling Projects
Project developer	ETM Group Company Limited
Project owner	Carbon Solution (Thailand) Limited Partnership
Operating area	Samrong Mai Subdistrict, Lahan Sai District, Buriram Province <i>01BR01S1 (Internal Project ID)</i>
Report date	June 1, 2025

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Executive Summary

The Carbon Capture and Greenhouse Gas Reduction Project in Rubber Plantations in Buriram Province, owned by Carbon Solution (Thailand) Limited Partnership and developed by ETM Group Co., Ltd., is an integrated project with the primary goal of mitigating climate change through sustainable rubber plantation management. 131 farmers participated in the project, covering a total area of 1,936.15 rai. The project also creates significant and diverse co-benefits for the environment, society, and local economy in Buriram Province. The application of cutting-edge technologies such as cryptocurrency, blockchain, and satellites increases the transparency, reliability, and efficiency of operations and verification of these benefits. This can reduce field inspection costs by approximately 30-40% and increase the accuracy of carbon capture data by more than 95%. This project not only supports climate goals but also promotes sustainable development, aligning with the United Nations Sustainable Development Goals (SDGs), particularly by improving the quality of life of rubber farmers, conserving natural resources, and creating economic value at the community level. With the potential to generate an average of 1,300 additional incomes for farmers, Baht/rai from carbon credits (data from simulation) and reducing the use of chemicals that are harmful to health and the environment by not less than 20%.

1. Introduction

1.1 Background and importance of the project

Climate change is a global challenge that requires collaboration from all sectors. The agricultural sector, particularly rubber plantations, a key economic crop in Thailand, has high potential to play a part in solving this issue through carbon sequestration and greenhouse gas emission reduction. The "Carbon Sequestration and Greenhouse Gas Emission Reduction in Rubber Plantations, Buriram Province" project was initiated by Carbon Solutions (Thailand) Limited Partnership and developed by ETM Group Co., Ltd. to promote sustainable rubber plantation management by integrating innovative technologies to improve efficiency, transparency, and access to project benefits.

1.2 Objectives of the Joint Benefits Report

This report aims to

1. Identify and assess the co-benefits arising from the project beyond greenhouse gas sequestration and mitigation.
2. Demonstrate the added value and positive impact of the project on the environment, society and economy in the operating area.
3. It serves as a communication tool and creates awareness among stakeholders about the holistic sustainability of the project.
4. Support funding and recognition from various sectors that prioritize sustainable development.

2. Project overview

2.1 General information of the project

Project name Carbon sequestration and greenhouse gas emission reduction in rubber plantations in Buriram Province using cryptocurrency, blockchain and Satellite technologies.

Project format Bundling Projects to consolidate a large number of small rubber plantations into a single project to increase efficiency and reduce management costs.

Project developer ETM Group Company Limited

Project owner Carbon Solution (Thailand) Limited Partnership

Operating area Buriram Province (Target area in Samrong Mai Subdistrict, Lahan Sai District, 131 cases, total rubber plantation area 1,936.15 rai/or 1 farmer, average approximately 14.78 rai per case)

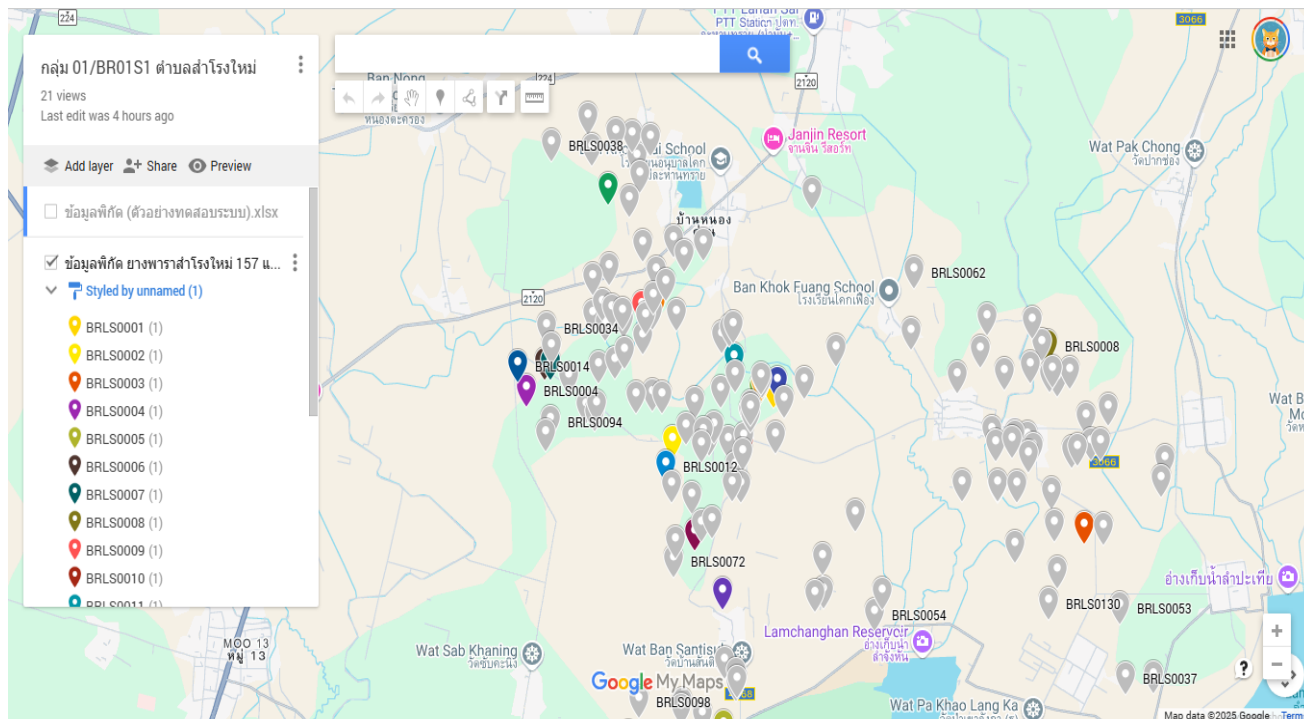


Figure 1 shows an aerial photograph of the rubber plantation area of the members of Samrong Mai Subdistrict (information from [google.com/maps/d/](https://www.google.com/maps/d/)).

2.2 Objectives and scope of the project

Main objectives Reduce greenhouse gas emissions through sustainable rubber plantation management and increase carbon sequestration in rubber plantation biomass and soil.

scope It covers various activities in rubber plantations, from planting, maintenance, harvesting, waste management, and the use of technology for monitoring and reporting results.

2.3 Project implementation mechanism and community participation

The project is implemented to promote sustainable rubber plantation management practices, such as reducing the use of chemicals. Non-burning weed management Intercropping and increasing the efficiency of rubber tapping, which is carried out in collaboration with small farmers in Buriram Province, with farmers participating in knowledge-sharing and training activities, with over 90% of the project participants participating, to create acceptance and true participation.

2.4 Application of technology (Cryptocurrency, Blockchain, Satellite)

Blockchain It is used as a distributed ledger to record information on rubber plantation activities such as fertilizer use and waste management, making the information transparent, traceable, and reliable. With an average of 10 activity records per plot per year, with accurate timestamps.

satellite It is used to track and verify plantation area data, rubber tree health, land use changes and biomass assessment to ensure wide-ranging accuracy in measurement and reporting. Data analysis can cover a total area of 1,936.15 rai with a frequency of every 7 - 14

days. and provide vegetation integrity data (NDVI) Accurate to the plot level (Plot ID) which has higher resolution than traditional field surveys

Cryptocurrency It serves as a mechanism for creating and trading carbon credit tokens, which will increase trading liquidity and promote the direct and efficient distribution of financial benefits from carbon credit sales to farmers. The goal is to reduce the payment process from 5 steps to only 2 steps and reduce the payment period from 30 days to only 7 business days.

3. Conceptual framework and standards for assessing joint benefits

The assessment of co-benefits of the "Carbon Capture and Greenhouse Gas Emission Reduction in Rubber Plantations, Buriram Province" project was conducted under a clear conceptual framework and standards to ensure credibility, transparency, and recognition of the true value the project creates beyond direct greenhouse gas reductions.

3.1 The concept of co- benefits

Co-benefits refer to positive outcomes that result from a project or activity that primarily aims to mitigate or sequester greenhouse gases, but also have important simultaneous benefits in other dimensions, including environmental, social, and economic. These benefits are not the primary goal of the project's initial design, but are rather by-products that add value and sustainability to the overall project. Assessing co-benefits provides stakeholders with a comprehensive picture of how a carbon project is focused on addressing climate change and creating comprehensive benefits that are important for the sustainable development of communities and ecosystems.

3.2 Standard framework used for reference: Standards of ETM Group Co., Ltd. (ETM CARBON TRADE Standard: ECT)

The assessment of the co-benefits of this project will be based on the standards of ETM CARBON TRADE Standard (ECT) BY ETM GROUP Co., Ltd., a framework specifically developed to ensure that carbon projects developed and managed by ETM Group will create sustainable and verifiable positive impacts.

ETM Group's standards are designed to closely align with the guidelines of the Thailand Greenhouse Gas Management Organization (Public Organization) (TGO), Thailand's primary agency promoting greenhouse gas reduction and supporting sustainable development. Key principles are as follows:

Environmental Integrity ETM Group's standards (ECT) focus on promoting practices that restore and preserve the environment beyond carbon reduction, such as increasing biodiversity, improving soil and water quality, and reducing pollution, in line with its approach that prioritizes reducing negative impacts and creating positive outcomes for the overall environment.

Positive Social Impact This standard prioritizes improving the quality of life, well-being and empowerment of participating local communities, as well as promoting participation and fairness in benefit sharing, which are fundamental principles adhered to when considering carbon projects.

Local Economic Development ETM Group's standards (ECT) focus on creating sustainable economic opportunities, increasing incomes and developing new skills for farmers, which are key goals aligned with the country's sustainable development philosophy, which aims for carbon projects to help stimulate the grassroots economy.

Transparency and Traceability ETM Group's standards (ECT) integrate the use of Blockchain and satellite technology to ensure transparent, traceable, and reliable data on activities and benefits. This is a key factor in building trust in the shared benefits and aligns with the trend towards international standards that require accurate and verifiable data.

Adherence to ETM Group's standards (ECT) enables the project to systematically and reliably identify, measure and report its co-benefits, ensuring that it is more than just a greenhouse gas reduction project, but a true driver of sustainable development.

3.3 Categorization of shared benefits according to the Sustainable Development Goals (SDGs)

To ensure that the assessment of co-benefits is clear, universal and can be communicated effectively, the identified co-benefits from the project will be categorised and linked to the United Nations Sustainable Development Goals (SDGs), with the following targets directly relevant to the project:

Classification of Co-Benefits SDG



Figure 2 shows the categorization of shared benefits according to the Sustainable Development Goals (SDGs).

The co-benefits aligned with the SDGs are as follows:

	The Goal 1: No Poverty
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Goal 1: No Poverty This project will provide additional income channels for rubber farmers through the sale of carbon credits, which is expected to increase their average income. Not less than 5 - 10% per year for farmers participating in the project. This will reduce the risk of fluctuations in rubber prices alone, giving farmers greater economic stability and improving the quality of life of their households.

Quantitative mutual benefits

1. **Additional income from carbon credits** Farmers participating in the project receive additional income from average carbon credits. **1,300 baht/rai/year**

2. **Increasing income per person** Each farmer will receive an average additional income. **19,213.7 baht/person/year** (calculated from 1,300 baht/rai/year x 14.78 rai/person)

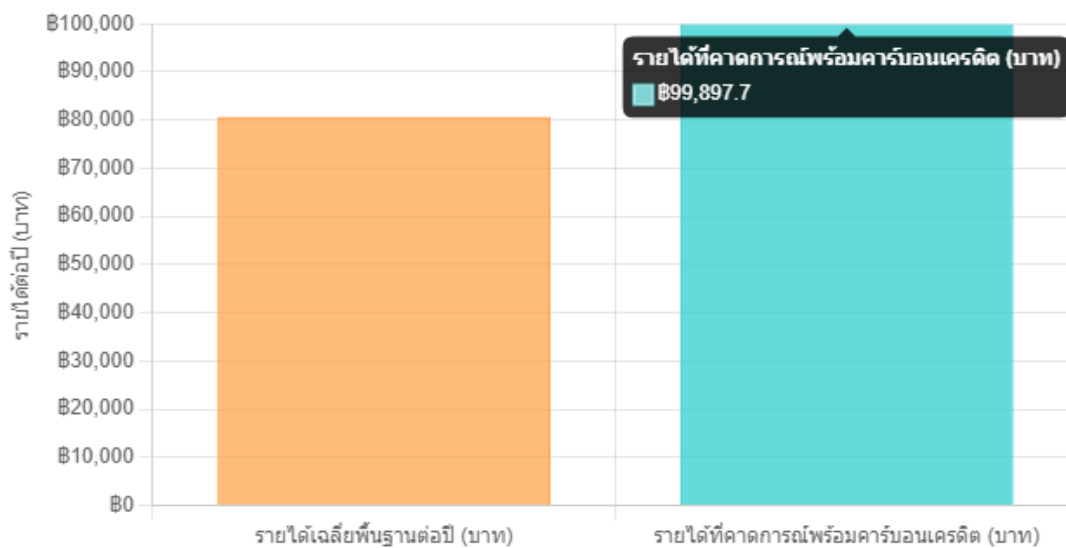
3. **Proportion of household income increase** Helps increase average household income of farmers up to **23.81%** Compared to the average per capita income (GPP per capita) of Buriram Province in 2021, which was 80,684 baht per year.

4. **Proportion of farm households with income above the poverty line**

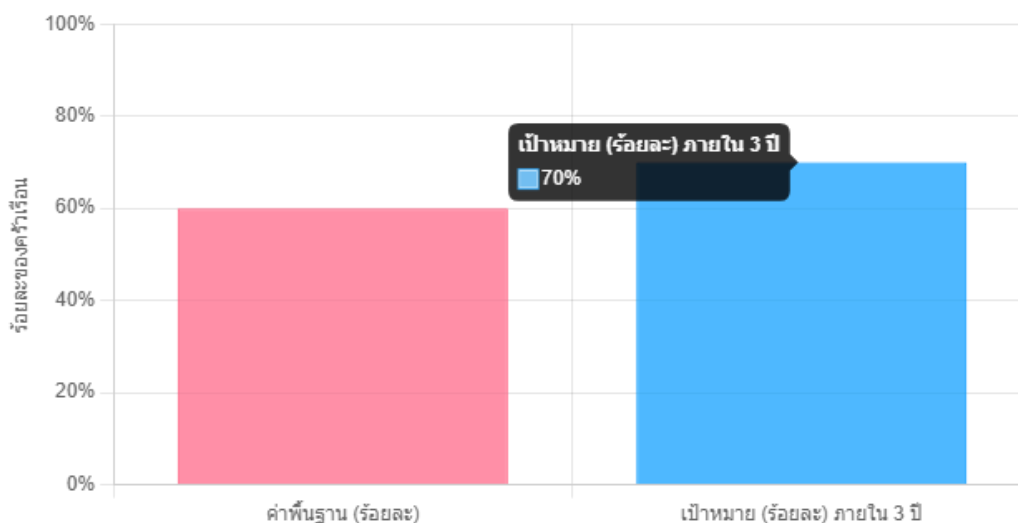
- **Baseline (assumed data)** about **60%** At the project start point
- **Target** more **10% within 3 years** (70 % of households)

Qualitative shared benefits

Reduce economic vulnerability , increase bargaining power , build confidence and dignity , access to basic services , and develop sustainable communities.



This bar graph compares the average annual income of farmers in the region with the projected additional income from carbon credits.



This bar graph shows the proportion of farm households with incomes above the poverty line (baseline vs. target).

2 ZERO HUNGER

The Goal 2: End Hunger and Achieve Food Security (Zero Hunger)

Goal 2: End hunger and achieve food security (Zero Hunger) Providing farmers with a stable additional income from carbon credits will help them better afford food and basic necessities for their livelihoods. Reduce the proportion of households with food insecurity by 15-20%. In addition, sustainable rubber plantation management promotes better soil health, which may facilitate the future cultivation of other supplementary crops in vacant or adjacent areas.

Quantitative mutual benefits

1. Reducing the use of chemical fertilizers

- a. **Baseline (assumed data)** 100 kg/rai/year
- b. **target** Decreased by 20% in the first year (to 80 kg/rai/year)

2. Increase in soil organic matter (SOC)

- a. **Baseline (assumed data)** 1.5%
- b. **target** Increased by an average of 0.75% per year (3rd year : 3.75%)

3. Proportion of farming households reporting food insecurity

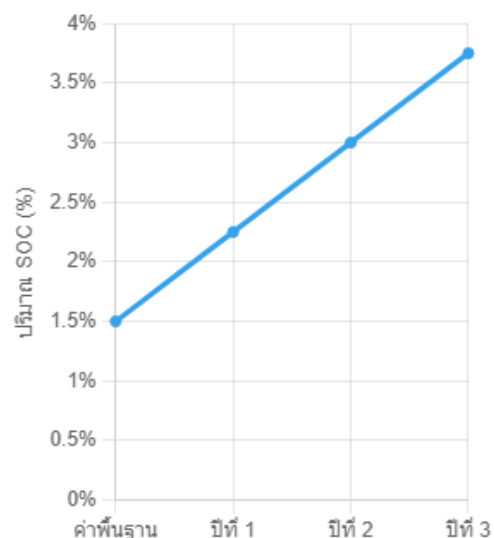
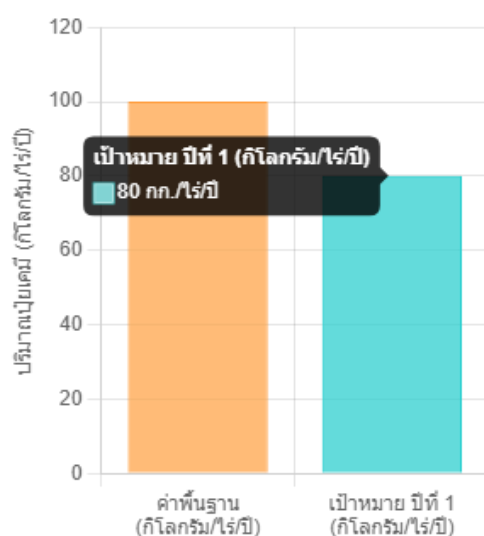
- a. **Baseline (assumed data)** 25% are food insecure.
- b. **target** Reduce insecurity by 18% within 3 years (to 20.5% of households)

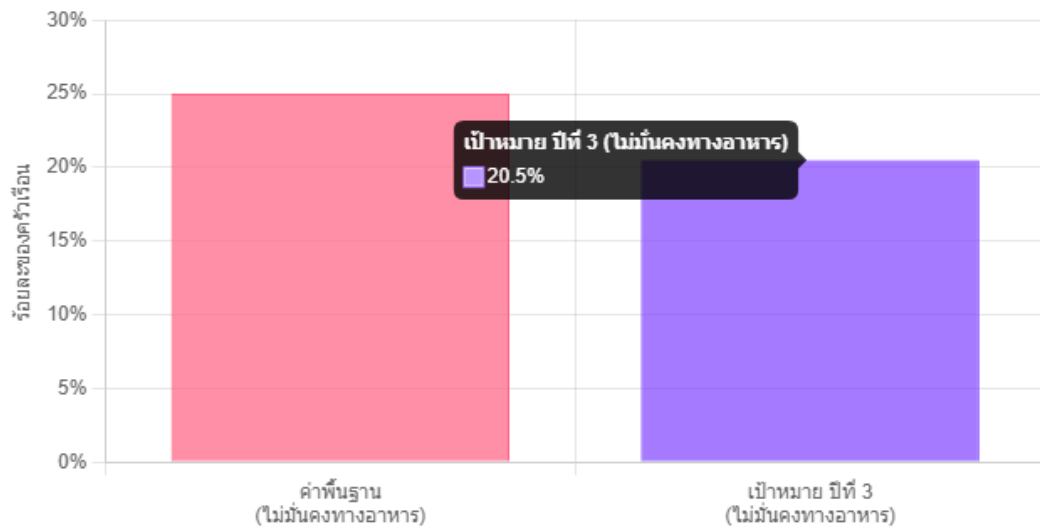
4. Average number of intercrop species planted in rubber plantations per plot

- a. 1 type of **basic value (hypothetical data)**
- b. **target** Increased by 3 species per plot (total 4 species)

Qualitative shared benefits

Safe and quality food , nutritional diversity , food self-sufficiency , sustainable agricultural knowledge





These graphs show the reduction in chemical fertilizer use , the increase in soil organic matter, and the reduction in food insecurity.

3 GOOD HEALTH AND WELL-BEING


The Goal 3: Good Health and Well-being

Goal 3: Good Health and Well- being Promoting sustainable rubber plantation management by reducing the use of hazardous chemicals and reducing the burning of weed residues will result in improved air quality. It is estimated that PM2.5 dust during the burning season can be reduced by 10-15%. in the surrounding area and reduce soil and water contamination, which helps reduce health risks to farmers and local communities from air pollution and chemicals. A better environment leads to better health and well-being for everyone. It is expected that the rate of respiratory illness associated with burning will decrease.

Quantitative mutual benefits

1. Reducing the number of patients suffering from agricultural chemical poisoning in the area

- a. **Basic rate (assumed data)** 5% per year
- b. **target** Decreased by 12% (to 4.4% in the first year)

2. Respiratory illness rates associated with burning in the project area

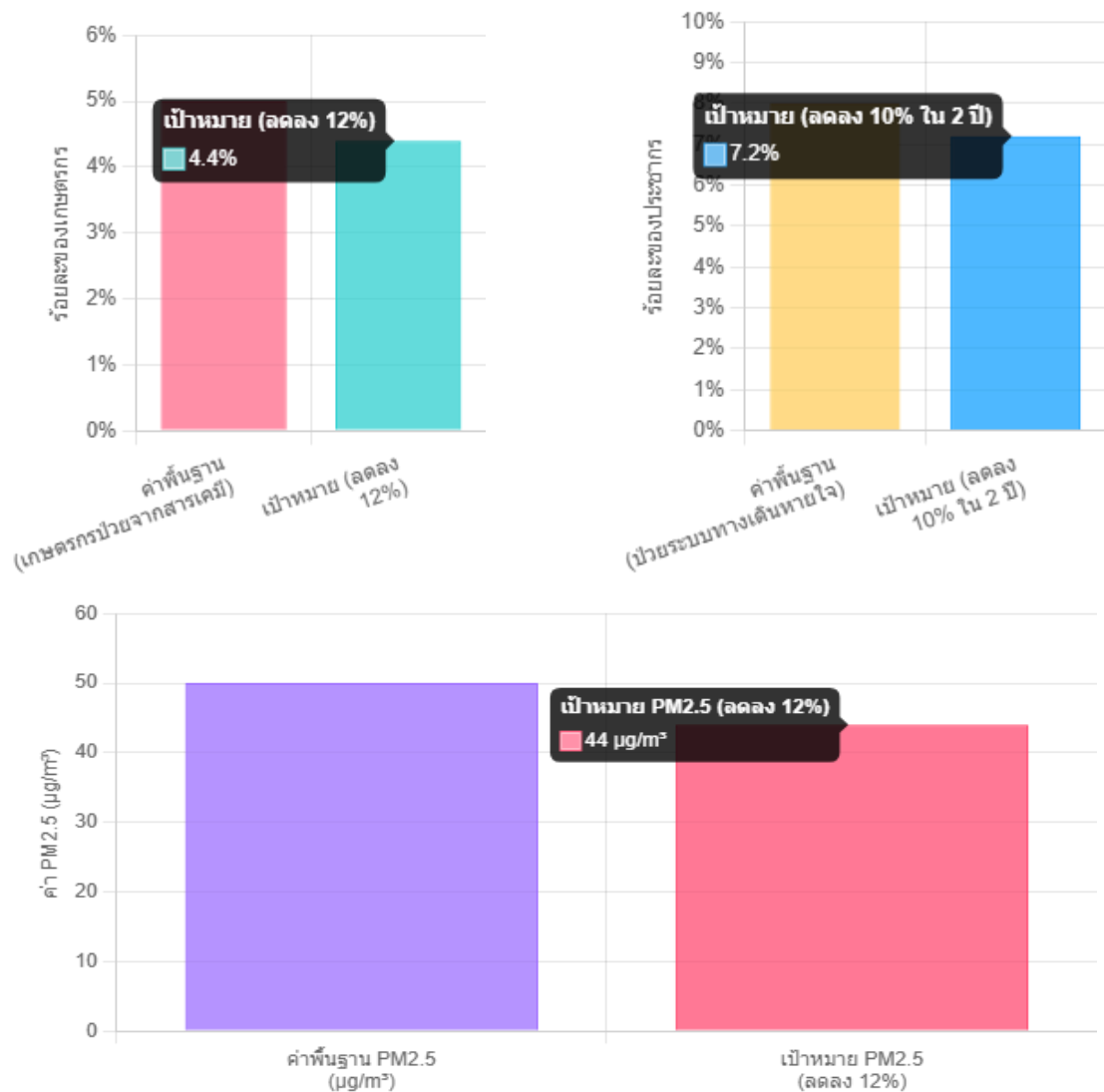
- a. **Baseline (assumed data)** 8%
- b. **target** Decreased by 10% within 2 years (to 7.2%)

3. PM2.5 dust reduction during burning in the project area

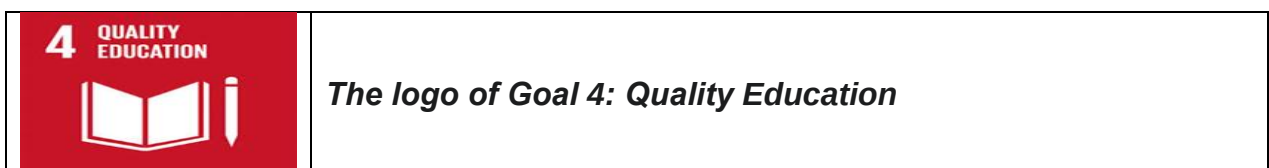
- a. **Baseline value (assumed data)** 50 micrograms/cubic meter ($\mu\text{g}/\text{m}^3$)
- b. **target** Decreased by 12% (to 44 $\mu\text{g}/\text{m}^3$)

Qualitative shared benefits

Improved physical and mental health of farmers and communities, reduced health care costs, improved local air quality, and a more pleasant environment.



These graphs show the reduction in health problems and air pollution associated with the project.



Goal 4: Quality Education This project promotes access to new knowledge and skills for farmers and communities, promoting quality education by providing new knowledge and skills to farmers and communities, which not only enhances their occupational capabilities but also promotes lifelong learning and access to useful information.

Workshops on sustainable agriculture practices, the use of blockchain and satellite technology for orchard management, and access to carbon credit markets are being held. Participating farmers are expected to increase their knowledge and understanding of sustainable agriculture and digital technology by an average of 30%, based on pre-and post-training assessments. Online courses are also being developed to broaden access to learning for farmers.

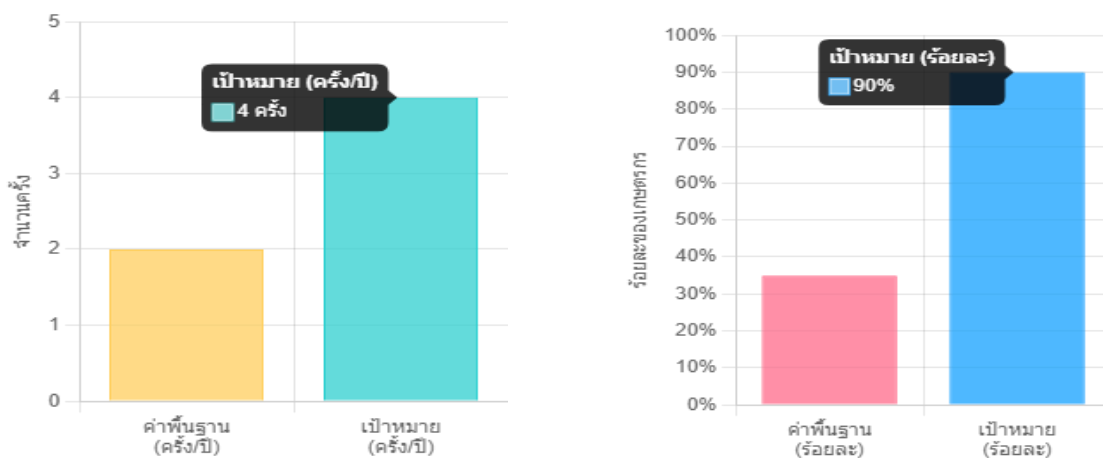
Quantitative mutual benefits

1. Number of times of training/seminars for farmers

- a. **Basic fee (assumed data)** 2 times/year (general training)
- b. **target** Provide specialized/technology training **At least 4 times/year**
2. **Percentage of farmers who participated and completed training in new skills**
 - a. **Baseline (assumed data)** 35%
 - b. **target** more than 90%
3. **Increased knowledge score after training**
 - a. **Basic Value (Assumed Data)** 50 points
 - b. **target** more 30% (65 points)

Qualitative shared benefits

Enhance modern knowledge and skills, promote lifelong learning, reduce technological knowledge gaps, and raise sustainability awareness.



These graphs show the increase in educational opportunities and skills development for farmers.

 5 GENDER EQUALITY	The Goal 5 : Gender Equality
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Goal 5 Gender Equality The project to promote women's participation in agriculture focuses on promoting gender roles and equality in agriculture, particularly by enabling women to participate in decision-making and access resources. This initiative prioritizes providing knowledge and equal access to technology and project benefits. It is expected that participating women farmers will increase their decision-making abilities and their role in rubber plantation management and household income by 20% , strengthening their capacity and reducing gender inequality in the community.

Quantitative mutual benefits

1. **Percentage of women rubber plantation owners/managers participating in the project**
 - a. **Baseline (assumed data)** 30%
 - b. **target** more 10% within 3 years (to 40%)

2. Percentage of women participating in training/skills training activities of the project

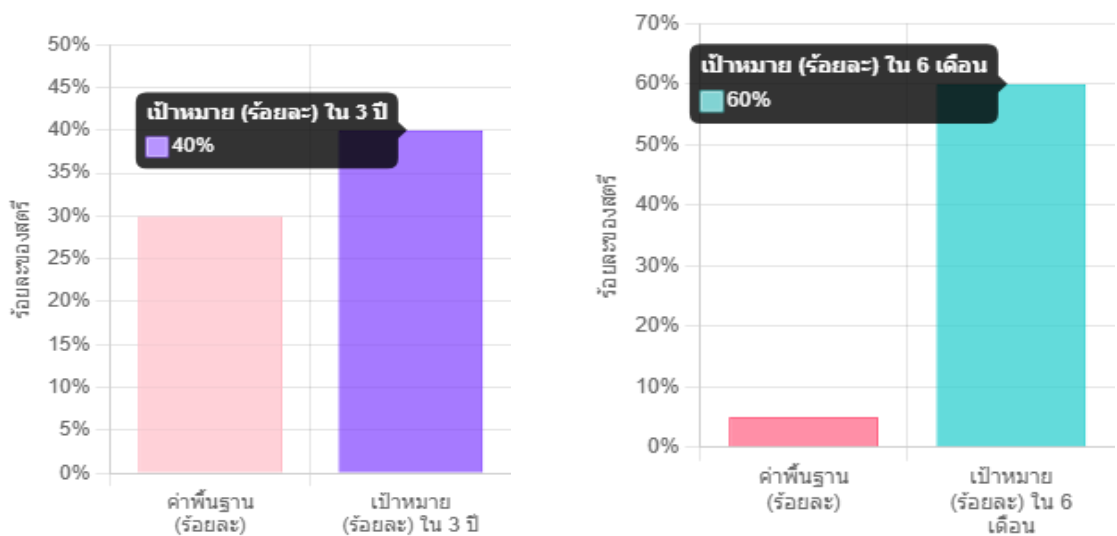
- Baseline (assumed data)** 40% of all training participants
- target** Increased to 50%

3. Percentage of women who can independently use the data recording platform

- Baseline (assumed data)** 5%
- target** Increased to 60% within 6 months

Qualitative shared benefits

Strengthen the role and potential of women in agriculture, increase access to technology and knowledge, promote participation in decision-making, and reduce gender gaps in access to resources.



These graphs show the increase in women's participation and potential in the project.

8 DECENT WORK AND ECONOMIC GROWTH


The Goal 8: Decent Work and Economic Growth

Goal 8: Decent Work and Economic Growth The development of a blockchain platform and carbon credit trading will create new economic opportunities and valuable local jobs. It is expected that the project will create approximately 5-10 new jobs (e.g. field coordinators, data administrators). This includes promoting new skills for farmers, which will help promote inclusive and sustainable economic growth in Buriram.

Quantitative mutual benefits

1. Creating new local fieldwork

- Basic value (assumed data)** 0 positions
- target** Create 1 position per 100 rai (total 19-20 positions)

2. Farmers' participation in new skills training

- Baseline (assumed data)** 35%

- b. **target** More than 90%

3. Increased knowledge score after training

- a. **Basic Value (Assumed Data)** 50 points
b. **target** Increased by 30% (to 65 points)

Qualitative shared benefits

Enhance farmers' skills and competitiveness , create employment opportunities related to technology and the environment, promote local circular economy, and enhance their potential and quality of life.



These graphs show job creation and skills development among farmers.

9
INDUSTRY, INNOVATION
AND INFRASTRUCTURE

The Goal 9: Industry , Innovation and Infrastructure

Goal 9: Industry, Innovation and Infrastructure This project is a clear example of how innovations like blockchain, cryptocurrency, and satellite technology can be applied in agriculture and the environment. Invest in digital infrastructure and remote monitoring systems To create a digital infrastructure for an efficient, transparent and accessible carbon credit market.

Quantitative mutual benefits

1. Project area and number of participating farmers

- a. The project covers an area of 1,936.15 rai.
- b. 131 participating farmers who used the digital platform to manage their data.

2. Investment budget for Blockchain platform and satellite system

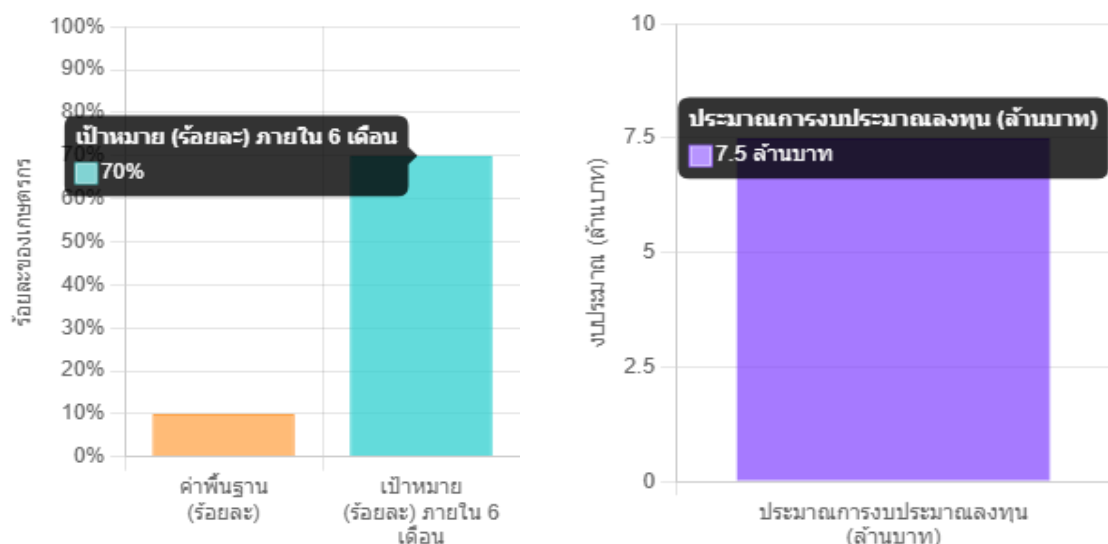
- a. **Estimated** 5-10 million baht

3. Percentage of farmers who can independently use the data recording platform

- a. **Baseline (assumed data)** 10%
- b. **Target** 70% within 6 months

Qualitative shared benefits

Create innovations in the agricultural sector that can serve as models for other projects, develop modern digital infrastructure, increase efficiency and reliability in tracking and reporting results, and promote access to technology for farmers.



These graphs show digital platform usage and infrastructure investments.

10
REDUCED
INEQUALITIES

The Goal 10: Reduced Inequalities

Goal 10 Reduced Inequalities The project focuses on reducing economic and social inequality, particularly among small-scale farmers in remote areas, through access to technology, economic opportunities, and fair distribution of benefits.

blockchain and cryptocurrency technologies to distribute carbon credit benefits directly to farmers reduces the role of middlemen and makes benefit sharing fairer and more transparent. It is estimated that smallholder farmers participating in the project will receive 15-20% more benefits from carbon credits compared to the previous system. Furthermore, promoting access to knowledge and technology for farmers in remote areas will help narrow the knowledge and opportunity gap.

Quantitative mutual benefits

1. **Percentage of smallholder farmers participating in the project (out of all in the area)**

- a. **Baseline (assumed data) 5%**
- b. **target Increased to 15% within 3 years**

2. **Percentage of increased income of the lowest income group of farmers (bottom 20%)**

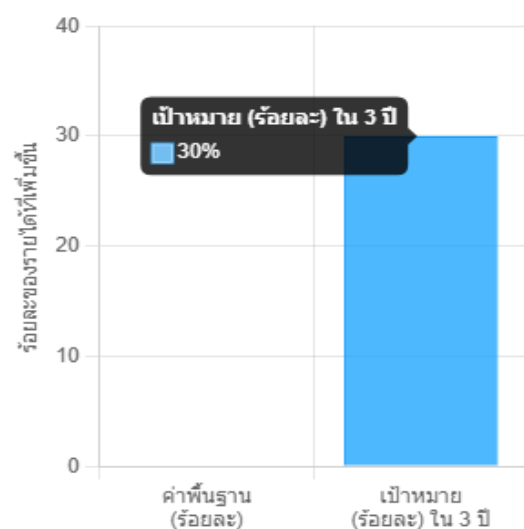
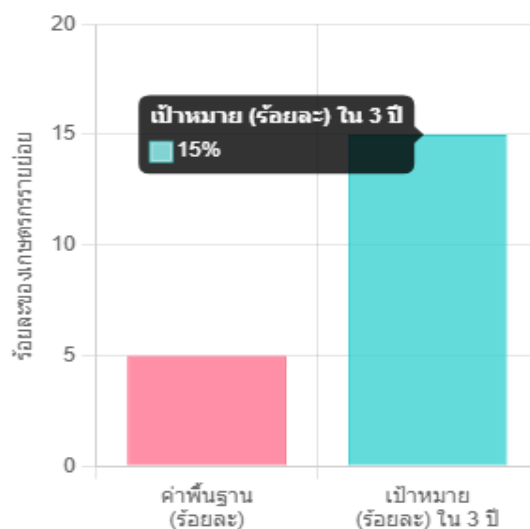
- a. **Baseline (assumed data) 0% (before project)**
- b. **target more 30% within 3 years**

3. **Percentage of farmers with access to digital technology/platforms (from disadvantaged groups)**

- a. **Baseline (assumed data) 5%**
- b. **target Increased to 50% within 1 year**

Qualitative shared benefits

Reduce the economic and digital divide , increase opportunities for vulnerable groups , promote equal access to resources , and create fairness in the distribution of benefits.



These graphs show the reduction of economic inequality and access to technology.

11 SUSTAINABLE CITIES AND COMMUNITIES

The Goal 11 : Sustainable Cities and Communities

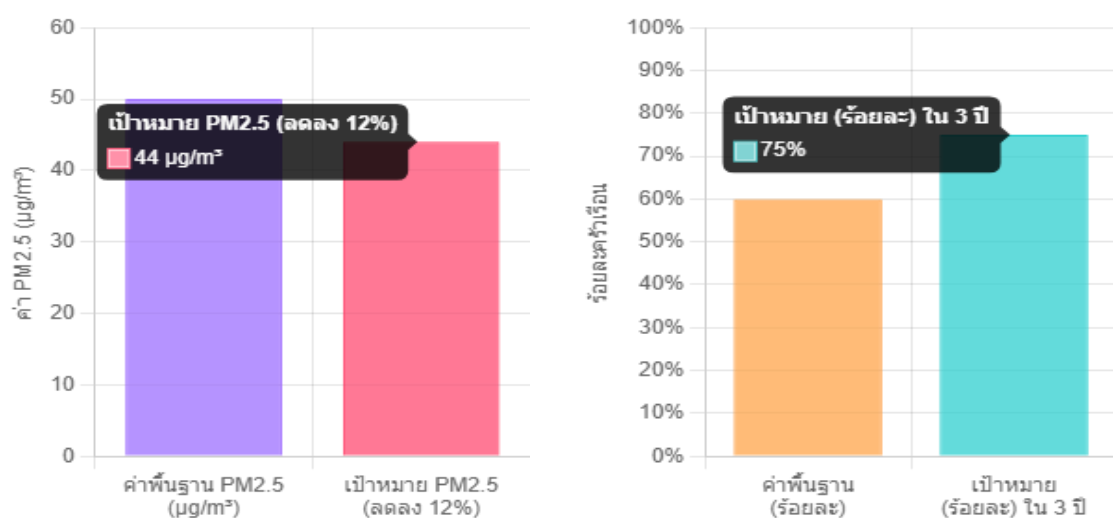
Goal 11 Sustainable Cities and Communities Although the project focuses on rural areas, promoting sustainable natural resource management within rubber plantations, reducing pollution, and increasing rural incomes will help create sustainable and livable rural communities that are integral to the community landscape. This will help create a livable environment that is resilient to climate change. Reducing air and water pollution, increasing green space, and promoting a circular economy in agricultural areas are all key foundations for sustainable community development. Environmental improvements are expected to improve the quality of life of residents in the project area by 5-10%.

Quantitative mutual benefits

1. **PM2.5 dust reduction during burning in the project area** (related to SDG 3)
 - a. **Baseline value (assumed data)** 50 micrograms/cubic meter ($\mu\text{g}/\text{m}^3$)
 - b. **target** Decreased by 12% (to 44 $\mu\text{g}/\text{m}^3$)
2. **Percentage of households reporting an overall improved quality of life**
 - a. **Baseline (assumed data)** 60%
 - b. **target** more 15% within 3 years (to 75%)
3. **Percentage of farmers participating in community/network project activities**
 - a. **Baseline (assumed data)** 20%
 - b. **target** Increased to 50% within 2 years

Qualitative shared benefits

Create a clean and safe environment , promote community participation , improve the quality of life in rural areas , and build community pride.



These graphs show improvements in quality of life and the environment in communities.

12 RESPONSIBLE CONSUMPTION AND PRODUCTION

The Goal 12: Responsible Consumption and Production

Goal 12: Responsible Consumption and Production Promoting sustainable rubber plantation management, including reducing the use of chemicals With the goal of reducing chemical use by 20% in the first year. Improving maintenance methods and reducing combustion Reduce the burning of weeds by 100% It supports production models that take into account the environment and natural resources in the long term, including creating value from by-products (carbon credits).

Quantitative mutual benefits

1. Percentage of reduction in the use of agricultural chemicals

- a. **Baseline (assumed data)** 100 kg/rai/year
- b. **target** Decreased by 20% in the first year (to 80 kg/rai/year)

2. Percentage of refraining from burning weeds in the project area

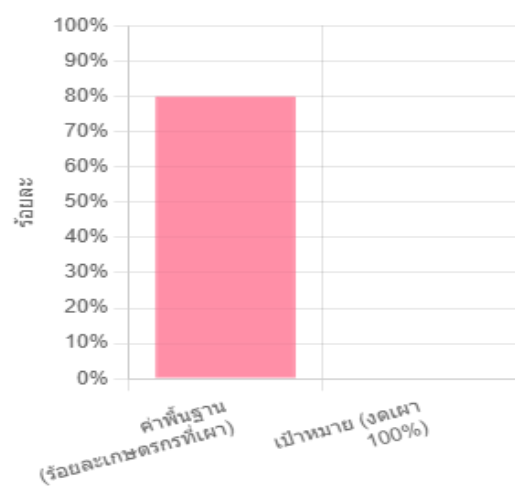
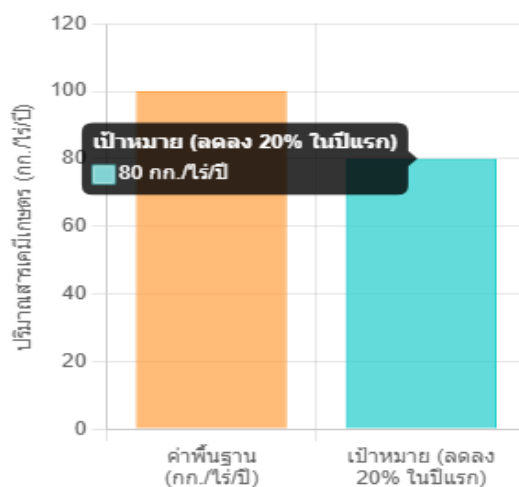
- a. **Baseline (assumed data)** 80% of farmers have burned.
- b. **target** 100% refrain from burning weeds in the project area.

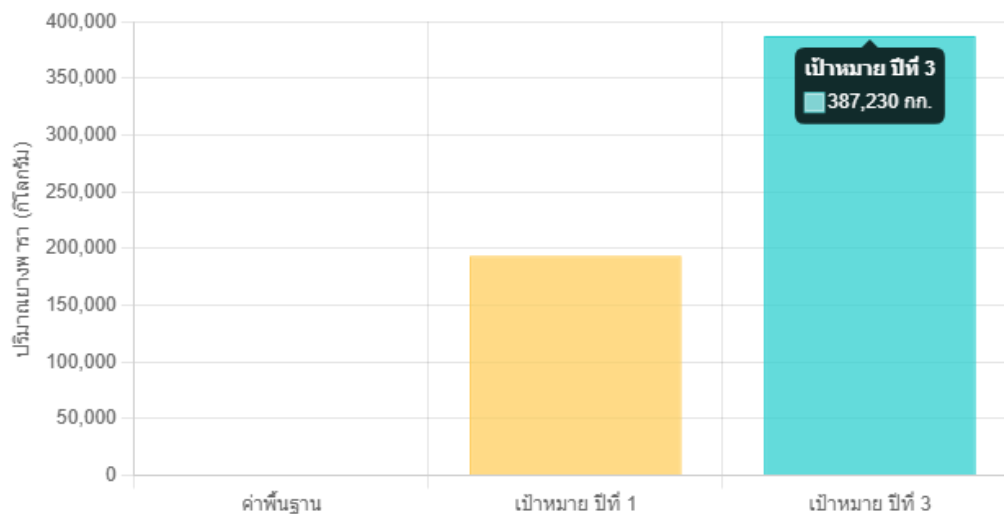
3. The amount of rubber certified for sustainability from projects entering the market

- a. **Base weight** 0 kg
- b. **Target (Year 1)** 193,615 kg.
- c. **Target (Year 3)** 387,230 kg.

Qualitative shared benefits

Promote sustainable agriculture , reduce soil, water and air pollution, raise awareness of responsible production and consumption, create opportunities to access sustainable agricultural products markets, and enhance the image of Thai rubber.





These graphs show the reduction in chemical use, the elimination of burning, and the amount of rubber certified sustainable.



Goal 13 Climate Action This goal is the core and primary goal of the project. The project has the potential to store approximately 1.5 - 3 tons of carbon equivalent per rai per year of additional carbon. Carbon sequestration in rubber trees and direct greenhouse gas emissions reduction through sustainable management and technological monitoring are important and measurable contributions to the fight against global climate change.

Quantitative mutual benefits

1. Net greenhouse gas sequestration/reduction potential

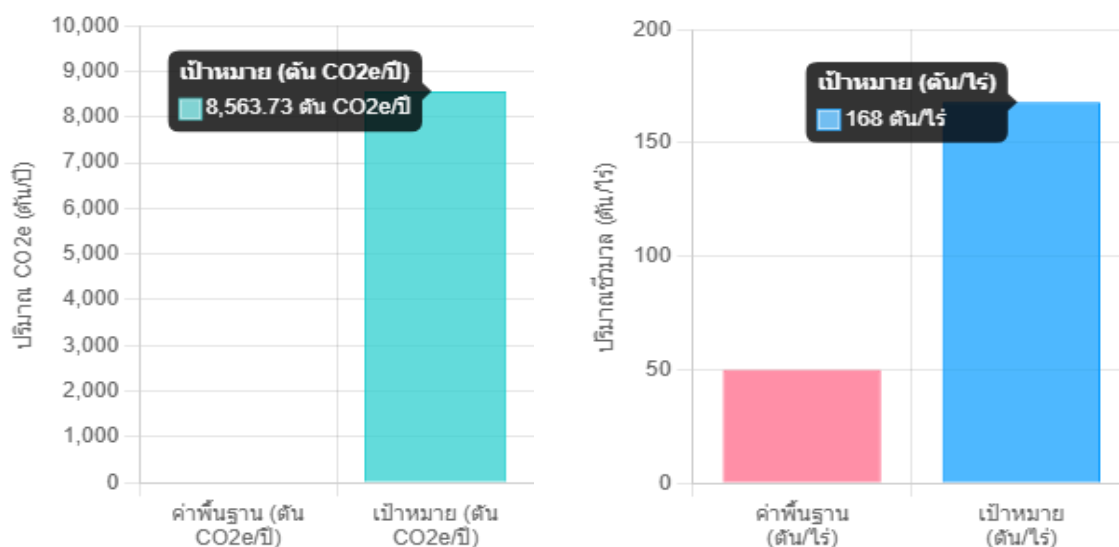
- a. **Baseline (assumed data)** 0 tons CO₂e/ year
- b. **target** about **8.5 78 . 98 Tons of CO₂e/ year** (based on the Joint Benefit Assessment Report)

2. Average aboveground biomass increase

- a. **Basic value (assumed data)** 50 tons/rai
- b. **target** Average increase **118 tons/rai** (total 168 tons/rai)

Qualitative shared benefits

Reduce the impact on the climate , create carbon credits , build corporate/national image , and promote sustainable development.



These graphs show the potential for greenhouse gas sequestration/mitigation and biomass addition.



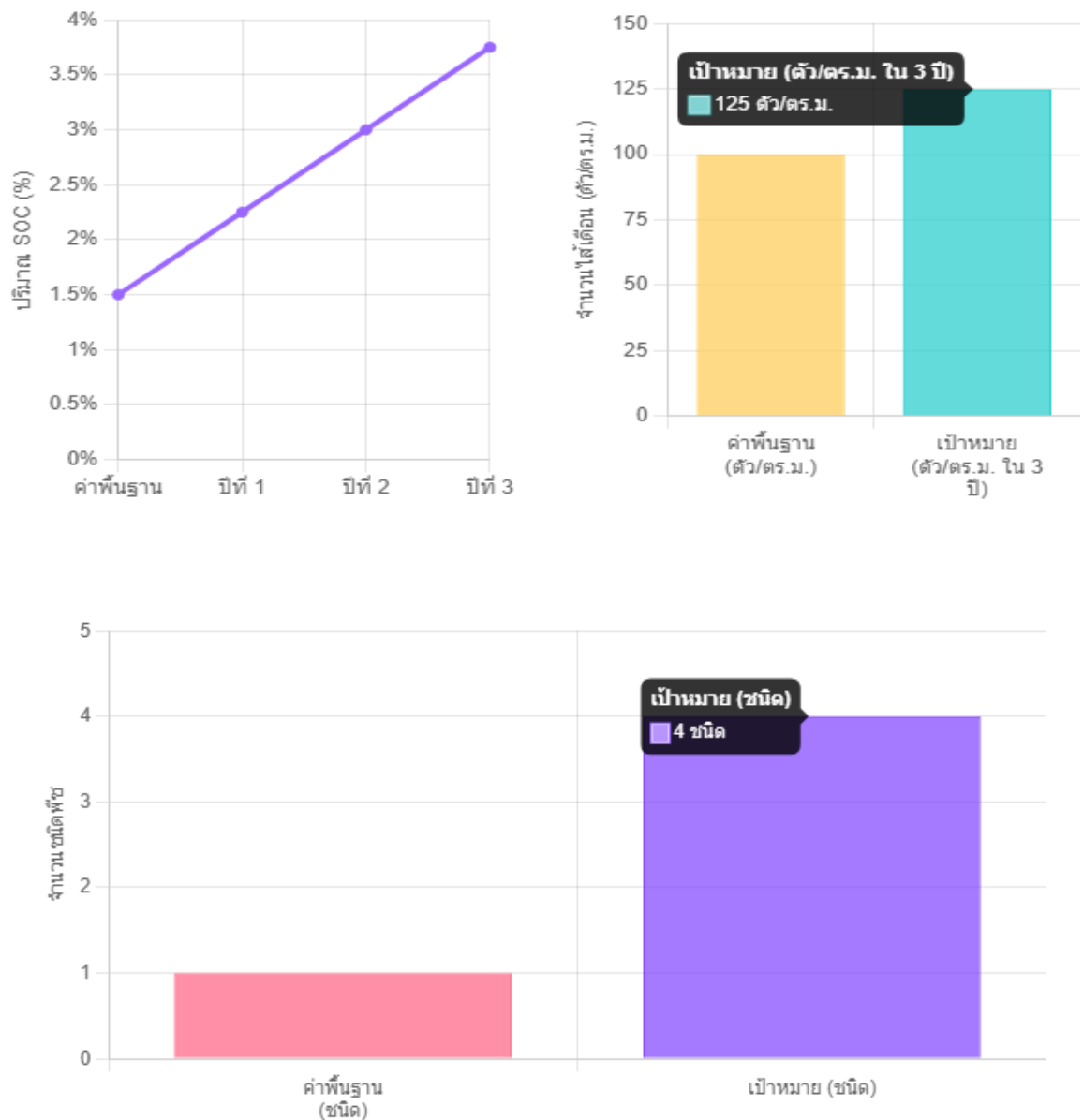
Goal 15 Life on Land Conservation and increase of forest areas (in the context of sustainable rubber plantations that meet standards) and intercropping. Increase the diversity of plant species in the rubber garden by an average of 3-5 species per plot. It helps conserve biodiversity, maintains healthy terrestrial ecosystems, and promotes responsible land use. The number of earthworms, an indicator of soil fertility, is expected to increase by 20-30% over the next three years.

Quantitative mutual benefits

1. **Percentage of increase in soil organic matter (SOC)**
 - a. **Baseline (assumed data)** 1.5%
 - b. **target** Increased by an average of 0.75% per year (3rd year : 3.75%)
2. **Percentage of increase in earthworm population in pilot area**
 - a. **Basic value (assumed data)** 100 units/square meter
 - b. **target** Increased by 25% in 3 years (to 125 units/square meter)
3. **Average number of intercrop species planted in rubber plantations per plot**
 - a. 1 type of **basic value (assumed data)**
 - b. **target** Increased by 3 species per plot (total 4 species)

Qualitative mutual benefits

Restore soil fertility , increase biodiversity of small plants and animals , reduce soil erosion , build ecosystem resilience to climate change , and promote natural resource conservation.



These graphs show improvements in soil health and biodiversity in ecosystems.

note

The baseline data presented in this section is ****fictitious data** for presentation purposes to illustrate the analysis and reporting format. In actual operation, the project will need to conduct a thorough and systematic ****baseline data survey** (initial data) in the project area to obtain the most accurate and authentic data for further monitoring and evaluation.

The overall picture of the project, which aims to capture carbon and reduce greenhouse gas emissions in rubber plantations in Buriram Province, using cryptocurrency, blockchain, and satellite technologies, serves as a hub that radiates positive impacts in multiple directions, each of which ties into various SDG goals.

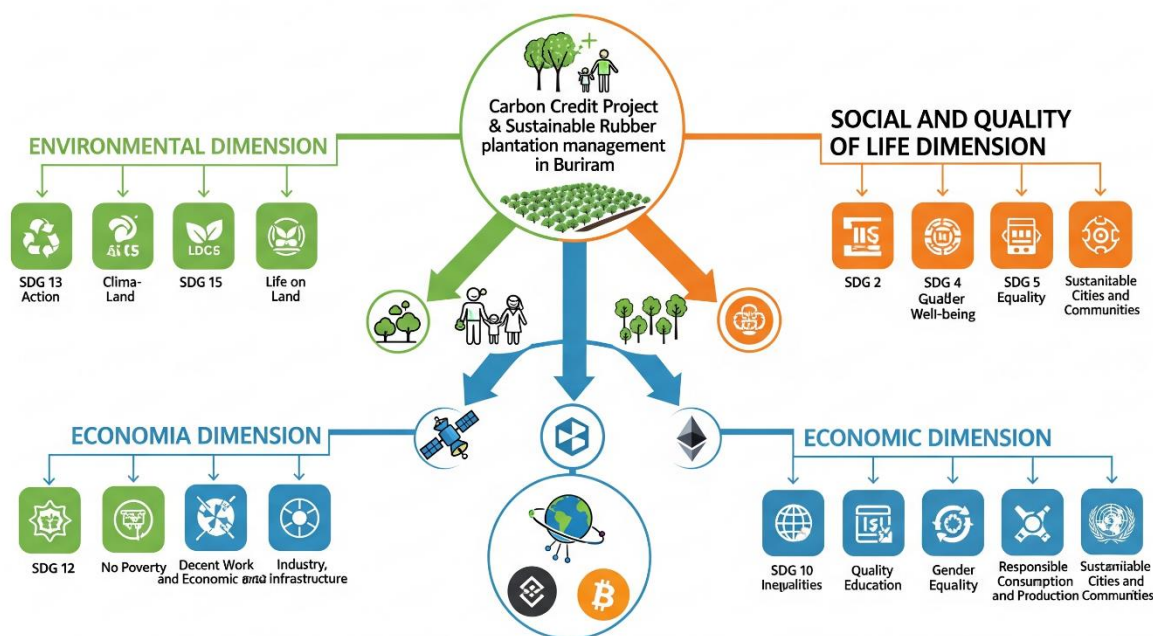


Figure 3 shows the link between the project and the Sustainable Development Goals (SDGs).

From Figure 3, the link between the project and the Sustainable Development Goals (SDGs) can be explained as follows: clearly and completely shows the connection between the project "Carbon Credit Project & Sustainable Rubber plantation management in Buriram" and the Sustainable Development Goals (SDGs) of the United Nations. It shows that the project has a core principle of sustainable rubber plantation management. Able to create co-benefits that cover environmental, social and economic dimensions.

Project linkage to SDGs

1. Environmental dimension, the core of the project

The project's primary goal is to reduce greenhouse gas emissions and sequester carbon, which is directly linked to environmental goals.

Goal 13 Climate Action It is the main goal of the project. The project has the potential to store approximately 1.5 - 3 tons of carbon equivalent per rai per year.

Goal 15 Life on Land The project promotes sustainable rubber plantation management, including intercropping, which helps increase the diversity of plant species in the rubber plantation, with an average of 3-5 species per plot. Earthworm populations are expected to increase by 20-30% over a three-year period, indicating soil fertility.

2. Economic dimension creates value and opportunities.

The project implementation generates economic benefits that improve the livelihoods of farmers and communities.

Goal 1: No Poverty The project helps increase farmers' income through the sale of carbon credits. It is expected that the income will increase on average. **5 - 10% per year** For farmers participating in the project and expected to generate an average additional income **1,000 - 2,000 baht/rai** From selling carbon credits

Goal 8: Decent Work and Economic Growth The project promotes the development of new skills for farmers and is expected to create approximately new local jobs. **5 - 10 positions** It also promotes farmer grouping to increase their bargaining power. **10-20%**

Goal 9: Industry , Innovation and Infrastructure This project is considered an innovation in the agricultural sector by introducing technology. **Blockchain, Cryptocurrency and Satellites** Let's apply it

Goal 10 Reduced Inequalities Using Blockchain technology to distribute benefits directly to farmers reduces the role of middlemen. Make the sharing of benefits more fair and transparent, with the expectation that small farmers will receive more benefits. **15-20%** Compared to the previous system

Goal 12: Responsible Consumption and Production Promoting sustainable rubber plantation management with the goal of reducing chemical use **20%** In the first year and reduce the burning of weeds. **100%** It supports production models that take into account the environment.

3. Social dimension: Improving quality of life

The project focuses on improving the quality of life and well-being of farmers and communities in Buriram Province.

Goal 2: End hunger and achieve food security (Zero Hunger) More stable income from carbon credits helps farmers afford essential basic necessities. And intercropping helps increase household food security. It is expected to reduce the proportion of households with food insecurity by 15-20%.

Goal 3: Good Health and Well- being Reducing the use of chemicals and reducing combustion reduces air pollution (PM2.5) and reduces the risk of respiratory diseases. It is expected that health costs from chemical-related illnesses will decrease by 10-15%.

Goal 4: Quality Education The project promotes access to new knowledge and skills in sustainable agriculture and digital technology. Over 90% of farmers participated in the training and experienced an average 30% increase in their knowledge scores after the training.

Goal 5 Gender Equality The project prioritizes women's participation in agriculture, with the expectation that women farmers will play a role in managing rubber plantations and increase household income by 20%.

Goal 11 Sustainable Cities and Communities Sustainable management of natural resources in agricultural areas is a key foundation for sustainable community development. This will help improve the quality of life of the population in the area surrounding the project by 5-10%.

4. Assessment of project benefits

The Carbon Capture and GHG Reduction Project in Rubber Plantations in Buriram Province creates significant co-benefits in three key dimensions.

4.1 Environmental Co-benefits

In addition to directly reducing greenhouse gas emissions, the project also contributes to environmental improvements in several areas.

4.1.1 Biodiversity Enhancement

Intercropping (Agroforestry) The project encourages farmers to grow other economic crops that are suitable for the area and market, such as vegetables, fruits, or utility/perennial trees in rubber plantations. The goal is to have at least two types of intercropped plants per plot. This not only increases income but also helps to increase the complexity of the ecosystem structure, attracting smaller organisms such as pollinators, birds and some small mammals to return to live and create a natural balance in the rubber plantation.



Figure 4. Project for intercropping with other economic crops that are suitable for the area and market conditions.

Reducing the use of chemicals Reducing or eliminating the use of herbicides and pesticides It is expected that the amount of agricultural chemical use will be reduced by 20-30% in the first year. Helps restore soil microorganisms and small organisms that are essential to the ecosystem, such as earthworms. Preliminary surveys found that the number of earthworms in the pilot area increased by an average of 25%. It is an important indicator of soil fertility and also helps reduce the impact on wildlife and birds that may be affected by chemical contamination.

Stop burning plant debris Stopping the burning of plant debris and weeds in rubber plantations No burning was reported by 100% of the farmers participating in the project. It helps reduce the destruction of small living things in the soil and also preserves the natural habitat of animals and insects.

4.1.2 Soil & Chemical Management Improvement

Increasing organic matter in the soil Not burning plant debris and using it as mulch or compost will help to continuously increase the amount of organic matter in the soil. From the results of the pilot soil analysis, it was found that the amount of organic matter in the soil (SOC) increased by an average of 0.5-1% per year. Improves soil structure, fertility, and ability to hold water and nutrients. Increases soil water holding capacity by 10-15%. which directly affects the growth of rubber trees and intercrops

Reduce soil erosion Increased ground cover and organic matter help reduce soil erosion caused by rain and wind. Reduces soil loss by 20-40% This preserves the landscape and prevents the loss of soil fertility in the long term.

Better soil health Reducing reliance on chemicals reduces the accumulation of toxins in the soil, promotes the activity of beneficial soil microorganisms, improves natural nutrient cycling, and reduces the need for chemical fertilizers in the future.

4.1.3 Water Conservation & Quality

Reduce contamination of water sources Reducing the direct use of chemical fertilizers and pesticides It is expected to reduce the amount of chemicals leaching into water sources by up to 25%. It helps reduce the amount of chemicals leaching into surface water sources such as canals and marshes and reduces infiltration into groundwater sources, which preserves aquatic ecosystems and reduces the risk of contamination of drinking water.

Improving the quality of wastewater from the process Promoting the use of formic acid in latex precipitation instead of sulfuric acid helps reduce the toxicity and acidity of wastewater released into the environment. Reduce the acidity (pH) of wastewater to 6 - 7 (neutral). Since formic acid is a biodegradable organic acid, it is easy to treat and has a reduced impact on aquatic life.

Increase water efficiency Improving soil health and mulching increases the soil's water retention capacity, allowing rubber trees and intercrops to use water more efficiently, reducing the need for additional irrigation during dry periods. Reduce the risk of plant water shortages in the dry season by up to 10%.

4.1.4 Air Quality Improvement

Reduce pollution from burning Eliminating the burning of agricultural waste and residues is key to reducing air pollution. It can reduce the emission of small dust particles (PM_{2.5}) caused by burning by approximately 20 - 30% during the dry season. The project can reduce emissions of fine particulate matter (PM_{2.5}), black carbon (Black Carbon), carbon monoxide (CO), methane (CH₄), and nitrous oxide (N₂O) from combustion, which directly affect the health of farmers and surrounding communities.

Health effects Reducing PM_{2.5} helps reduce the risk of respiratory health problems such as asthma, allergies, and various lung diseases, especially among children, the elderly, and those with compromised immune systems. It is projected that the hospitalization rate for respiratory diseases related to pollution from burning in the project area will decrease by 10% within 2 years.

4.1.5 Increasing resilience to climate change (Climate Resilience)

A stronger ecosystem Sustainably managed rubber plantations with richer soils and higher biodiversity are more resilient and resistant to the impacts of climate change, such as more severe droughts or unusually heavy rainfall. The survival rate of rubber trees during severe drought is expected to increase by 5-10%.

Increase water retention Soil with high organic matter can retain water better, helping rubber trees survive longer dry seasons and reducing the severity of flooding in some areas.

4.2 Social Co-benefits

This project plays an important role in improving the quality of life and promoting the well-being of farmers and communities in Buriram Province in a sustainable manner.

4.2.1 Improving the quality of life and well-being of farmers and communities (Improved Livelihoods & Well-being)

Better health from reducing chemicals Farmers and their families who reduce their direct exposure to hazardous chemicals, such as herbicides and pesticides, tend to have better health. It is estimated that health care costs from chemical-related illnesses will decrease by 10-15%. Reduce the risk of skin diseases, respiratory diseases and long-term health problems caused by the accumulation of toxins.

Food security Promoting intercropping in rubber plantations With farmers participating in intercropping increasing by 50% in the first year This allows farmers to have a variety of produce, such as vegetables and fruits, for household consumption, which helps increase food security and reduce daily expenses. If there is enough, it can be sold to generate additional income.



Figure 5 shows the rubber plantation area where farmers participated in the intercropping project.

Better living environment Improving the quality of soil, water and air in the project area results in a more livable and healthier environment for the community.

4.2.2 Job Creation & Capacity Building

Create local jobs The project may create local employment opportunities for new activities related to sustainable garden management. It is expected that approximately 1 field job will be created per 100 rai. Such as organic fertilizer production, intercropping and care, field data collection for blockchain platforms, or technology system maintenance.

Develop new skills Farmers and stakeholders will receive training on sustainable rubber plantation management practices. More than 90% of farmers participated in the training and their knowledge scores after the training increased by an average of 30%. This includes the use of digital technologies, such as recording data through applications linked to Blockchain and interpreting satellite data, which are crucial skills enhancements in the digital age.

Promote entrepreneurship Access to carbon markets and sustainable agricultural commodity markets may encourage farmers to develop management and marketing skills to increase the value of their produce.

4.2.3 Community Empowerment & Participation

Farmer grouping Through the Bundling Projects model, small farmers are encouraged to form networks or cooperatives. Increase the proportion of farmers joining official groups/networks from 20% to 50%. This helps increase bargaining power with buyers and distributors of production factors.

Participation in decision-making Project design based on community participation principles. By holding at least two consultation meetings with farmers per year. It will enable farmers to express their opinions and participate in decisions that affect the operation of the project, creating a sense of ownership and commitment to the project.

Exchange of knowledge The project platform and group activities create a space for farmers to exchange knowledge, experiences and best practices in sustainable rubber plantations.

4.2.4 Access to Knowledge & Technology

Raising the level of farmers' knowledge The project brings new knowledge and technologies in sustainable and digital agriculture directly to farmers. It is expected that 70% of farmers will be able to independently use the data recording platform within 6 months. Equip them with up-to-date knowledge and the ability to adapt to changes in the agricultural world.

Bridging the technology gap The adoption of blockchain and satellite technology at the smallholder level can help bridge the technology gap and enhance the competitiveness of farmers in remote areas.

4.3 Economic Co- benefits

This project aims to create added economic value for rubber plantations and farmers in Buriram Province through various channels.

4.3.1 Increased & Stabilized Farmer Income

Additional income from carbon credits Farmers receive cash rewards from selling carbon credits generated from carbon sequestration and greenhouse gas emission reduction in their rubber plantations. It is expected that this will generate additional income for farmers of an average of 1,000 - 2,000 baht/rai from the sale of carbon credits (based on average market prices). which is a stable and sustainable additional income in addition to the main income from selling latex

Income from intercropping Intercropping (Agroforestry) that provides additional production such as fruits, vegetables or economic trees. It is expected that the average income will increase by 500 - 1,500 baht/household/year from selling intercrop products. It helps diversify income risks and provides farmers with new sources of income, resulting in more stable and consistent income throughout the year.



Figure 6 shows the pineapple production of rubber plantations where farmers participated in the project.

Better rubber prices Implementation of sustainable rubber plantation management practices and the use of appropriate coagulants (e.g. formic acid) may result in improved rubber quality. This may allow farmers to get a better selling price of 1 - 2 baht/kilogram for rubber sheets. In a market that cares about sustainability

Reduce production costs Reducing the use of chemical fertilizers and herbicides through sustainable garden management It is expected to help reduce production cost for farmers by 10-15%. In the long term

4.3.2 Creating new business and investment opportunities (New Business & Investment Opportunities)

Digital Carbon Market The development of a carbon credit trading platform using Blockchain technology creates a new market for carbon assets, creating business opportunities for investors , platform developers , and technology providers. Attracting private sector investors interested in green investments

Investing in green technology The project attracts investment in technologies that support sustainable agriculture and carbon reduction, potentially leading to the development of new solutions in the area.

Access to markets for sustainable products The project's rubber products being able to claim 'sustainable rubber' status will open up access to a global consumer market that prioritizes environmentally friendly products, which has high growth potential. Increase the value of certified sustainable rubber exports

4.3.3 Skill Development & Competitiveness

Digital skills for farmers Training and hands-on experience using blockchain platforms and satellite data will equip farmers with cutting-edge digital skills, crucial for enhancing their competitiveness in agriculture and the modern economy.

Modern farm management Farmers will learn how to manage their rubber plantations systematically and sustainably, enabling them to become more efficient agricultural entrepreneurs.

Grouping for Negotiation The integrated program encourages farmers to group together to gain more bargaining power with buyers, enabling them to receive fairer prices and easier access to larger orders. Increase the bargaining power of farmer groups by 10-20%.

4.3.4 Access to Carbon & Sustainable Markets

Reducing barriers to carbon market access The integrated model and technology use will simplify and reduce the cost of entering the carbon market for smallholder farmers, enabling them to sell the carbon credits they generate. Reduce the cost of carbon market access for smallholder farmers by up to 50% compared to individual operations.

Make a difference in the market The rubber from this project can differentiate itself in the market with its “**sustainable**” properties. And “**environmentally friendly**” This can attract buyers who want products that are socially and environmentally responsible.

Co-benefit Assessment



Figure 7 shows the relationship between environmental, social, and economic benefits.

From Figure 7, it can be seen that the three benefits are linked and mutually supportive, such as:

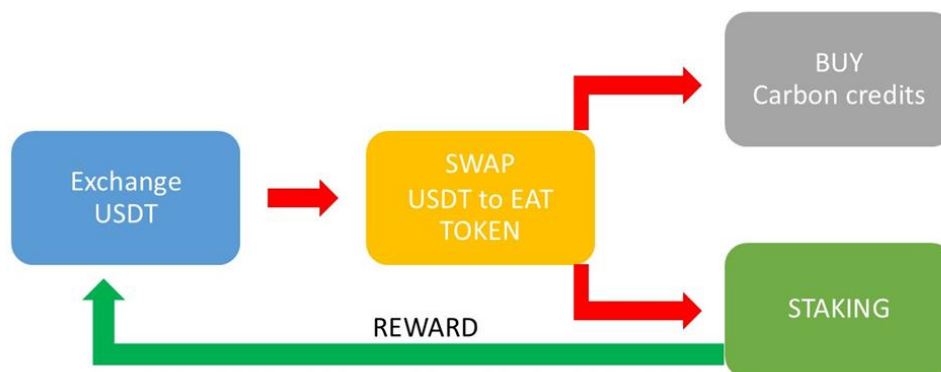
Environmental benefits (such as good soil and water quality) are fundamental to social benefits (such as better health of people in communities), both environmental and social benefits help support economic benefits (such as increased productivity and income).

4.3.5 Economic benefits from the token system (EAT24MALL TOKEN)

The project leverages digitalization to support its sustainability by enabling participants to hold and stake EAT24MALL TOKEN, a blockchain-based cryptocurrency designed to incentivize participation and generate income from project benefits, such as revenue from trading carbon credits certified by the ETM standard.

DeFi) revenue to the community in a transparent, traceable manner, and aligns with the project's values of innovation, sustainability, and citizen participation.

staking earnings can be used to support local environmental projects, increasing positive social and environmental sustainability outcomes. You can view and participate in the survey here. www.investcarboncredit.com



EAT24MALL TOKEN usage cycle in the carbon credit system.

From Figure 8, it clearly shows the working mechanism of the token system used in the project, which has the following steps:

1. Exchange USDT Users can exchange USDT, a stablecoin, into the system.
2. Swap USDT to EAT TOKEN After exchanging USDT, users can "Swap" or exchange it for EAT TOKEN, a cryptocurrency designed on blockchain technology for use in projects.
3. To purchase Carbon credits or Staking, after obtaining EAT TOKEN, users have two options :
 - (1) Buy Carbon credits Use EAT TOKEN to buy carbon credits from projects.
 - (2) Staking: Stake your EAT TOKEN to earn income from project benefits, such as income from trading carbon credits certified by the ETM standard.
4. Receive Rewards: Those who choose to Staking will receive rewards in the form of USDT, which can be exchanged for use in the first step.

This system demonstrates the application of digital finance to support the sustainability of the project, highlighting its transparency and traceability, which align with the project's values of innovation, sustainability, and citizen participation.

5. The role of technology in enhancing and monitoring joint benefits

Technology is key to enabling projects to effectively achieve and monitor their shared benefits.

5.1 Blockchain Transparency and Traceability

1. Record garden activity data (fertilizer use, pruning, harvesting) and carbon credit sales data immutably with an accuracy of 99.9%. Ensure the accuracy and transparency of data, which is essential for assessing joint benefits and preventing duplication.

ETM-006 แบบบันทึกเกษตรกร หน้า 1 จาก 2

แบบบันทึกเกษตรกร
ข้อมูลทั่วไป

1. ชื่อ-สกุล เกษตรกร.....

2. สถานที่ติดต่อ.....
บ้านเลขที่..... หมู่ที่..... ถนน..... ตำบล/แขวง.....
แขวง/อำเภอ..... เขต/อำเภอ..... จังหวัด.....
รหัสไปรษณีย์..... โทรศัพท์.....

3. สถานที่ตั้งแปลง.....
แปลงที่ 1 ภูมิที่..... แขวง/ตำบล..... เขต/อำเภอ.....
จังหวัด..... พื้นที่แปลง..... ไร่.....
พื้นที่ป่าธรรมชาติ..... ไร่.....
แปลงที่ 2 ภูมิที่..... แขวง/ตำบล..... เขต/อำเภอ.....
จังหวัด..... พื้นที่แปลง..... ไร่.....
พื้นที่ป่าธรรมชาติ..... ไร่.....
แปลงที่ 3 ภูมิที่..... แขวง/ตำบล..... เขต/อำเภอ.....
จังหวัด..... พื้นที่แปลง..... ไร่.....
พื้นที่ป่าธรรมชาติ..... ไร่.....

4. แหล่งน้ำที่ใช้.....
☐ น้ำฝน ☐ คลองชลประทาน ☐ สระ/บึง/คู.....
☐ บ่อน้ำบาดาล ☐ ลำธาร/คลองธรรมชาติ ☐ อื่นๆ ระบุ.....

1. การใช้และแหล่งที่มาของปัจจัยการผลิต

แปลงที่	วันเดือนปี	รายการปัจจัยการผลิตที่ใช้	ปริมาณที่ใช้/จ้าง/คิดค่า	ราคาต่อไร่ (บาท)	แหล่งที่มา

2. การใช้ปุ๋ย การป้องกันกำจัดแมลง โรคพืช วัชพืช และการดูแลรักษา

ชื่อพื้นที่	ชื่อปุ๋ย สารเคมี และ	อัตราที่ใช้	เกษตรกรที่ใช้	เหตุผลที่ใช้
แปลงที่.....	สารป้องกันกำจัดศัตรูพืช			
วันเดือนปี	และวัชพืชที่ใช้			

ETM-006 แบบบันทึกเกษตรกร หน้า 2 จาก 2

3. แบบบันทึกการวัดผลทางอาหารและการจัดการด้านการเก็บเกี่ยวผลผลิต

วันที่	ผู้บันทึก	แปลงยาง	พื้นที่ที่วัด (ไร่)	จำนวนต้นยางที่วัด	อายุต้นยาง (ปี)	ระบบวัด 1/25 d/2 2/7

ข้อมูลการวัดผลทางอาหาร

- เวลาเริ่มวัด:..... เวลาสิ้นสุดการวัด:.....
- ปริมาณน้ำยางสดที่ได้ (กก.):.....
- ลักษณะน้ำยาง:.....
☐ ปกติ ☐ ผิดปกติ (โปรดระบุ:.....)
- สารเคมีที่ใช้ (ถ้ามี):..... ชนิด:..... ปริมาณ:.....
- ผลการแยกยางสด:.....
☐ ผสม ☐ แยก ☐ มีผล ☐ อื่นๆ (โปรดระบุ:.....)
- ปัญหาและอุปสรรคในการวัดผล:.....

ข้อมูลการจัดการด้านการเก็บเกี่ยวผลผลิต

- วิธีการรวบรวมน้ำยาง:..... (เช่น โส้ตรวม, แยกตามแปลง)
- การจัดการน้ำยางสด:.....
☐ จำนวนต้นที่..... ☐ ปกติ ☐ ผิดปกติ (โปรดระบุ:.....)
☐ อื่นๆ (โปรดระบุ:.....)
- วิธีการแปรรูป (ถ้ามี):.....
☐ ไม่มีการแปรรูป ☐ ทำยางแผ่น ☐ ทำยางก้อนถ้วย ☐ อื่นๆ (โปรดระบุ:.....)
- สารเคมีที่ใช้ในการแปรรูป (ชนิดและปริมาณ):.....
- การจัดการของเสีย/น้ำเสีย:.....
- ข้อมูลและอุปสรรคในการจัดการด้านการเก็บเกี่ยว:.....

4. หมายเหตุเพิ่มเติม

Figure 8 shows the farmer's record form used to record activities within the plot.

2. Helps in traceability of the origin of rubber and the benefits generated from the project. Reduce traceability time from days to minutes.

5.2 Satellite monitoring and confirmation of wide-scale impacts

1. High-resolution satellite imagery is used to monitor changes in rubber plantation areas (e.g., land use change, forest encroachment). Covering an area of 1,936.15 rai with an image resolution of 3 - 5 meters per pixel. This helps confirm compliance with the principle of no deforestation.

2. Vegetation index (such as NDVI) analysis from satellite imagery helps assess rubber plantation health, biomass growth and carbon sequestration. Biomass conversion can be identified with 90% accuracy. This is information that supports environmental benefits.

3. Help monitor environmental changes related to water and soil quality in the project area. Reduce the need for field surveys by 30%

5.3 Cryptocurrency: Incentives and Fair Distribution of Benefits

1. Carbon credit tokens built on the blockchain can deliver financial benefits from selling carbon credits directly and quickly to farmers. Reduce transaction fees by 50% compared to traditional money transfer systems. Reduce the steps and costs of middlemen

2. Create a fair and transparent system for distributing benefits, giving farmers incentives to participate and maintain sustainable practices. It is expected to increase the long-term farmer participation rate to 80%.

6. Audit and certification of joint benefits

To ensure that the co-benefits identified in this report are realized and verifiable, the project has implemented a systematic monitoring, evaluation and certification plan, leveraging cutting-edge technology to enhance credibility and transparency.

6.1 Planning for monitoring and evaluation of each area (environment, society, economy)

The project has established a detailed monitoring and evaluation framework for each of the co-benefits dimensions to enable tangible and continuous measurement of positive impacts.

Environmental aspects

- **biodiversity** Monitor the number and types of intercrops planted in rubber plantations, including preliminary surveys of some organisms (e.g. pollinators, earthworms). By surveying samples in pilot plots of 10% of the total area To assess the changes in the ecosystem in the project area
- **Soil and water quality** Collect soil and water samples regularly in participating project areas. Every 6 months, 50 soil samples and 10 water samples were taken. To analyze the amount of organic matter in the soil, pH of soil and water, including chemical residue contamination to show the improvement of quality.
- **Air quality** Monitor air pollution data (e.g. PM2.5, black carbon) in nearby areas or use models to estimate pollution reductions from phasing out burning in rubber plantations. Use data from the nearest air quality monitoring station or from an air quality model.

Social aspect

- **Quality of life and well-being** Conduct surveys or interviews with farmer and community groups. By collecting data from 30% of farmers who participated in the project. To assess the perception of health changes from chemical reduction, food access and life security.
- **Job and skills creation** Monitor the number of jobs created by the project and farmers' participation in training. Collect data from all training participants and evaluate them through pre- and post-training tests. and assess the development of new skills (e.g. digital skills, sustainable garden management)
- **Community Strength** Evaluate farmers' participation in project activities, group formation and knowledge exchange within the community. Through focus group meetings and participant observation

Economic

- **Farmers' income** Collect data on additional income that farmers receive from selling carbon credits and intercropping products. Using transaction data on the Blockchain and recording the sale of products Including an assessment of the reduction in production costs resulting from the reduction in the use of chemicals and fertilizers.
- **Business opportunities** Follow the emergence of new businesses related to the project or expand marketing channels for sustainable rubber products and intercrops. **From a survey of local entrepreneurs**

Summary of a robust and comprehensive monitoring and evaluation system (Figure 9), focusing on: The three main dimensions are environmental, social and economic, which show the co-benefits arising from each dimension, project activities, sustainable rubber plantation management and the role of technology (satellite and Blockchain) in driving and monitoring, focusing on monitoring and evaluation, showing the methods of data collection and indicators used to confirm project results.

Planning for Monitoring and Evaluation in each aspect: Environmental: Social, Economic

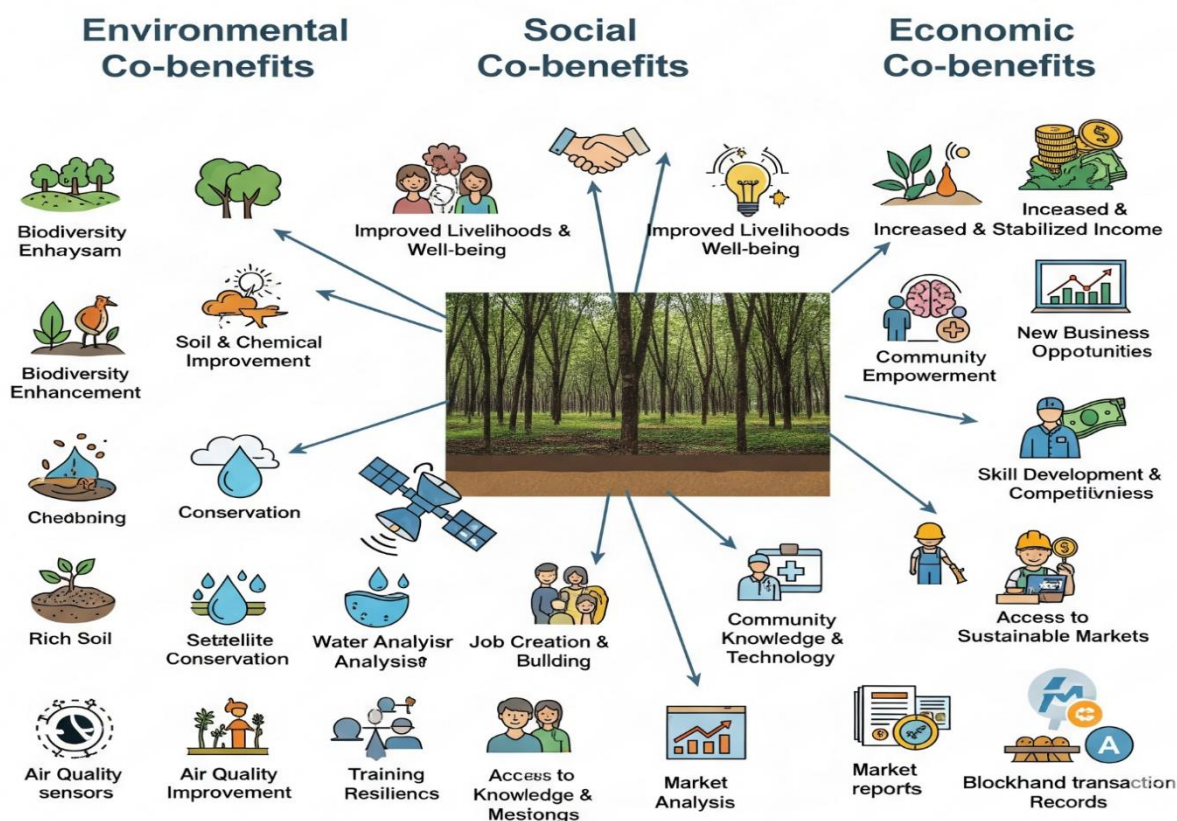


Figure 9 shows the linkage of "Planning for monitoring and evaluation of each area (environment, society, economy)". To explain the descriptive relationship

From Figure 9, it shows the connections and arrows. Arrows linking project activities to the co-benefits in each pillar, and from co-benefits to the monitoring method, are used to illustrate the cause-and-effect relationships and flow of information in the evaluation. This illustration focuses on the descriptive relationships of the project's monitoring and evaluation system, divided into three main interconnected parts. **Environment, society and economy** Each section will show the joint benefits that have occurred and how to follow up on the results.

The main elements of the image

The center of the project is the rubber plantation and the main technology of the project.

- **Picture of a complete rubber plantation** It is the core that represents the base of the project.
- **satellite symbol** It demonstrates the role of remote analysis and monitoring in helping to monitor changes in the area and health of rubber trees.
- **Blockchain symbol** Demonstrate transparency, immutable record keeping and traceability of activities and benefits generated.

Three pillars of shared benefits and monitoring system (linked from a central point)

Pillar 1: Environmental Co-benefits

- Related symbols Trees, various wildlife, clear water drops, clean clouds, fertile soil

- Explaining the relationship between sustainable rubber plantation management (no burning, reduced chemical use, intercropping) (link from rubber plantation) Leading to
 - (1) Promoting biodiversity Leading to Monitoring the number of plant/animal species, earthworms (by field surveys and analysis of satellite images)
 - (2) Soil quality improvement Leading to Monitoring of soil organic matter content, pH value (by soil sampling)
 - (3) Water resource conservation Leading to Water quality monitoring, reducing chemical contamination (by water sampling)
 - (4) Improving air quality Leading to PM2.5 monitoring , burning reduction (with satellite data and field reports)
 - (5) Increasing resilience to climate change Leading to Monitoring of plant survival rates, soil water holding capacity

Pillar 2: Social Co-benefits

- Related symbols Happy farmer family , hand in hand (cooperation), brain/light bulb (knowledge), medical cross (health)
- Explaining the relationship between additional income from carbon credits and chemical reduction (linked to rubber plantations and technology) Leading to
 - (1) Improving quality of life and well-being Leading to Farmer Health Survey , Food Security (with Survey and Interview)
 - (2) Job creation and workforce empowerment Leading to Tracking the number of new jobs, training participation, and skills development (by recording employment data and training outcomes)
 - (3) Community Strengthening and Participation Leading to Group assessment , meeting attendance (by observation and meeting minutes)
 - (4) Access to knowledge and technology Leading to Evaluation of the usability of Blockchain platform, interpretation of satellite data (with tests and observations)

Pillar 3: Economic Co-benefits

- Related symbols Coin/Money Increasing , Growth Graph , Skilled Farmer , Carbon Market Symbol
- Explaining the relationship between carbon credit generation and technology efficiency (linked from rubber plantations and technology) Leading to
 - (1) Increasing income and economic stability Leading to Tracking carbon credit income, intercrop income, and reduced production costs (with Blockchain transaction data and income-expense records)
 - (2) Creating new business and investment opportunities Leading to Tracking the number of new businesses, investments in green technology (with business surveys and investment reports)
 - (3) Development of skills and competitiveness Leading to Digital skills assessment , modern farm management (with skills assessment)
 - (4) Access to carbon markets and sustainable agricultural product markets Leading to Tracking the amount of carbon credits sold , access to premium markets (with market data and certification)

In summary, this Co-Benefits Report systematically describes the relationship between projects and sustainable development in various dimensions to ensure that the Co-Benefits Assessment is clear, universal, and can be effectively communicated and categorized and linked to the United Nations' Sustainable Development Goals (SDGs) in accordance with ETM Group standards.

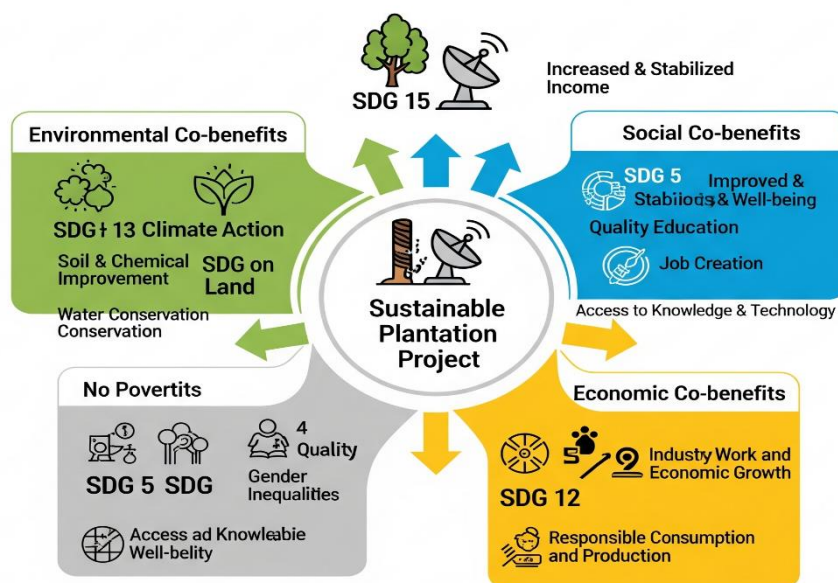


Figure 10 systematically illustrates the relationship between the project and sustainable development in various dimensions.

As Figure 10 shows, this "three pillars" classification provides a systematic way to visualize the relationship between projects and sustainable development across various dimensions. Each pillar demonstrates the benefits generated and provides concrete monitoring and evaluation methods.

Pillar 1: Environmental Co-benefits

This pillar emphasizes the positive impact the project will have on natural resources and ecosystems, with sustainable rubber plantation management at its core.

Relationships and connections

core Carbon sequestration projects and sustainable rubber plantation management (e.g., chemical reduction, no burning) are the starting point.

The benefits that arise Leading to improved soil quality, increased biodiversity (SDG 15), conserving water resources, improving air quality and increasing climate resilience (SDG 13).

Related SDGs and how to track them

1. **SDG 13 (Climate Change Action)** Direct greenhouse gas reduction and storage projects, which we can track through carbon measurements and reports from external agencies.

2. **SDG 15 (Terrestrial Ecosystems)** Intercropping, increased soil organic matter (SOC), and increased earthworm populations are all indicators of improved terrestrial ecosystems, which can be monitored through field surveys and soil sample analysis.

Pillar 2: Social Co-benefits

This pillar focuses on positive impacts on people in the community, particularly on quality of life, health and access to opportunities.

Relationships and connections

core Reducing the use of chemicals and having a more stable income (linked to the economic pillar)

The benefits that arise Leading to better health and well-being (SDG 3), access to education and knowledge (SDG 4), gender equality (SDG 5), and reduced inequality (SDG 10).

Related SDGs and how to track them

1. **SDG 3 (Good Health and Well-being)** Reducing the use of chemicals and avoiding burning can reduce the rate of illness from chemical poisoning and respiratory diseases, which we can track through health surveys.

2. **SDG 4 (Quality Education)** Providing new skills training and developing online courses is an opportunity for farmers to gain more educational opportunities, which can be tracked through attendance records and evaluation results.

3. **SDG 5 (Gender Equality)** The project promotes women's participation in management and access to technology, which can be tracked by the proportion of women who own plots or attend training.

4. **SDG 10 (Reduce inequality)** The project enables smallholder farmers and low-income groups to have equal access to opportunities and additional income from carbon credits, which can be tracked by the proportion of smallholder farmers participating and the increasing share of income from low-income groups.

Pillar 3: Economic Co-benefits

This pillar covers creating economic value for farmers and communities, as well as developing innovation and infrastructure to support future growth.

Relationships and connections

core Mechanisms for generating income from carbon credits, using technology (Blockchain, Cryptocurrency) and accessing markets

The benefits that arise Leading to increased incomes and economic stability (SDG 1), decent work (SDG 8), innovation and infrastructure development (SDG 9), and sustainable consumption and production (SDG 12).

Related SDGs and how to track them

1. **SDG 1 (No poverty)** Additional income from carbon credits and intercropping increases farmers' household income, which can be tracked through blockchain payment data and household surveys.

2. **SDG 8 (Decent work and economic growth)** The project creates new field jobs and improves skills for farmers, which can be tracked through employment records and post-training knowledge scores.

3. **SDG 9 (Industry, Innovation, Infrastructure)** Investing in Blockchain platforms and satellite systems is creating new innovations and digital infrastructure, which we can track by the percentage of farmers using the platforms.

4. **SDG 11 (Sustainable Cities and Communities)** Rural development helps create more liveable and sustainable communities, as evidenced by reduced air quality from burning restrictions and the percentage of households that feel their quality of life has improved.

5. SDG 12 (Sustainable Consumption and Production) Reducing chemical use and avoiding burning promotes responsible production, which can be tracked by reduced chemical use and higher yields certified as sustainable.

6.2 Using information from technology for auditing

The technology implemented in the project plays a crucial role in enhancing the efficiency and reliability of the audit of joint benefits.

Blockchain

- **Transparent activity recording** All activities related to rubber plantation management, such as intercropping, using organic fertilizers, and avoiding weed burning, are recorded on the blockchain platform, ensuring accurate, unalterable, and traceable data. By recording data with plot-level resolution and specifying GPS coordinates This is important evidence to confirm the practice that creates mutual benefits.

- **Financial traceability** The use of cryptocurrency allows for a transparent and fair tracking of the distribution of financial benefits (such as carbon credit income) to farmers. You can track your money transfers in real time. Ensure that benefits reach the recipients directly.

Satellite

- **Confirmation of land use and biomass changes** High-resolution satellite imagery and vegetation index (e.g. NDVI) analysis are used to confirm that there is no deforestation in the project area. By verifying the accuracy of field data with satellite images with an error of less than 5% and can assess the biomass growth of rubber trees and intercrops, which is related to the increase in carbon sequestration and biodiversity.

- **Wide-scale environmental monitoring** Satellite data can be used to track environmental changes, such as changes in green space, reductions in wildfires, or changes in water resources, which are important indicators of environmental benefits.

- **Compliance Assessment** Helps verify that farmers are following established sustainable orchard management practices, such as no burning or planting cover crops. There will be notifications and field inspections if abnormalities are found in satellite images.

6.3 Joint benefit certification plan by external agencies (if any)

To enhance its credibility and international recognition, the project plans to consider seeking a globally recognized, neutral, and independent third-party accreditation.

- **Requesting for certification** Projects will consider applying for certification against reputable standards, such as the Gold Standard for the Global Goals, or in combination with VCS + SDG Claims certification. Third-party certification validates the co-benefits the project creates and increases confidence for carbon credit buyers, investors and other stakeholders.

- **Preparing for the audit** The project will provide all necessary data and documentation, including access to blockchain-based data and satellite analysis results, to facilitate independent auditors' efficient operations. With the goal of passing an external audit within 24 months.

- **Communication of certification results** Once certified, the results and details of the certification will be made publicly available to create transparency and demonstrate the project's commitment to creating truly sustainable development.

7. Conclusion and recommendations

The "Carbon Capture and Greenhouse Gas Emission Reduction in Rubber Plantations in Buriram Province" project, developed by Carbon Solution (Thailand) Limited Partnership and ETM Group Co., Ltd., goes beyond a simple carbon credit project. It's a model for a holistic sustainable development program that creates comprehensive and lasting positive impacts on the environment, society, and local economy in Buriram Province. The project's seamless

integration of cutting-edge technologies like cryptocurrency, blockchain, and satellites is key to unlocking the potential of these co-benefits and making them tangible and measurable.

Summary of important joint benefits

The Carbon Capture and GHG Mitigation Project in Rubber Plantations in Buriram Province not only achieves climate goals, but also creates significant co-benefits across environmental, social, and economic dimensions, positively impacting farmers, communities, and the ecosystem as a whole, with results demonstrated through clear quantitative indicators (as discussed in Section 4) and a reliable monitoring system (Sections 5 and 6).

Future operational guidelines

1. Continue providing knowledge and training to farmers to enable widespread adoption of sustainable practices and new technologies. By organizing additional training at least twice a year and developing online courses for wider accessibility.
2. study and analysis of co-benefits in quantitative terms (Quantify Co-benefits) to enable more concrete impact reporting. In collaboration with research institutes or universities to collect basic data and follow up in the long term.
3. Consider applying for international standards of mutual benefit certification to increase acceptance and funding opportunities. With the goal of achieving Gold Standard certification within 3 years.
4. Expand the project to other potential areas to create a wide-ranging positive impact. By considering other rubber plantation areas in the *Northeast* with similar contexts to expand the project area by another 5,000,000 rai within 5 years.



Figure 10 shows the ranking of provinces with the most rubber tree plantations in the Northeastern region.

Source : Office of Agricultural Economics

Appendix

A. Project location map and study area Showing the location map of participating rubber plantations in Buriram Province

ตำแหน่ง	พิกัดตำแหน่งที่ตั้ง			Decimal Degrees		ตำแหน่ง	พิกัดตำแหน่งที่ตั้ง			Decimal Degrees	
	Zone	X	Y	Latitude	Longitude		Zone	X	Y	Latitude	Longitude
BRLS0001	48P	267665	1587689	14.3515447	102.8456988	BRLS0046	48P	271975	1586090	14.3374566	102.8857788
BRLS0002	48P	265711	1586875	14.3440248	102.8276607	BRLS0047	48P	271216	1587896	14.3537119	102.8785913
BRLS0003	48P	273629	1585392	14.3312859	102.9011659	BRLS0048	48P	272994	1587898	14.3538770	102.8950698
BRLS0004	48P	262913	1587754	14.3517276	102.8016535	BRLS0049	48P	271664	1588322	14.3575982	102.8827072
BRLS0005	48P	266649	1582178	14.3016656	102.8367603	BRLS0050	48P	272629	1588039	14.3551209	102.8916750
BRLS0006	48P	263277	1588187	14.3556710	102.8049888	BRLS0051	48P	275196	1586472	14.3411725	102.9155975
BRLS0007	48P	263381	1588188	14.3556890	102.8059525	BRLS0052	48P	275131	1586140	14.3381673	102.9150228
BRLS0008	48P	272953	1588401	14.3584185	102.8946473	BRLS0053	48P	274303	1584055	14.3192603	102.9075240
BRLS0009	48P	265142	1589106	14.3641338	102.8221927	BRLS0054	48P	269578	1583981	14.3182019	102.8637455
BRLS0010	48P	267082	1586847	14.3438878	102.8403687	BRLS0055	48P	269740	1584341	14.3214681	102.8652159
BRLS0011	48P	266910	1588231	14.3563781	102.8386547	BRLS0056	48P	272665	1588788	14.3618915	102.8919453
BRLS0012	48P	265580	1586482	14.3404628	102.8264809	BRLS0057	48P	269226	1585628	14.3330538	102.8603426
BRLS0013	48P	266140	1585347	14.3302553	102.8317692	BRLS0058	48P	272291	1585080	14.3283568	102.8887928
BRLS0014	48P	262748	1588153	14.3553183	102.8000892	BRLS0059	48P	271801	1588841	14.3622990	102.8839328
BRLS0015	48P	267401	1587721	14.3518116	102.8432494	BRLS0060	48P	268883	1588364	14.3577459	102.8569289
BRLS0016	48P	267744	1587840	14.3529157	102.8464179	BRLS0061	48P	273406	1586644	14.3425802	102.8989939
BRLS0017	48P	267430	1587795	14.3524826	102.8435118	BRLS0062	48P	270385	1589636	14.3693645	102.8707409
BRLS0018	48P	264524	1591074	14.3818622	102.8162924	BRLS0063	48P	270336	1588621	14.3601895	102.8703735
BRLS0019	48P	266653	1584367	14.3214441	102.8366079	BRLS0064	48P	266352	1590129	14.3734797	102.8333181
BRLS0020	48P	265412	1589139	14.3644550	102.8246922	BRLS0065	48P	265344	1587647	14.3509687	102.8241923
BRLS0021	48P	264052	1587468	14.3492412	102.8122343	BRLS0066	48P	266963	1586762	14.3431098	102.8392732
BRLS0022	48P	264221	1587330	14.3480088	102.8138126	BRLS0067	48P	266792	1586862	14.3439989	102.8376798
BRLS0023	48P	266147	1587520	14.3498895	102.8316452	BRLS0068	48P	264260	1587478	14.3493493	102.8141611
BRLS0024	48P	274853	1579282	14.2761776	102.9130188	BRLS0069	48P	265765	1590197	14.3740442	102.8278716
BRLS0025	48P	274702	1579352	14.2767978	102.9116140	BRLS0070	48P	265980	1587099	14.3460715	102.8301341
BRLS0026	48P	265459	1581943	14.2994417	102.8257546	BRLS0071	48P	266083	1585957	14.3357620	102.8311880
BRLS0027	48P	272557	1586888	14.3447150	102.8911050	BRLS0072	48P	265716	1584916	14.3263252	102.8278775
BRLS0028	48P	272323	1586903	14.3448313	102.8889351	BRLS0073	48P	266911	1586449	14.3402774	102.8388184
BRLS0029	48P	273113	1584660	14.3246295	102.8964457	BRLS0074	48P	266835	1588700	14.3606093	102.8379189
BRLS0030	48P	273689	1587191	14.3475459	102.9015706	BRLS0075	48P	266900	1588759	14.3611479	102.8385162
BRLS0031	48P	266688	1588593	14.3596301	102.8365658	BRLS0076	48P	267873	1587513	14.3499720	102.8476417
BRLS0032	48P	268270	1587824	14.3528154	102.8512942	BRLS0077	48P	265524	1587626	14.3507943	102.8258623
BRLS0033	48P	265865	1582546	14.3049243	102.8294641	BRLS0078	48P	265807	1588984	14.3630881	102.8283666
BRLS0034	48P	263308	1588776	14.3609953	102.8052242	BRLS0079	48P	267096	1586914	14.3444944	102.8404926
BRLS0035	48P	275508	1603841	14.3447982	102.8460785	BRLS0080	48P	267076	1586663	14.3422248	102.8403290
BRLS0036	48P	263400	1588452	14.3580759	102.8061054	BRLS0081	48P	265086	1591559	14.3862923	102.8214590
BRLS0037	48P	274409	1582895	14.3087876	102.9086034	BRLS0082	48P	265138	1591259	14.3835862	102.8219672
BRLS0038	48P	263434	1591794	14.3882739	102.8061259	BRLS0083	48P	268599	1584366	14.3215987	102.8546406
BRLS0039	48P	274938	1582906	14.3089300	102.9135043	BRLS0084	48P	266250	1582351	14.3031950	102.8330483
BRLS0040	48P	272840	1588408	14.3584724	102.8935994	BRLS0085	48P	265768	1585221	14.3290854	102.8283329
BRLS0041	48P	271877	1586992	14.3455986	102.8847942	BRLS0086	48P	266654	1587698	14.3515407	102.8363284
BRLS0042	48P	271940	1586775	14.3436431	102.8853964	BRLS0087	48P	266935	1587945	14.3537961	102.8389112
BRLS0043	48P	273136	1587827	14.3532471	102.8963918	BRLS0088	48P	268451	1590965	14.3812106	102.8527008
BRLS0044	48P	271292	1586115	14.3376260	102.8794471	BRLS0089	48P	264920	1590853	14.3798993	102.8199822
BRLS0045	48P	272125	1587939	14.3541757	102.8870123	BRLS0090	48P	265171	1590123	14.3733250	102.8223725

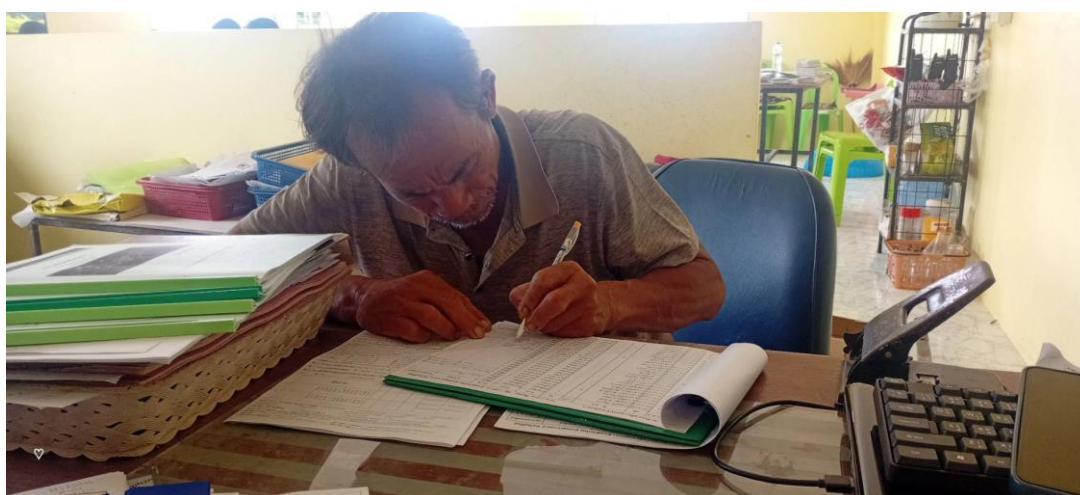
ตำแหน่ง	พิกัดตำแหน่งที่ตั้ง			Decimal Degrees		ตำแหน่ง	พิกัดตำแหน่งที่ตั้ง			Decimal Degrees	
	Zone	X	Y	Latitude	Longitude		Zone	X	Y	Latitude	Longitude
BRLS0091	48P	264143	1592222	14.3922018	102.8126600	BRLS0136	48P	265852	1582460	14.3041462	102.8293511
BRLS0092	48P	264195	1588976	14.3628784	102.8134273	BRLS0137	48P	266906	1582846	14.3077228	102.8390838
BRLS0093	48P	264992	1591931	14.3896453	102.8205551	BRLS0138	48P	268598	1584916	14.3265681	102.8545841
BRLS0094	48P	263371	1587238	14.3471048	102.8059435	BRLS0139	48P	268430	1584313	14.3211057	102.8530791
BRLS0095	48P	264666	1591973	14.3899969	102.8175297	BRLS0140	48P	272263	1586822	14.3440944	102.8883859
BRLS0096	48P	265338	1591868	14.3891056	102.8237677	BRLS0141	48P	266678	1583224	14.3111189	102.8369385
BRLS0097	48P	264215	1591717	14.3876453	102.8133718	BRLS0142	48P	266903	1583037	14.3094483	102.8390395
BRLS0098	48P	265032	1582597	14.3053145	102.8217413	BRLS0143	48P	266915	1582902	14.3082295	102.8391624
BRLS0099	48P	267027	1586136	14.3374591	102.8399205	BRLS0144	48P	266306	1587017	14.3453582	102.8331624
BRLS0100	48P	267460	1587854	14.3530183	102.8437847	BRLS0145	48P	266279	1586799	14.3433862	102.8329312
BRLS0101	48P	267192	1587343	14.3483786	102.8413452	BRLS0146	48P	273040	1587964	14.3544771	102.8954905
BRLS0102	48P	267219	1587285	14.3478568	102.8416004	BRLS0147	48P	265366	1589257	14.3655172	102.8242556
BRLS0103	48P	267425	1587906	14.3534851	102.8434558	BRLS0148	48P	266270	1585497	14.3316216	102.8329608
BRLS0104	48P	267226	1587445	14.3493031	102.8416514	BRLS0149	48P	266462	1585547	14.3320896	102.8347357
BRLS0105	48P	267222	1587391	14.3488148	102.8416190	BRLS0150	48P	265623	1589466	14.3674274	102.8266193
BRLS0106	48P	264791	1588878	14.3620439	102.8189596	BRLS0151	48P	273507	1586675	14.3428686	102.8999273
BRLS0107	48P	265157	1588588	14.3594549	102.8223770	BRLS0152	48P	274000	1585358	14.3310090	102.9046069
BRLS0108	48P	265977	1589946	14.3717944	102.8298584	BRLS0153	48P	264773	1588996	14.3631085	102.8187824
BRLS0109	48P	263735	1587945	14.3535238	102.8092546	BRLS0154	48P	265019	1587619	14.3506881	102.8211828
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BRLS0112	48P	265353	1588995	14.3631489	102.8241580	BRLS0157	48P	264830	1582035	14.3002196	102.8199186
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BRLS0117	48P	264389	1589164	14.3645936	102.8152088						
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BRLS0119	48P	266853	1586153	14.3375980	102.8383066						
BRLS0120	48P	265431	1589681	14.3693537	102.8248210						
BRLS0121	48P	264214	1589582	14.3683553	102.8135501						
BRLS0122	48P	264619	1588189	14.3558040	102.8174258						
BRLS0123	48P	272673	1586713	14.3431434	102.8921949						
BRLS0124	48P	278392	1586159	14.3386027	102.9452432						
BRLS0125	48P	273776	1586764	14.3436948	102.9024128						
BRLS0126	48P	273015	1585972	14.3364761	102.8954269						
BRLS0127	48P	273061	1585435	14.3316278	102.8958985						
BRLS0128	48P	273954	1586764	14.3437094	102.9040625						
BRLS0129	48P	271979	1586104	14.3375835	102.8858147						
BRLS0130	48P	272945	1584146	14.3199713	102.8949321						
BRLS0131	48P	274117	1587339	14.3489183	102.9055249						
BRLS0132	48P	272579	1586572	14.3418616	102.8913356						
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BRLS0135	48P	266525	1587104	14.3461628	102.8351845						

B. Photographs Photos of activities in the rubber plantation , meetings with farmers



C. Stakeholder information *Related farmer groups*





D. Reference documents List of documents, research, or databases used to support the assessment of joint benefits.

1. Standards and reference frameworks

1.1 National standards

1. **Document name** Guidelines and criteria for implementing voluntary greenhouse gas reduction projects according to Thailand standards (Thailand Voluntary Emission Reduction - T-VER)
 - a. **Creator** Greenhouse Gas Management Organization (Public Organization) (PMO)
 - b. **Source** Official website of TGO
 - c. **details** It is the primary document used as a framework for assessing and certifying the amount of greenhouse gas reduction and sequestration of projects, including the methodologies related to the agricultural and forestry sectors.
2. **Document name** Information related to the country's natural resources and environmental management policies and plans
 - a. **Creator** Office of Natural Resources and Environmental Policy and Planning (ONEP)
 - b. **Source** Official website of the ONEP
 - c. **details** Used as a reference to ensure that the project is in line with the national sustainable development direction.

1.2 International standards and guidelines

1. **Document name:** Sustainable Development Goals (SDGs)
 - a. **Nations** (United Nations)
 - b. **Source** Official website of the United Nations (sdgs.un.org)
 - c. **details** A global framework consisting of 17 core goals that serve as a compass for sustainable global development.
2. **Document name:** Verra Methodologies (e.g., VM0047 Afforestation, Reforestation, and Revegetation)
 - a. **Creator:** Verra
 - b. **Source** Verra 's official website (verra.org)
 - c. **details** It is the primary standard for voluntary carbon credit certification, including methodologies for reforestation and forest restoration projects.
3. **Document name:** Gold Standard for the Global Goals
 - a. Gold Standard **Foundation**
 - b. **Source** Gold Standard 's official website (globalgoals.goldstandard.org)
 - c. **details** Standards for certifying the positive impacts on sustainable development and co-benefits arising from carbon projects

2. Research list and database supporting the assessment of joint benefits

2.1 Environmental research

1. **Document name (Thai)** Assessment of carbon sequestration and carbon offset revenue in rubber plantations
 - a. **Author** Not specified (found in the Burapha Science Journal)
 - b. **Source:** Burapha Science Journal
 - c. **details** Provides quantitative data on carbon sequestration in rubber plantations at different ages.
2. **Document Name (English)** Rubber-Based Agroforestry Systems Associated with Food Crops: A Solution for Sustainable Rubber and Food Production?
 - a. **Author** Not specified (found in MDPI journal)
 - b. **Source:** MDPI ([mdpi.com/journal/sustainability](https://www.mdpi.com/journal/sustainability))
 - c. **details** Research studies the benefits of intercropping in rubber plantations for sustainability, biodiversity and food security.

2.2 Social and economic research

1. **Document name (Thai)** Examining the economic status of rubber farmers on a challenging path
 - a. **Creator** Bank of Thailand
 - b. **Source** Bank of Thailand website (bot.or.th)
 - c. **details** A report providing an overview of the economic status of rubber farmers in Thailand
2. **Document Name (Thai)** SDG Updates | How Blockchain Can Enhance Supply Chains and Solve Data Issues in Thailand's Agriculture Sector
 - a. **Author** Not specified
 - b. **Source** SDG Move website (sdgmove.com)
 - c. **details** An article analyzing the potential of Blockchain technology to increase transparency and promote sustainable development in Thailand's agricultural sector.
3. **Document Name (English)** Toward a New Economy: Cryptocurrency and International Development
 - a. **Author** Not specified
 - b. **Source:** Colorado State University Magazine
 - c. **details** An article analyzing the role of cryptocurrencies in financial access for rural communities.

3. United Nations Sustainable Development Goals and Objectives (SDGs) Total of 17 items

Goal (Goal)	Target (Objective)	Description (Details)
Goal 1 No Poverty (Goal 1: Eradicate poverty)	Target 1.1 Objective 1.1	By 2030, eradicate extreme poverty for all people everywhere, currently measured as people living on less than \$1.25 a day. By 2030, end poverty in all its dimensions for all people, everywhere, globally, as measured by the number of people living on less than \$1.25 a day.
	Target 1.2 Objective 1.2	By 2030, reduce at least by half the proportion of men, women and children of all ages living in poverty in all its dimensions according to national definitions. By 2030, reduce by at least half the proportion of men, women and children of all ages living in poverty in all its dimensions, as defined by the country.
	Target 1.3 Objective 1.3	Implement nationally appropriate social protection systems and measures for all, including floors, and by 2030 achieve substantial coverage of the poor and the vulnerable. Implement appropriate social protection measures and systems at the national level for all, including basic protection measures, and by 2030 achieve substantial coverage for the poor and vulnerable.
	Target 1.4 Objective 1.4	By 2030, ensure that all men and women, in particular the poor and the vulnerable, have equal rights to economic resources, as well as access to basic services, ownership and control over land and other forms of property, inheritance, natural resources, appropriate new technology and financial services, including microfinance. By 2030, ensure that all men and women, in particular the poor and vulnerable, have equal access to economic resources, including access to basic services, ownership and control of land and other assets, inheritance rights, natural resources, appropriate new technologies, and financial services, including microfinance.
	Target 1.5 Objective 1.5	By 2030, build the resilience of the poor and those in vulnerable situations and reduce their exposure and vulnerability to climate-related extreme events and other economic, social and environmental shocks and disasters. By 2030, build resilience among the poor and vulnerable and reduce their vulnerability to climate-related extreme events and other economic, social and environmental disasters.

Goal 2 Zero Hunger Goal 2: End hunger	Target 2.1 Objective 2.1	By 2030, end hunger and ensure access by all people, in particular the poor and people in vulnerable situations, including infants, to safe, nutritious and sufficient food all year round. By 2030, end hunger and ensure that all people, in particular the poor and people in vulnerable situations, including infants, have access to safe, nutritious and sufficient food all year round.
	Target 2.2 Objective 2.2	By 2030, end all forms of malnutrition, including achieving, by 2025, the internationally agreed targets on stunting and wasting in children under 5 years of age, and address the nutritional needs of adolescent girls, pregnant and lactating women and older persons. By 2025, end all forms of malnutrition, including achieving, by 2025, the internationally agreed targets on stunting and wasting in children under 5 years of age , and address the nutritional needs of adolescent girls, pregnant and lactating women and older persons.
	Target 2.3 Objective 2.3	By 2030, double the agricultural productivity and incomes of small-scale food producers, in particular women, indigenous peoples, family farmers, pastoralists and fishers, including through secure and equal access to land, other productive resources and inputs, knowledge, financial services, markets and opportunities for value addition and non-farm employment. By 2030, double the agricultural productivity and incomes of small-scale food producers, particularly women, indigenous peoples, small-scale farmers, pastoralists and fishers, through secure and equitable access to land, access to production resources and other inputs, knowledge, financial services, markets and opportunities for value creation and non-farm employment.
	Target 2.4 Objective 2.4	By 2030, ensure sustainable food production systems and implement resilient agricultural practices that increase productivity and production, that help maintain ecosystems, that strengthen capacity for adaptation to climate change, extreme weather, drought, flooding and other disasters and that progressively improve land and soil quality. By 2030 , ensure sustainable food production systems and implement resilient agricultural practices that increase productivity and production, that support ecosystem maintenance, that strengthen adaptive capacity to climate change, extreme weather events, drought, floods and other disasters, and that gradually improve soil and land quality.

	Target 2.5 Objective 2.5	By 2020, maintain the genetic diversity of seeds, cultivated plants and farmed and domesticated animals and their related wild species, including through soundly managed and diversified seed and plant banks at the national, regional and international levels, and promote access to and fair and equitable sharing of benefits arising from the utilization of genetic resources and associated traditional knowledge, as internationally agreed. By 2020 , maintain the genetic diversity of seeds, cultivated crops, farm animals and domesticated animals, and associated wild species, including through good management and diversification of seed and plant banks at the national, regional and international levels, and promote fair and equitable access to and sharing of benefits from the use of genetic resources and associated traditional knowledge as internationally agreed.
Goal 3 Good Health and Well-being Goal 3: Good health and well-being	Target 3.1 Objective 3.1	By 2030, reduce the global maternal mortality ratio to less than 70 per 100,000 live births. By 2030 , reduce the global maternal mortality rate to no more than 70 deaths per 100,000 live births .
	Target 3.2 Objective 3.2	By 2030, end preventable deaths of newborns and children under 5 years of age, with all countries aiming to reduce neonatal mortality to at least as low as 12 per 1,000 live births and under-5 mortality to at least as low as 25 per 1,000 live births. By 2030 , end preventable deaths of newborns and children under 5 years of age, with all countries aiming to reduce the newborn mortality rate to at least 12 deaths per 1,000 live births and the under 5 mortality rate to at least 25 deaths per 1,000 live births .
	Target 3.3 Objective 3.3	By 2030, end the epidemics of AIDS, tuberculosis, malaria and neglected tropical diseases and combat hepatitis, water-borne diseases and other communicable diseases. By 2030 , end the epidemics of AIDS, tuberculosis, malaria and neglected tropical diseases, and combat hepatitis, waterborne diseases and other communicable diseases.
	Target 3.4 Objective 3.4	By 2030, reduce by one third premature mortality from non-communicable diseases through prevention and treatment and promote mental health and well-being. By 2030 , reduce premature deaths from non-communicable diseases by one-third through

		prevention and treatment, and promoting mental health and well-being.
	Target 3.5 Objective 3.5	Strengthen the prevention and treatment of substance abuse, including narcotic drug abuse and harmful use of alcohol Strengthen the prevention and treatment of drug abuse, including the harmful use of drugs and alcohol.
	Target 3.6 Objective 3.6	By 2020, halve the number of global deaths and injuries from road traffic accidents. By 2020 , halve the number of deaths and injuries from road traffic accidents worldwide.
	Target 3.7 Objective 3.7	By 2030, ensure universal access to sexual and reproductive health-care services, including for family planning, information and education, and the integration of reproductive health into national strategies and programs. By 2030, ensure access for all to sexual and reproductive health services, including family planning, information and education, and integrate reproductive health into national strategies and plans.
	Target 3.8 Objective 3.8	Achieve universal health coverage, including financial risk protection, access to quality essential health-care services and access to safe, effective, quality and affordable essential medicines and vaccines for all. Achieve universal health coverage, including financial risk protection, access to quality essential health services, and access to safe, effective, high-quality, and affordable essential medicines and vaccines for all.
	Target 3.9 Objective 3.9	By 2030, substantially reduce the number of deaths and illnesses from hazardous chemicals and air, water and soil pollution and contamination. By 2030 , significantly reduce the number of deaths and illnesses from hazardous chemicals and air, water and soil pollution and contamination.
Goal 4 Quality Education Goal 4: Quality education	Target 4.1 Objective 4.1	By 2030, ensure that all girls and boys complete free, equitable and quality primary and secondary education leading to relevant and effective learning outcomes. By 2030, ensure that all girls and boys complete inclusive, equitable and free quality primary and secondary education that leads to relevant and effective learning outcomes.

	Target 4.2 Objective 4.2	By 2030, ensure that all girls and boys have access to quality early childhood development, care and pre-primary education so that they are ready for primary education. By 2030, ensure that all girls and boys have access to quality early childhood development, care and pre-primary education to prepare them for primary school.
	Target 4.3 Objective 4.3	By 2030, ensure equal access for all women and men to affordable and quality technical, vocational and tertiary education, including university. By 2030, ensure equal access for all men and women to quality and affordable technical, vocational and higher education, including university.
	Target 4.4 Objective 4.4	By 2030, substantially increase the number of youth and adults who have relevant skills, including technical and vocational skills, for employment, decent jobs and entrepreneurship. By 2030, increase the number of youth and adults with relevant skills, including technical and vocational skills, for employment, decent work and entrepreneurship.
	Target 4.5 Objective 4.5	By 2030, eliminate gender disparities in education and ensure equal access to all levels of education and vocational training for the vulnerable, including persons with disabilities, indigenous peoples and children in vulnerable situations. By 2030, eliminate gender inequalities in education and ensure equal access for vulnerable groups, including people with disabilities, indigenous peoples and children in vulnerable situations, to all levels of education and vocational training.
	Target 4.6 Objective 4.6	By 2030, ensure that all youth and a substantial proportion of adults, both men and women, achieve literacy and numeracy .
	Target 4.7 Objective 4.7	By 2030, ensure that all learners acquire the knowledge and skills needed to promote sustainable development, including, among others, through education for sustainable development and sustainable lifestyles, human rights, gender equality, promotion of a culture of peace and non-violence, global citizenship and appreciation of cultural diversity and of culture's contribution to sustainable development. By 2030, ensure that all learners acquire the knowledge and skills necessary to promote sustainable development, including through

		education for sustainable development, sustainable livelihoods, human rights, gender equality, the promotion of cultures of peace and nonviolence, global citizenship, and an appreciation of cultural diversity and its contribution to sustainable development.
Goal 5 Gender Equality Goal 5 Gender Equality	Target 5.1 Objective 5.1	End all forms of discrimination against all women and girls everywhere. End all forms of discrimination against all women and girls everywhere.
	Target 5.2 Objective 5.2	Eliminate all forms of violence against all women and girls in the public and private spheres, including trafficking and sexual and other types of exploitation. Eliminate all forms of violence against all women and girls in public and private spaces, including human trafficking and sexual and other forms of exploitation.
	Target 5.3 Objective 5.3	Eliminate all harmful practices, such as child, early and forced marriage and female genital mutilation. Eliminate all harmful practices such as forced child marriage, early and underage marriage, and female genital mutilation.
	Target 5.4 Objective 5.4	Recognize and value unpaid care and domestic work through the provision of public services, infrastructure and social protection policies and the promotion of shared responsibility within the household and the family as nationally appropriate. Recognize and value unpaid care and domestic work through the provision of public services, infrastructure and social protection policies, and promote the sharing of household and family responsibilities, as appropriate for each country.
	Target 5.5 Objective 5.5	Ensure women's full and effective participation and equal opportunities for leadership at all levels of decision-making in political, economic and public life. Ensure women's full and effective participation and equal opportunities for leadership at all levels of decision-making in politics, the economy and public life.
	Target 5.6 Objective 5.6	Ensure universal access to sexual and reproductive health and reproductive rights as agreed in accordance with the Program of Action of the International Conference on Population and Development and the Beijing Platform for Action

		and the outcome documents of their review conferences. Ensure universal access to sexual and reproductive health and access to reproductive health rights as agreed upon in the Programme of Action of the International Conference on Population and Development and the Beijing Programme of Action and the outcome documents of those review conferences.
Goal 6 Clean Water and Sanitation (Goal 6 Clean Water and Sanitation)	Target 6.1 Objective 6.1	By 2030, achieve universal and equitable access to safe and affordable drinking water for all. By 2030, achieve universal and equitable access to safe and affordable drinking water for all.
	Target 6.2 Objective 6.2	By 2030, achieve access to adequate and equitable sanitation and hygiene for all and end open defecation, paying special attention to the needs of women and girls and those in vulnerable situations. By 2030, achieve access to adequate and equitable sanitation and hygiene for all and end open defecation, paying special attention to the needs of women and girls, including those in vulnerable situations.
	Target 6.3 Objective 6.3	By 2030, improve water quality by reducing pollution, eliminating dumping and minimizing release of hazardous chemicals and materials, halving the proportion of untreated wastewater and substantially increasing recycling and safe reuse globally. By 2030, improve water quality by reducing pollution, eliminating waste and minimizing the release of hazardous chemicals and materials, halving the proportion of untreated wastewater, and significantly increasing safe recycling and reuse globally.
	Target 6.4 Objective 6.4	By 2030, substantially increase water-use efficiency across all sectors and ensure sustainable withdrawals and supply of freshwater to address water scarcity and substantially reduce the number of people suffering from water scarcity. By 2030, significantly increase water use efficiency across all sectors and ensure sustainable freshwater use and supply to address water scarcity and significantly reduce the number of people suffering from water scarcity.

	Target 6.5 Objective 6.5	By 2030, implement integrated water resources management at all levels, including through transboundary cooperation as appropriate. By 2030, implement integrated water resources management at all levels, including through cross-border cooperation as appropriate.
	Target 6.6 Objective 6.6	By 2020, protect and restore water-related ecosystems, including mountains, forests, wetlands, rivers and aquifers. By 2020, protect and restore water-related ecosystems, including mountains, forests, wetlands, rivers and groundwater sources.
Goal 7 Affordable and Clean Energy Goal 7: Affordable and Clean Energy for All	Target 7.1 Objective 7.1	By 2030, ensure universal access to affordable, reliable and modern energy services. By 2030, ensure access to affordable, reliable and modern energy services for all.
	Target 7.2 Objective 7.2	By 2030, increase substantially the share of renewable energy in the global energy By 2030, significantly increase the share of renewable energy in the global energy mix.
	Target 7.3 Objective 7.3	By 2030, double the global rate of improvement in energy efficiency. By 2030, double the global rate of energy efficiency improvement.
Goal 8 Decent Work and Economic Growth Goal 8 : Decent work and economic growth	Target 8.1 Objective 8.1	Sustain per capita economic growth in accordance with national circumstances and, in particular, at least 7 per cent gross domestic product growth per annum in the least developed countries. Support sustainable per capita economic growth in each country's context, and in particular, at least 7 percent annual GDP growth in least developed countries.
	Target 8.2 Objective 8.2	Achieve higher levels of economic productivity through diversification, technological upgrading and innovation, including through a focus on high-value added and labor-intensive sectors. Achieve higher levels of economic productivity through diversification, technological upgrading and innovation, including by focusing on high-value-added and labour-intensive sectors.
	Target 8.3 Objective 8.3	Promote development-oriented policies that support productive activities, decent job creation, entrepreneurship, creativity and innovation, and encourage the formalization and growth of micro-,

		small- and medium-sized enterprises, including through access to financial services. Promote development-oriented policies that support productive activities, decent job creation, entrepreneurship, creativity and innovation, and support the formalization and growth of micro, small and medium-sized enterprises, including through access to financial services.
	Target 8.4 Objective 8.4	Improve progressively, through 2030, global resource efficiency in consumption and production and endeavor to decouple economic growth from environmental degradation, in accordance with the 10-Year Framework of Programmes on Sustainable Consumption and Production, with developed countries taking the lead. Continuously improve the efficiency of global resource use in consumption and production until 2030 and strive to decouple economic growth from environmental degradation, as per the 10-year framework of the Sustainable Consumption and Production Roadmap, with developed countries leading the way.
	Target 8.5 Objective 8.5	By 2030, achieve full and productive employment and decent work for all women and men, including for young people and persons with disabilities, and equal pay for work of equal value. By 2030, achieve full and productive employment and decent work for all men and women, including young people and people with disabilities, and equal pay for work of equal value.
	Target 8.6 Objective 8.6	By 2020, substantially reduce the proportion of youth not in employment, education or training. By 2020, significantly reduce the proportion of youth not in employment, education or training.
	Target 8.7 Objective 8.7	Take immediate and effective measures to eradicate forced labor, end modern slavery and human trafficking and secure the prohibition and elimination of the worst forms of child labor, including recruitment and use of child soldiers, and by 2025 end child labor in all its forms. Take swift and effective measures to eliminate forced labour, end modern slavery and human trafficking, and ensure the prohibition and elimination of the worst forms of child labour, including recruitment and use of child soldiers, and by 2025, end all forms of child labour.
	Target 8.8	Protect labor rights and promote safe and secure working environments for all workers, including

	Objective 8.8	migrant workers, in particular women migrants, and those in precarious employment. Protect labor rights and promote safe and secure working environments for all workers, including migrant workers, particularly women workers and those in vulnerable jobs.
	Target 8.9 Objective 8.9	By 2030, devise and implement policies to promote sustainable tourism that creates jobs and promotes local culture and products. By 2030, design and implement policies that promote sustainable tourism, which creates jobs and promotes local culture and products.
	Target 8.10 Objective 8.10	Strengthen the capacity of domestic financial institutions to encourage and expand access to banking, insurance and financial services for all. Strengthen the capacity of domestic financial institutions to promote and expand access to banking, insurance and financial services for all.
Goal 9 Industry, Innovation and Infrastructure Goal 9 Industry, Innovation and Infrastructure	Target 9.1 Objective 9.1	Develop quality, reliable, sustainable and resilient infrastructure, including regional and transborder infrastructure, to support economic development and human well-being, with a focus on affordable and equitable access for all. Develop quality, reliable, sustainable and resilient infrastructure, including regional and cross-border infrastructure, to support economic development and human well-being, with a focus on affordable and equitable access for all.
	Target 9.2 Objective 9.2	Promote inclusive and sustainable industrialization and, by 2030, significantly raise industry's share of employment and gross domestic product, in line with national circumstances, and double its share in least developed countries. Promote inclusive and sustainable industrialization and, by 2030, significantly increase the industrial sector's share of employment and GDP in each country context, doubling this share in least developed countries.
	Target 9.3 Objective 9.3	Increase the access of small-scale industrial and other enterprises, in particular in developing countries, to financial services, including affordable credit, and their integration into value chains and markets. Increase access for small-scale and other enterprises, particularly in developing countries, to financial services, including affordable credit, and integrate these enterprises into value chains and markets.

	Target 9.4 Objective 9.4	By 2030, upgrade infrastructure and retrofit industries to make them sustainable, with increased resource-use efficiency and greater adoption of clean and environmentally sound technologies and industrial processes, with all countries taking action in accordance with their respective capabilities. By 2030, upgrade infrastructure and improve industrial sustainability by increasing resource efficiency and adopting cleaner and greener technologies and industrial processes, with all countries working to their own capabilities.
	Target 9.5 Objective 9.5	Enhance scientific research, upgrade the technological capabilities of industrial sectors in all countries, in particular developing countries, including, by 2030, encouraging innovation and substantially increasing the number of research and development workers per 1 million people and public and private research and development spending. Strengthen scientific research, enhance the technological capabilities of industry in all countries, especially developing countries, including by promoting innovation and significantly increasing the number of R&D workers per million people, and increasing public and private sector R&D spending by 2030 .
Goal 10 Reduced Inequalities Goal 10 : Reduce inequality	Target 10.1 Objective 10.1	By 2030, progressively achieve and sustain income growth of the bottom 40 per cent of the population at a rate higher than the national average. By 2030, achieve and maintain income growth for the bottom 40 percent of the population at a rate consistently higher than the national average.
	Target 10.2 Objective 10.2	By 2030, empower and promote the social, economic and political inclusion of all, irrespective of age, sex, disability, race, ethnicity, origin, religion or economic or other status. By 2030, strengthen and promote the social, economic and political participation of all people, regardless of age, gender, disability, race, ethnicity, national origin, religion or economic or other status.
	Target 10.3 Objective 10.3	Ensure equal opportunity and reduce inequalities of outcome, including by eliminating discriminatory laws, policies and practices and promoting appropriate legislation, policies and action in this regard. Ensure equal opportunities and reduce inequalities in outcomes, including by eliminating

		discriminatory laws, policies and practices and promoting appropriate laws, policies and measures in this regard.
	Target 10.4 Objective 10.4	Adopt policies, especially fiscal, wage and social protection policies, and progressively achieve greater equality. Implement policies, particularly fiscal, wage and social protection policies, and gradually achieve greater equality.
	Target 10.5 Objective 10.5	Improve the regulation and monitoring of global financial markets and institutions and strengthen the implementation of such regulations. Develop and improve the regulation and supervision of global markets and financial institutions, and strengthen the operation of such regulations.
	Target 10.6 Objective 10.6	Ensure enhanced representation and voice for developing countries in decision-making in global international economic and financial institutions in order to deliver more effective, credible, accountable and legitimate institutions. Ensure that developing countries have an increased representation and voice in decision-making in the world's international economic and financial institutions, to deliver more effective, credible, accountable and legitimate institutions.
	Target 10.7 Objective 10.7	Facilitate orderly, safe, regular and responsible migration and mobility of people, including through the implementation of planned and well-managed migration policies. Facilitate orderly, safe, regular and responsible migration and movement of people, including through the implementation of well-planned and well-managed migration policies.
Goal 11 Sustainable Cities and Communities Goal 11 Sustainable Cities and Human Communities	Target 11.1 Objective 11.1	By 2030, ensure access for all to adequate, safe and affordable housing and basic services and upgrade slums. By 2030, ensure access for all people to adequate, safe and affordable housing and basic services, and upgrade slum communities.
	Target 11.2 Objective 11.2	By 2030, provide access to safe, affordable, accessible and sustainable transport systems for all, improving road safety, notably by expanding public transport, with special attention to the needs of those in vulnerable situations, women, children, persons with disabilities and older persons.

		By 2030, ensure access for all to safe, affordable, accessible and sustainable transport systems, including improving road safety, in particular by expanding public transport, and paying special attention to the needs of people in vulnerable situations, women, children, people with disabilities and older people.
	Target 11.3 Objective 11.3	By 2030, enhance inclusive and sustainable urbanization and capacity for participatory, integrated and sustainable human settlement planning and management in all countries. By 2030, enhance inclusive and sustainable urbanization and capacity for participatory, integrated and sustainable human settlement planning and management in all countries.
	Target 11.4 Objective 11.4	Strengthen efforts to protect and safeguard the world's cultural and natural heritage. Strengthen efforts to protect and preserve the world's cultural and natural heritage.
	Target 11.5 Objective 11.5	By 2030, significantly reduce the number of deaths and the number of people affected and substantially decrease the direct economic losses relative to global gross domestic product caused by disasters, including water-related disasters, with a focus on protecting the poor and people in vulnerable situations. By 2030, significantly reduce the number of people killed and affected by disasters, and reduce the direct economic losses caused by disasters relative to global GDP, with a focus on protecting the poor and people in vulnerable situations, including water-related disasters.
	Target 11.6 Objective 11.6	By 2030, reduce the adverse per capita environmental impact of cities, including by paying special attention to air quality and municipal and other waste management. By 2030, reduce the negative environmental impact of cities per capita, including paying special attention to air quality and the management of municipal solid waste and other waste.
	Target 11.7 Objective 11.7	By 2030, provide universal access to safe, inclusive and accessible, green and public spaces, in particular for women and children, older persons and persons with disabilities. By 2030, ensure universal access to safe, inclusive and accessible green and public spaces, particularly for women and children, older people and people with disabilities.

	Target 11.a Objective 11.a	Support positive economic, social and environmental links between urban, peri-urban and rural areas by strengthening national and regional development planning. Promote positive economic, social and environmental linkages between urban, peri-urban and rural areas by strengthening national and regional development planning.
	Target 11.b Objective 11.b	By 2020, substantially increase the number of cities and human settlements adopting and implementing integrated policies and plans towards inclusion, resource efficiency, mitigation and adaptation to climate change, resilience to disasters, and holistic disaster risk management, in line with the Sendai Framework for Disaster Risk Reduction 2015-2030. By 2020, increase the number of cities and settlements implementing integrated policies and plans that promote participation, resource efficiency, climate change mitigation and adaptation, disaster resilience, and integrated disaster risk management in line with the Sendai Framework for Action on Disaster Risk Reduction 2015–2030 .
Goal 12 Responsible Consumption and Production Goal 12 Sustainable Consumption and Production	Target 12.1 Objective 12.1	Implement the 10-Year Framework of Programmes on Sustainable Consumption and Production Patterns, with all countries taking action, the developed countries taking the lead, taking into account the development and capabilities of developing countries. Implement the 10- year framework of the Sustainable Consumption and Production Patterns Roadmap, with all countries taking action and developed countries taking the lead, taking into account the development and capabilities of developing countries.
	Target 12.2 Objective 12.2	By 2030, achieve the sustainable management and efficient use of natural resources. By 2030 , achieve sustainable management and efficient use of natural resources.
	Target 12.3 Objective 12.3	By 2030, halve per capita global food waste at the retail and consumer levels and reduce food losses along production and supply chains, including post-harvest losses. By 2030, halve global food waste at the retail and consumer levels, and reduce food losses throughout the production and supply chain, including post-harvest losses.

	Target 12.4 Objective 12.4	By 2020, achieve the environmentally sound management of chemicals and all wastes throughout their life cycle, in accordance with agreed international frameworks, and significantly reduce their release to air, water and soil in order to minimize their adverse impacts on human health and the environment. By 2020, achieve the environmentally sound management of all chemicals and wastes throughout their life cycles, in accordance with agreed international frameworks, and reduce the release of these chemicals and wastes into air, water and soil to minimize their negative impacts on human health and the environment.
	Target 12.5 Objective 12.5	By 2030, substantially reduce waste generation through prevention, reduction, recycling and reuse. By 2030, significantly reduce waste generation through prevention, reduction, recycling and reuse.
	Target 12.6 Objective 12.6	Encourage companies, especially large and transnational companies, to adopt sustainable practices and to integrate sustainability information into their reporting cycle. Encourage companies, especially large and multinational corporations, to adopt sustainability practices and integrate sustainability information into their reporting cycles.
	Target 12.7 Objective 12.7	Promote public procurement practices that are sustainable, in accordance with national policies and priorities. Promote environmentally and socially friendly public procurement practices in line with national policies and priorities.
Goal 13 Climate Action Goal 13: Climate Change Action	Target 13.1 Objective 13.1	Strengthen resilience and adaptive capacity to climate-related hazards and natural disasters in all countries. Strengthen the capacity to adapt and recover from climate-related disasters and natural hazards in all countries.
	Target 13.2 Objective 13.2	Integrate climate change measures into national policies, strategies and planning. Integrate climate change measures into national policies, strategies and planning.
	Target 13.3 Objective 13.3	Improve education, awareness-raising and human and institutional capacity on climate change mitigation, adaptation, impact reduction and early warning.

		Develop and improve education, awareness raising, and human and institutional capacity for climate change mitigation, adaptation, and exposure reduction, and early warning.
Goal 14 Life Below Water Goal 14: Sustainable use of the oceans and marine resources	Target 14.1 Objective 14.1	By 2025, prevent and significantly reduce marine pollution of all kinds, in particular from land-based activities, including marine debris and nutrient pollution. By 2025, prevent and significantly reduce all forms of marine pollution, particularly from land-based activities, including marine debris and nutrient pollution.
	Target 14.2 Objective 14.2	By 2020, sustainably manage and protect marine and coastal ecosystems to avoid significant adverse impacts, including by strengthening their resilience, and take action for their restoration in order to achieve healthy and productive oceans. By 2020, sustainably manage and protect marine and coastal ecosystems to avoid significant negative impacts, including through building resilience and implementing measures to restore them, to achieve healthy and productive oceans.
	Target 14.3 Objective 14.3	Minimize and address the impacts of ocean acidification, including through enhanced scientific cooperation at all levels. Minimize the impacts of ocean acidification and address it, including through scientific collaboration at all levels.
	Target 14.4 Objective 14.4	By 2020, effectively regulate harvesting and end overfishing, illegal, unreported and unregulated fishing and destructive fishing practices and implement science-based management plans, in order to restore fish stocks in the shortest time feasible, at least to levels that can produce maximum sustainable yield as determined by their biological characteristics. By 2020, establish effective harvesting regulations and end overfishing, illegal, unreported and unregulated fishing, and destructive fishing practices, and implement science-based management plans to restore aquatic resources to the shortest possible time and at least the maximum sustainable yield levels based on their biological characteristics.
	Target 14.5 Objective 14.5	By 2020, conserve at least 10 per cent of coastal and marine areas, consistent with national and international law and based on the best available scientific information.

		By 2020, conserve at least 10 percent of coastal and marine areas , in accordance with national and international legislation and based on the best available scientific information.
Goal 15 Life on Land Goal 15 Terrestrial ecosystems	Target 15.1 Objective 15.1	By 2020, ensure the conservation, restoration and sustainable use of terrestrial and inland freshwater ecosystems and their services, in particular forests, wetlands, mountains and drylands, in line with obligations under international agreements. By 2020, ensure the conservation, restoration and sustainable use of terrestrial and freshwater ecosystems and their services, in particular forests, wetlands, mountains and drylands, in accordance with commitments under international agreements.
	Target 15.2 Objective 15.2	By 2020, promote the implementation of sustainable management of all types of forests, halt deforestation, restore degraded forests and substantially increase afforestation and reforestation globally. By 2020, promote sustainable forest management practices for all types of forests, halt deforestation, restore degraded forests, and significantly increase reforestation and reforestation globally.
	Target 15.3 Objective 15.3	By 2030, combat desertification, restore degraded land and soil, including land affected by desertification, drought and floods, and strive to achieve a land degradation-neutral world. By 2030, combat desertification, restore degraded lands and soils, including those affected by desertification, drought and flooding, and strive to achieve a land degradation-neutral world.
	Target 15.4 Objective 15.4	By 2030, ensure the conservation of mountain ecosystems, including their biodiversity, in order to enhance their capacity to provide benefits that are essential for sustainable development By 2030, ensure the conservation of mountain ecosystems, including their biodiversity, to enhance their ability to provide the benefits essential for sustainable development.
	Target 15.5 Objective 15.5	Take urgent and significant action to reduce the degradation of natural habitats, halt the loss of biodiversity and, by 2020, protect and prevent the extinction of threatened species. Take urgent and significant measures to reduce the degradation of natural habitats, halt the loss of

		biodiversity and, by 2020, protect and prevent the extinction of threatened species.
	Target 15.6 Objective 15.6	Promote fair and equitable sharing of the benefits arising from the utilization of genetic resources and promote appropriate access to such resources, as internationally agreed. Promote fair and equitable sharing of benefits arising from the use of genetic resources and promote access to such resources as agreed at the international level.
	Target 15.7 Objective 15.7	Take urgent action to end poaching and trafficking of protected species of flora and fauna and address both demand and supply of illegal wildlife products. Take urgent measures to end poaching and trade in protected wildlife and plant species, and address both the supply and demand sides of illegal wildlife products.
	Target 15.8 Objective 15.8	By 2020, introduce measures to prevent the introduction and significantly reduce the impact of invasive alien species on land and water ecosystems and control or eradicate the priority species. By 2020, implement measures to prevent the introduction and significantly reduce the impact of invasive alien species on terrestrial and aquatic ecosystems, and control or eliminate priority species.
	Target 15.9 Objective 15.9	By 2020, integrate ecosystem and biodiversity values into national and local planning, development processes, poverty reduction strategies and accounts. By 2020, integrate ecosystem and biodiversity values into national and local planning, development processes, poverty reduction strategies and accounting.
Goal 16 Peace, Justice and Strong Institutions Goal 16 Peace, justice and strong institutions	Target 16.1 Objective 16.1	Significantly reduce all forms of violence and related death rates everywhere. Significantly reduce all forms of violence and related mortality rates worldwide.
	Target 16.2 Objective 16.2	End abuse, exploitation, trafficking and all forms of violence against and torture of children. End all forms of child abuse, exploitation, human trafficking, and violence and torture.

	Target 16.3 Objective 16.3	Promote the rule of law at the national and international levels and ensure equal access to justice for all. Promote the rule of law at the national and international levels and ensure equal access to justice for all.
	Target 16.4 Objective 16.4	By 2030, significantly reduce illicit financial and arms flows, strengthen the recovery and return of stolen assets and combat all forms of organized crime. By 2030, significantly reduce the flow of illicit money and arms, strengthen the recovery and return of stolen assets, and combat organized crime in all its forms.
	Target 16.5 Objective 16.5	Substantially reduce corruption and bribery in all their forms. Significantly reduce corruption and bribery in all its forms.
	Target 16.6 Objective 16.6	Develop effective, accountable and transparent institutions at all levels. Develop an effective, accountable and transparent institutional system at all levels.
	Target 16.7 Objective 16.7	Ensure responsive, inclusive, participatory and representative decision-making at all levels. Ensure responsive, inclusive, participatory and representative decision-making at all levels.
	Target 16.8 Objective 16.8	Broaden and strengthen the participation of developing countries in the institutions of global governance. Expand and strengthen the participation of developing countries in global governance institutions.
	Target 16.9 Objective 16.9	By 2030, provide legal identity for all, including birth registration. By 2030, provide legal identity for all, including birth registration.
	Target 16.10 Objective 16.10	Ensure public access to information and protect fundamental freedoms, in accordance with national legislation and international agreements. Ensure that citizens have access to information and protect fundamental freedoms in accordance with domestic law and international agreements.
Goal 17 Partnerships for the Goals	Target 17.1 Objective 17.1	Strengthen domestic resource mobilization, including through international support to developing countries, to improve domestic capacity for tax and other revenue collection.

Goal 17 Partnerships for Sustainable Development		Strengthen domestic resource mobilization, including through international support to developing countries, to develop domestic capacities for tax collection and other revenue collection.
	Target 17.2 Objective 17.2	Developed countries to implement fully their official development assistance commitments, including the commitment by many developed countries to achieve the target of 0.7 per cent of ODA/GNI to developing countries and 0.15 to 0.20 per cent of ODA/GNI to least developed countries; ODA providers are encouraged to consider setting a target to provide at least 0.20 per cent of ODA/GNI to least developed countries. Developed countries are fully implementing their official development assistance obligations, including the commitments of many developed countries to achieve a target of 0.7 percent of ODA/GNI to developing countries and 0.15 to 0.20 percent of ODA/GNI to least developed countries. ODA donors should consider aiming for at least 0.20 percent of ODA/GNI to least developed countries.
	Target 17.3 Objective 17.3	Mobilize additional financial resources for developing countries from multiple sources. Mobilize additional financial resources for developing countries from multiple sources.
	Target 17.4 Objective 17.4	Assist developing countries in attaining long-term debt sustainability through coordinated policies aimed at fostering debt financing, debt relief and debt restructuring, as appropriate, and address the external debt of highly indebted poor countries to reduce debt distress. Assist developing countries in achieving long-term debt sustainability through coordinated policies aimed at promoting debt financing, debt relief and debt restructuring, as appropriate, and addressing the external debt problems of heavily indebted poor countries to reduce their debt distress.
	Target 17.5 Objective 17.5	Adopt and implement investment promotion regimes for least developed countries. Implement and operate an investment promotion system for least developed countries.
	Target 17.6 Objective 17.6	Enhance North-South, South-South and triangular regional and international cooperation on and access to science, technology and innovation and enhance knowledge sharing on mutually agreed terms, including through improved coordination

		among existing mechanisms, in particular at the United Nations level, and through a global technology facilitation mechanism. Strengthen regional and international cooperation between North-South, South-South and trilateral levels, and increase access to science, technology and innovation, and enhance knowledge sharing based on mutually agreed arrangements, including through improved coordination between existing mechanisms, particularly at the United Nations level and through the global technology facilitation mechanism.
	Target 17.7 Objective 17.7	Promote the development, transfer, dissemination and diffusion of environmentally sound technologies to developing countries on favorable terms, including on concessional and preferential terms, as mutually agreed. Promote the development, transfer, dissemination and distribution of environmentally friendly technologies to developing countries under appropriate conditions, including concessional and special conditions, as mutually agreed.
	Target 17.8 Objective 17.8	Fully operationalize the technology bank and science, technology and innovation capacity-building mechanism for least developed countries by 2017 and enhance the use of enabling technology, in particular information and communications technology. To enable the Technology Bank and the Science, Technology and Innovation Capacity Building Mechanism for Least Developed Countries to be fully operational by 2017 and to increase the use of enabling technologies, particularly information and communication technologies.
	Target 17.9 Objective 17.9	Enhance international support for implementing effective and targeted capacity-building in developing countries to support national plans to implement all the sustainable development goals, including through North-South, South-South and triangular cooperation. Strengthen international support for effective and targeted capacity-building efforts in developing countries to support national plans to achieve all Sustainable Development Goals, including through North-South, South-South and trilateral cooperation.
	Target 17.10	Promote a universal, rules-based, open, non-discriminatory and equitable multilateral trading system under the World Trade Organization,

	Objective 17.10	including through the conclusion of negotiations under its Doha Development Agenda. Promote a universal, rules-based, open, non-discriminatory and equitable multilateral trading system under the World Trade Organization, including through the conclusion of negotiations under the WTO Doha Development Agenda.
	Target 17.11 Objective 17.11	Substantially increase the exports of developing countries, in particular with a view to doubling the least developed countries' share of global exports by 2020. Significantly increase the exports of developing countries, in particular to double the share of least developed countries in global exports by 2020 .
	Target 17.12 Objective 17.12	Realize timely implementation of duty-free and quota-free market access on a lasting basis for all least developed countries, consistent with World Trade Organization decisions, including by ensuring that preferential rules of origin applicable to imports from least developed countries are transparent and simple, and contribute to facilitating market access. Ensuring the timely implementation of continued duty-free and quota-free market access for all least developed countries, in line with WTO resolutions, including through ensuring that preferential rules of origin applicable to imports from least developed countries are transparent and simple, and contribute to facilitating market access.
	Target 17.13 Objective 17.13	Enhance global macroeconomic stability, including through policy coordination and policy coherence. Strengthen global macroeconomic stability, including through policy coordination and policy coherence.
	Target 17.14 Objective 17.14	Enhance policy coherence for sustainable development. Strengthening policy coherence for sustainable development
	Target 17.15 Objective 17.15	Respect each country's policy space and leadership to establish and implement policies for poverty eradication and sustainable development. Respect the policy space and leadership of each country in formulating and implementing policies for poverty eradication and sustainable development.

	Target 17.16 Objective 17.16	Enhance the global partnership for sustainable development, complemented by multi-stakeholder partnerships that mobilize and share knowledge, expertise, technology and financial resources, to support the achievement of the sustainable development goals in all countries, in particular developing countries. Strengthen the global partnership for sustainable development, complemented by multi-stakeholder partnerships that mobilize and share knowledge, expertise, technology and financial resources to support the achievement of the Sustainable Development Goals in all countries, particularly in developing countries.
	Target 17.17 Objective 17.17	Encourage and promote effective public, public-private and civil society partnerships, building on the experience and resourcing strategies of partnerships. Support and promote effective public-private partnerships and civil society partnerships based on the experience and resource strategies of the partnerships.