ใบเตย (BaiToey)

RiceMaid

Innovative Solutions for Sustainable Rice Farming in the Face of Climate Change

Outline

Motivation and Benefits

Objective and Scope

Unique Features

System Design

Sensors/IoT Devices

Demonstration

Motivation and Benefits

Motivation:

- Climate change impacts rice farming.
- Challenges: water scarcity, pests, crop yields.

Benefits:

- Reduce methane emissions with AWD
- Optimized water usage

Objective and Scope

Develop a comprehensive support system for rice farmers

Information website

Field sensors

Interactive chatbot

Unique Features

Information Related

- Multiple sources for data
- Time-consuming and inefficient..
- Delayed decision-making.

- Single platform for real-time updates.
- Simplified access to critical data.
- Faster, informed decision-making.

Unique Features

Sensor Related

- High costs deter adoption.
- Complex installation processes.
- Isolated insights without integration.

- Effective use of AWD method
- Integrated with a chatbot for analysis.
- Real-time data collection and consulting.

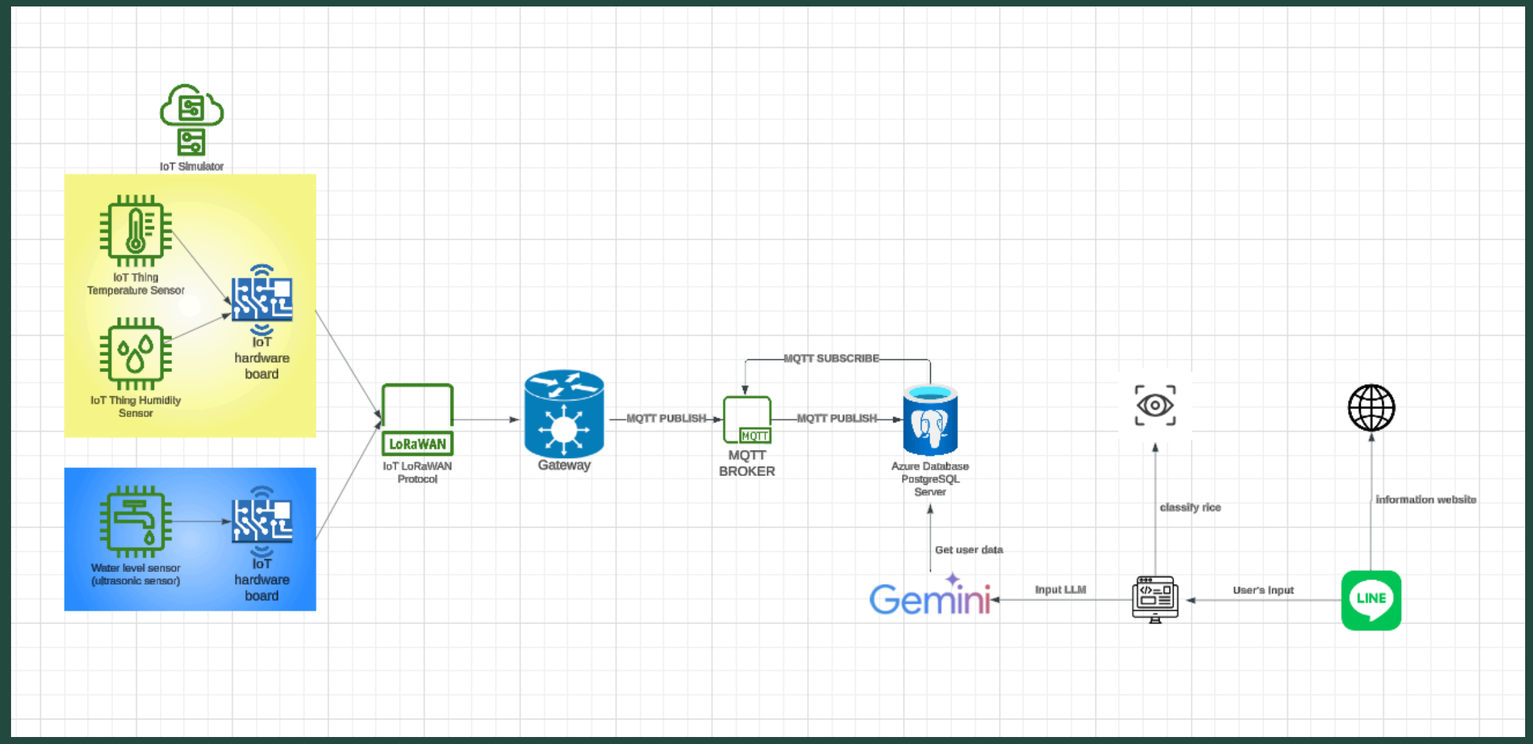
Unique Features

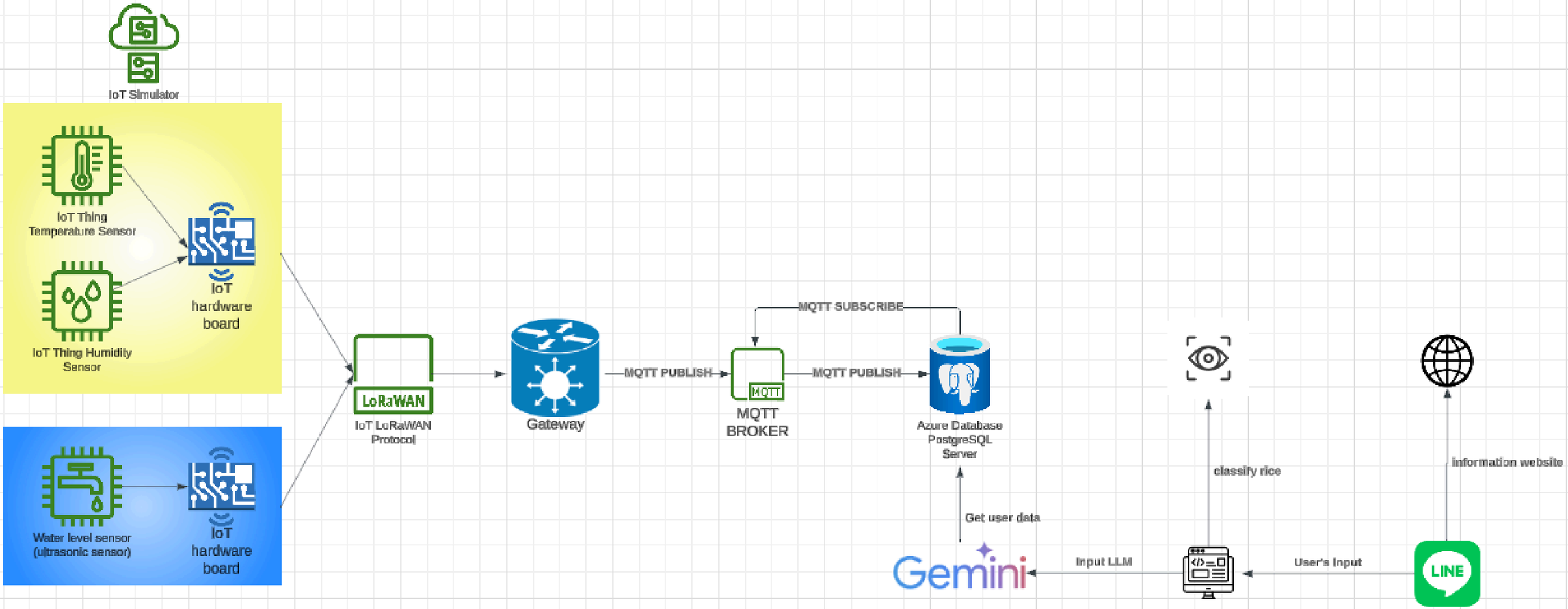
Carbon Credit Calculation

- Limited tools for sustainable practices.
- Lack of guidance for implementation
- Difficulty in calculating carbon credits.

- Tools for calculating carbon credits.
- Clear guidance for sustainable practices.
- Empowerment to engage in carbon credit markets.

System Design




IoT Simulator
IoT Thing
Temperature Sensor
IoT Thing Humidity
Sensor
IoT
hardware
board
Water level sensor
(ultrasonic sensor)
IoT
hardware
board
LoRaWAN
IoT LoRaWAN
Protocol
Gateway
MQTT PUBLISH
MQTT
MQTT
BROKER
MQTT SUBSCRIBE
MQTT PUBLISH
Azure Database
PostgreSQL
Server
Get user data
Gemini
Input LLM
classify rice
User's Input
information website
LINE

Cost Analysis of Sensors/IoT Devices

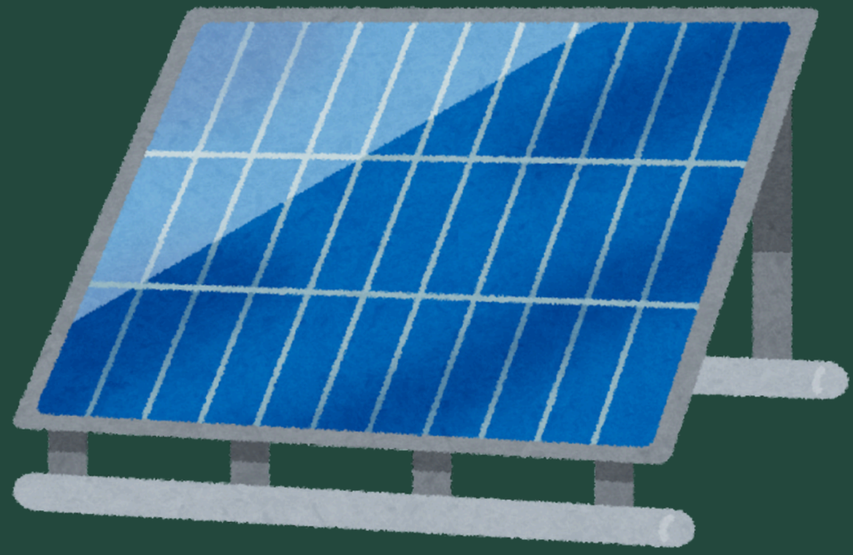
Cost 1 rai (1,600 m²) rice field

- Sensor Node
- Gateway
- Power Management
- Communication Protocol

Solar cell vs Battery

For 3 month

one-time deployment



recurring/long-term

Seasonal Operation Strategy

Two-Part System Design

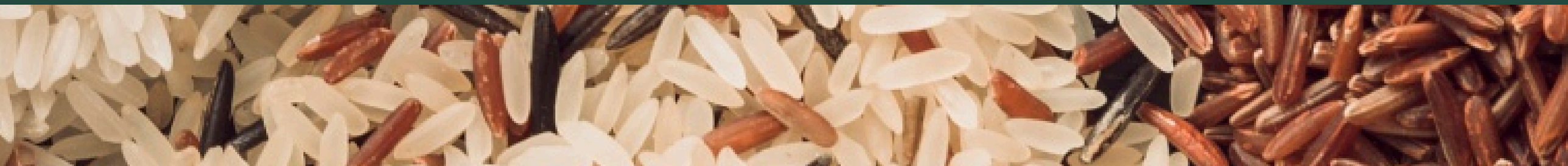
- Removable Sensor Unit
- Permanent Base Station

Installation Method

- Pre-planting
- Growing Season (120 days)
- Harvest
- Off-season

Cost-Saving Features

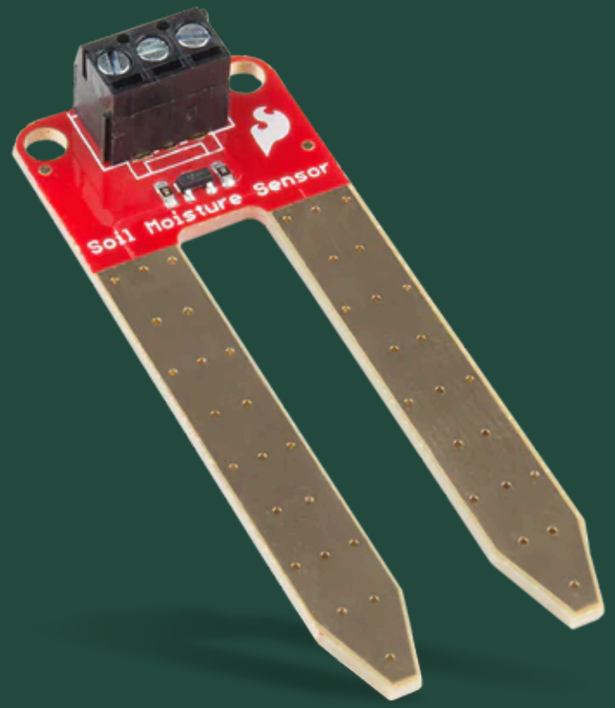
- Power Management
- Maintenance Schedule
- Protection Measures



Complete System Cost Breakdown

16 sub-areas (100m² each)

Water Level Sensors: 1 per 400m²



Soil Moisture Sensors: 1 per 800m²

Temperature Sensors: 2 air + 2 soil sensors

Sensor Allocation

Complete System Cost Breakdown

Hardware Components Breakdown

Water Level Sensors x4 $48

Soil Moisture Sensors x2 $26

Temperature Sensors x1 $34

Base Stations x2 $90

Gateway (shared) x1 $70

Total Initial Investment $268

Annual Maintenance

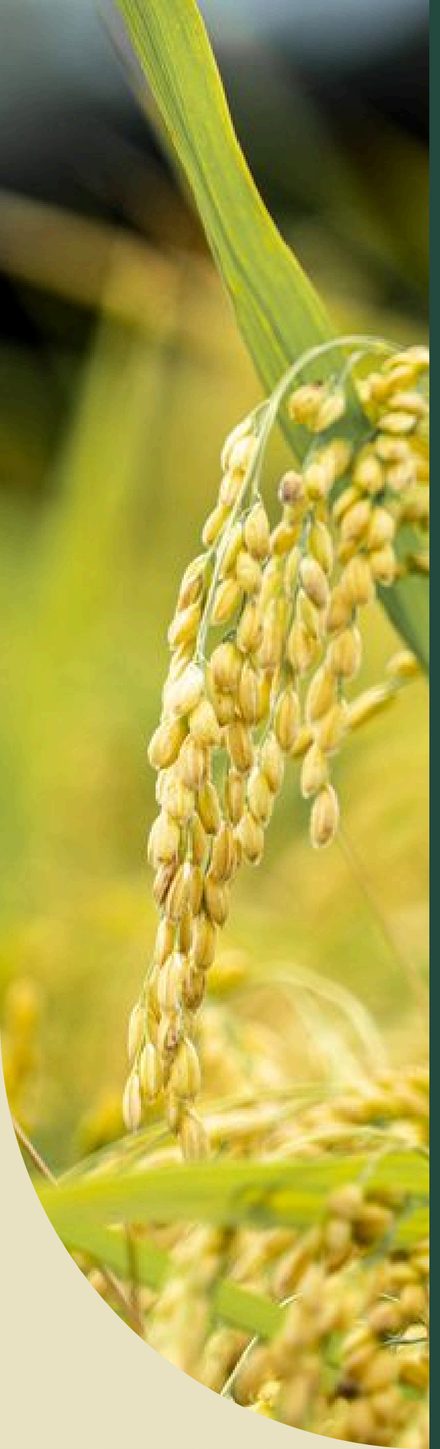
Sensor calibration x1 $10

Battery maintenance x1 $4

Connector maintenance x1 $5

System cleaning x1 $6

Total Annual Maintenance $25 per year



Demo

Line Chatbot

Information Website

Field Sensors

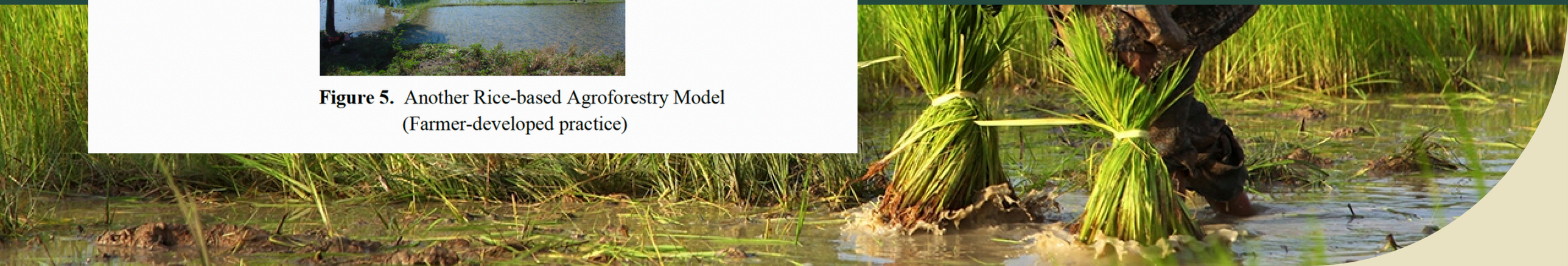
Promoting Sustainable Practices

Crop Rotation and Agroforestry Advocacy

Figure 3. Rainfed rice production
Atimonan, Quezon

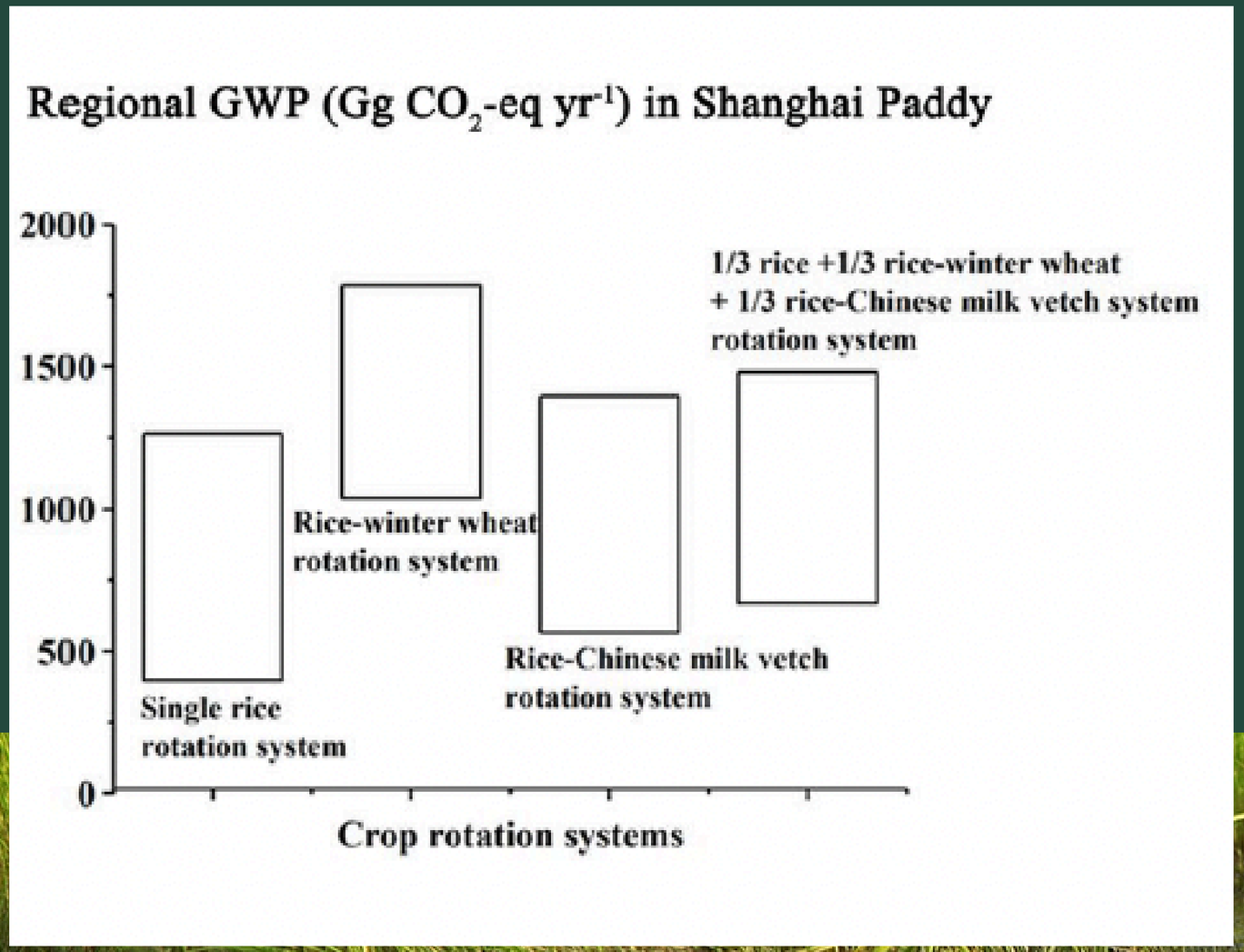
Figure 4. Upland rice production in
Pagbilao, Quezon

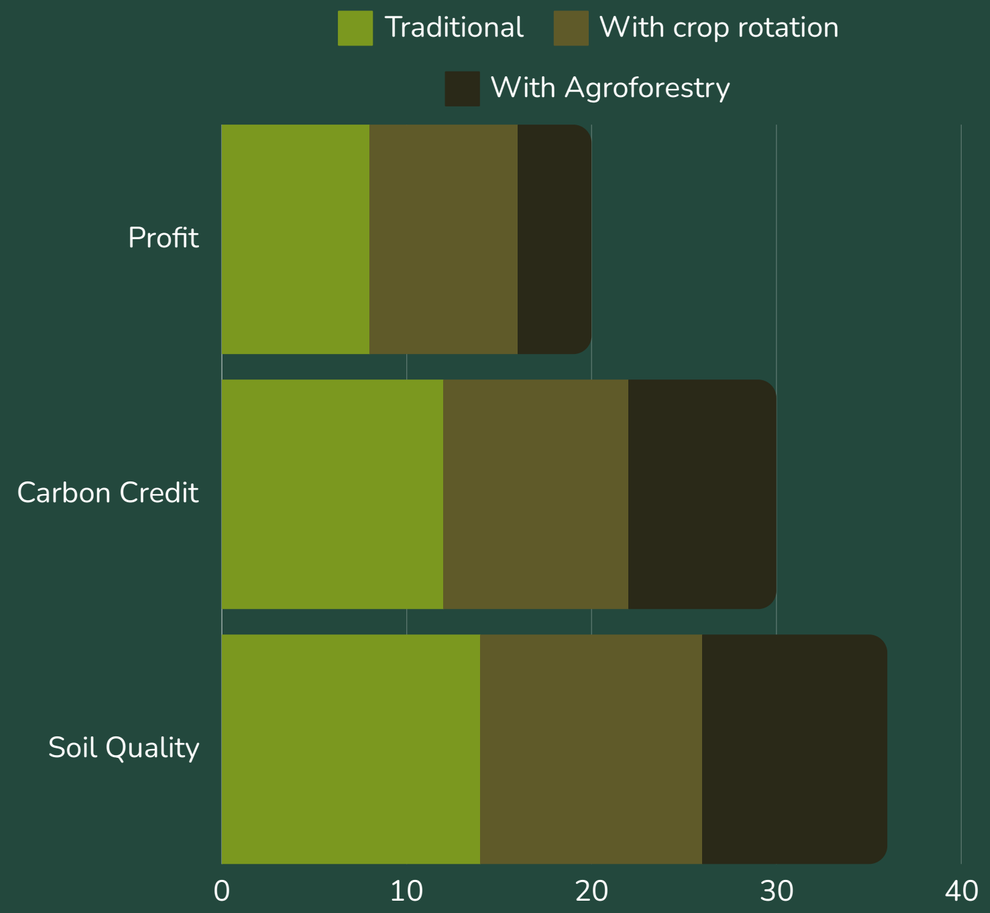
Figure 5. Another Rice-based Agroforestry Model
(Farmer-developed practice)



Promoting Sustainable Practices

Crop Rotation and Agroforestry Advocacy





Promoting Sustainable Practices

Crop Rotation and Agroforestry Advocacy

ใบเตย (BaiToey)

Q & A

Open floor for questions and discussion