CLIMATE-RESILIENT SMART AGRICULTURE USING AI & IOT








Scaling Agrivoltaic Innovative Solutions for Climate–Resilience Agriculture

Presented by

Mukhammad Muryono, Ph.D

Founder and Director of IDM (Insitute for Indenpendence Village)

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Date

February 24th, 2026

100 MW
Capacity electricity

80 ha
Area Pv used

Location:
Purwakarta, West Java

Mr Warsidi

Smallholder Farmer in Lombok Island

For a 100 MW ground-mounted PV occupying ~80 ha, the estimated annual PV gross revenue is ~IDR 119-166B, while the forgone rice gross revenue is ~IDR 5-11B/year (depending on yield and cropping intensity)

Our Project

Location:
Malang,East Java

1. Company overview

About IDM

Nurture Growth with Intelligent Agri-Solutions

IDM stands IDM at the forefront of optimizing the agriculture-technology nexus, empowering Indonesian farmers with AI for holistic resource efficiency. We enable integrated, low-carbon farming systems that synergise with nature-based solutions and shifting toward renewable energy for a clean energy economy in agriculture.

Our global projects leverage critical resource synergies to create measurable cross-sectoral impact, bridging fragmented local initiatives with integrated, resilient systems

RegeneratifAgriculture

Crop locus

Indonesia
Timor Leste
Filiphine
Vietnam

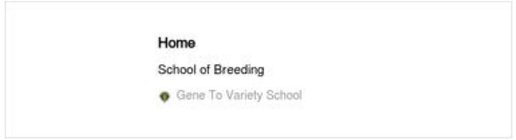
Agroindustrial

Clean Energy

AWD projects : 1,500,000 ha
Biochar : 6,000 ton/year
Agrivoltaic : 10,000ha / KWh m
Palm Oil : 3,000ha

OUR BUSINESS

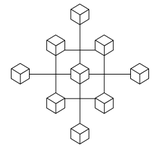
1. MAP AGRICULTURAL PRACTICES



2. **BREEDING INNOVATION**

3. L**OW CARBON SMART RICE** : AWD

4. **AGRIVOLTAIC**



5. **IDENTIFY & COST INVESTABLE SOLUTION WITH INTEGRATING BLOCKCHAIN AND IOT FOR TRACEABILITY SYSTEMS**

TRACTION: VALIDATED CLIMATE-SMART AGRICULTURE PLATFORM

Field Implementation

1.5M ha AWD Pathway

Agrivoltaic Sites

10,000 ha

Solar + Crop Integration

Technology & System

6,000 Tons/Year

Biochar Capacity

Funding & Impact

40% Cost Reduction

Solar-Powered Irrigation

Multi-Country Collaboration

MARKET SIZE OPPORTUNITY: AGRIVOLTAIC IoT

Smart Farming Integration - Sensors, Connectivity, AI Analytics

Global TAM (2030)

~USD 250–620 M
AGRIVOLTAIC IoT

% of Value: 2–5% Digital/IoT Layer Capture Rate

Estimated TAM: Agrivoltaics market ~USD 12.5B by 2030, Digital/IoT layer capture ~2–5% Implying Agrivoltaic IoT TAM of ~USD 250–620M. APAC market. ~40–45% of TAM, ASEAN (IDM's SAM): 10–20% of APAC

(Sources: Allied Market Research, Precedence Research)

APAC / ASEAN SAM

~USD 100–279 M
(40–45% of TAM)

APAC SAM
~USD 100–28 M

ASEAN SAM (10–20% of
- A) **10%** of APAC
- B) **15%** of APAC
- C) **20%** of APAC

IDM's Near-Term **SAM**

Global TAM	Global Agrivoltaic IoT TAM
~USD 12.5 B	~ USD 100–279 M
AGRIVOLTAICS	~APAC SAM
~USD 250–620 M	~USD 10–56 M

Project : 2026
Climate-Resilient Smart Agriculture using AI & IoT

What variety to plant?

Where to plant?

HOW?

When to plant?

What's the smartest way – irrigate, fertilize, manage pest

What's the status – crop production, damages

who's responsible for crop practices

PROBLEM

WEF : Water - Energy - Food

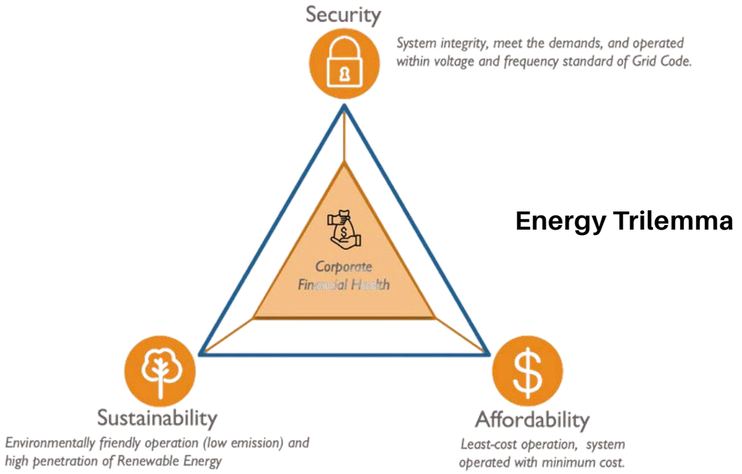
Climate change will exacerbate deterioration and reduce yields

By the **year 2050**, we anticipate observing:

10-50%
Decrease in
Crop Yields

$ 25 Tn
Maximum Cumulative
Economic Damages

IUCN and Food and Land Use Coalition, 2021



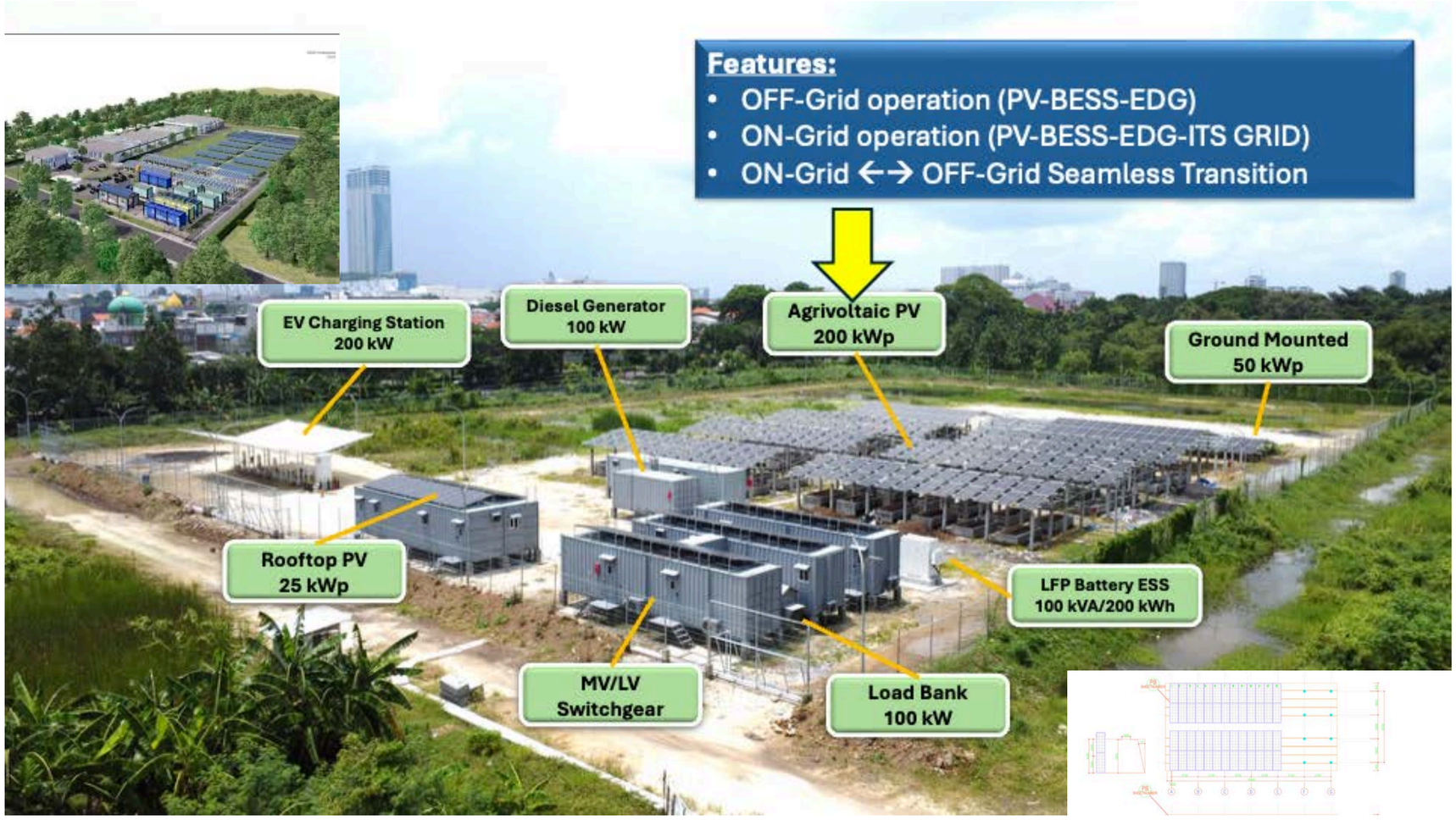
Utilizing the Energy Trilemma, aims to achieve the Net Zero Emissions target by 2060 while maintaining the company's financial health, managing debt, and ensuring the capacity for growth.

WHAT WE HAVE

Renewable Energy Integration Demonstrator of Indonesia (REIDI)

Laboratory of Field Phenomics
Dept. Biotechnology. ITS

Laboratory of Algorithms and Programming
Faculty of Intelligent Electrical and Informatics Technology, ITS



Agrivoltaics: Merging Solar Energy and Agricultural Production

WHAT WE DO

Research topics

> Development of field Sensing techniques and facilities (Applied research)

- IOT
- Robotics
- UAVs

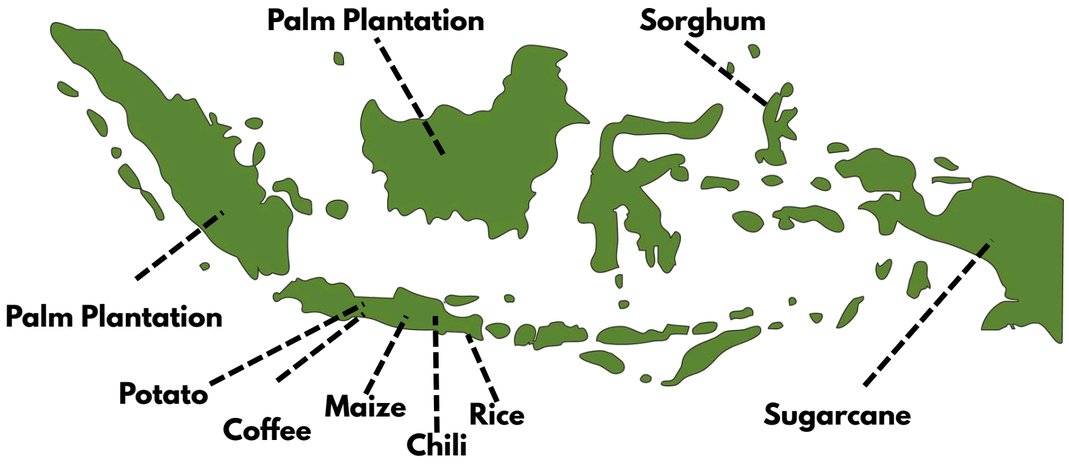
> Development of phenotyping algorithms and applications (Basic + Applied research)

- Crop growth monitoring
- Crop organ detection
- Crop/tree 3D reconstruction and analyzing

> Development of phenotyping Pipeline, System, protype (Experimental development)

- Collaboration with Private Company
- Startup projects

Field Experiment



Monitoring the crops (phenotyping)

C3 (Rice) and C4 (Corn) models plant harvest date prediction to increase farmers income and clean energy

PAR / PV DATA

+

AGRONOMIC DATA

+

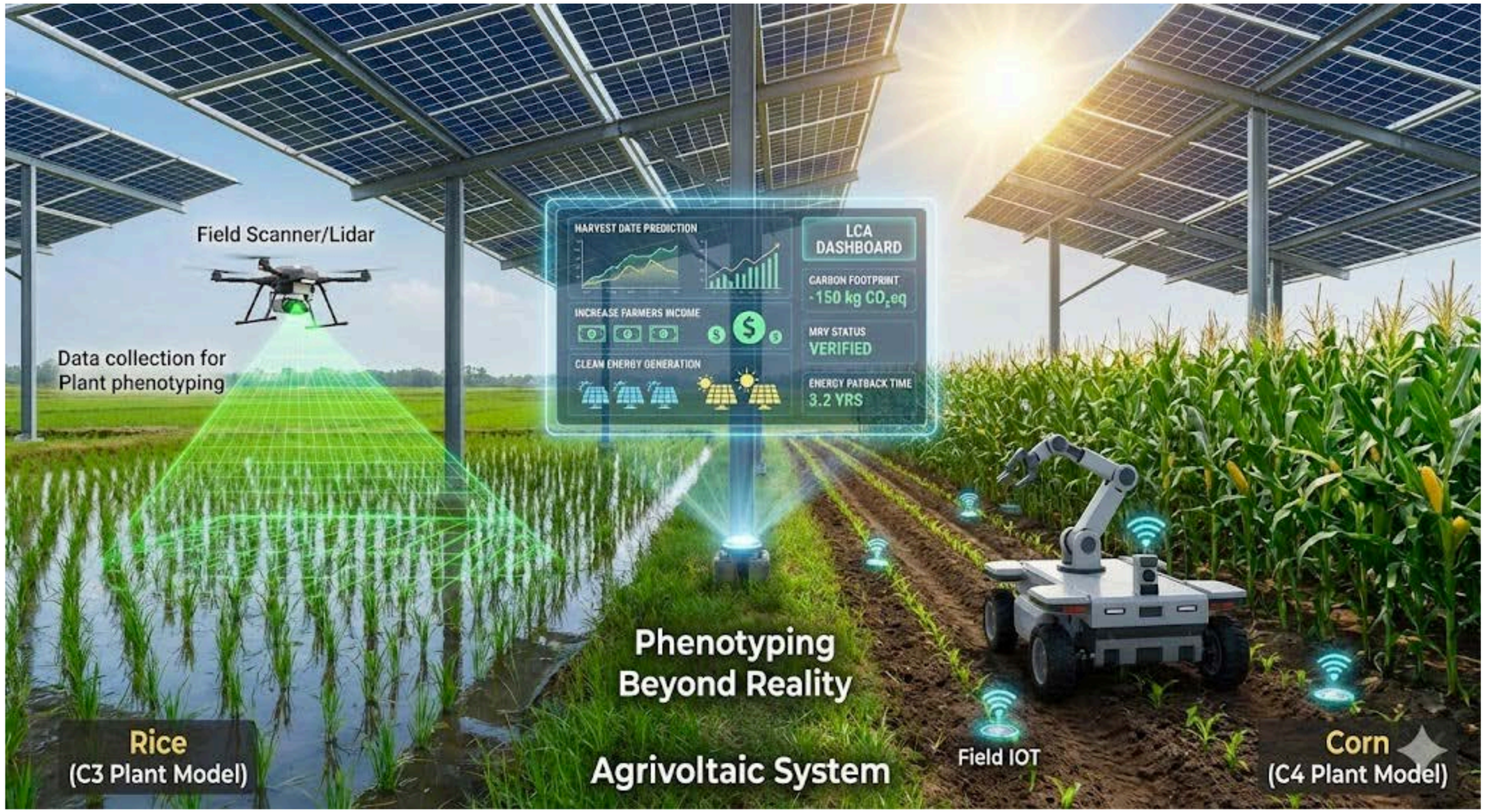
MOBILE APP

+

WEATHER DATA

=

Cropping decision support system and early warning



AGRIVOLTAIC & LOW-CARBON AGRICULTURE CONCEPT

Integrating **Solar Energy**, AI, and Sustainable Farming

ITS Institut Teknologi Sepuluh Nopember · PUBLIC POLICY ITS CSID · Jokeen Indonesia Group

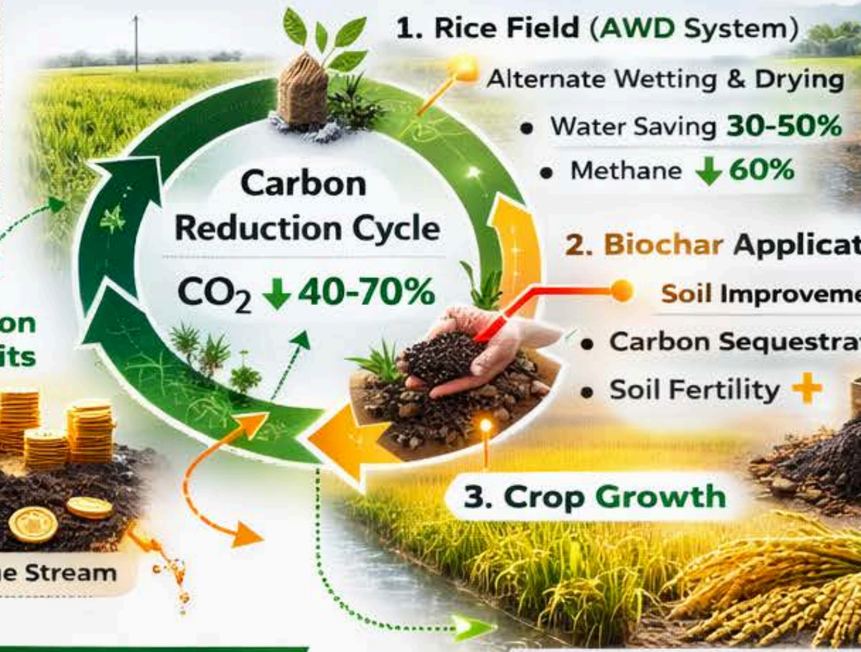
IDM INSTITUT DESA MANDIRI

- SDG 1 No Poverty
- SDG 6 Clean Water and Sanitation
- SDG 8 Decent Work and Economic Growth
- SDG 12 Responsible Consumption and Production
- SDG 15 Life on Land
- SDG 3 Good Health and Well-being
- SDG 7 Affordable and Clean Energy
- SDG 11 Sustainable Cities and Communities
- SDG 13 Climate Action
- SDG 16 Peace, Justice and Strong Institutions

AGRIVOLTAIC SYSTEM

- **Solar Panels** (Dual Use Land)
- **Crop Cultivation** (Rice, Corn, Vegetables)
- **Livestock & Fish Pond**
- **IoT Sensors & Drip Irrigation**
- **Energy Storage**

LOW-CARBON AGRICULTURE (AWD + Biochar)



1. **Rice Field** (AWD System)
   - Alternate Wetting & Drying
   - Water Saving **30-50%**
   - Methane ↓ **60%**
2. **Biochar** Applicat
   - Soil Improveme
   - Carbon Sequestra
   - Soil Fertility +
3. **Crop Growth**
4. **Carbon Credits**
   - Revenue Stream

SYSTEM INTEGRATION

IMPACT METRICS (per 1,000 ha)

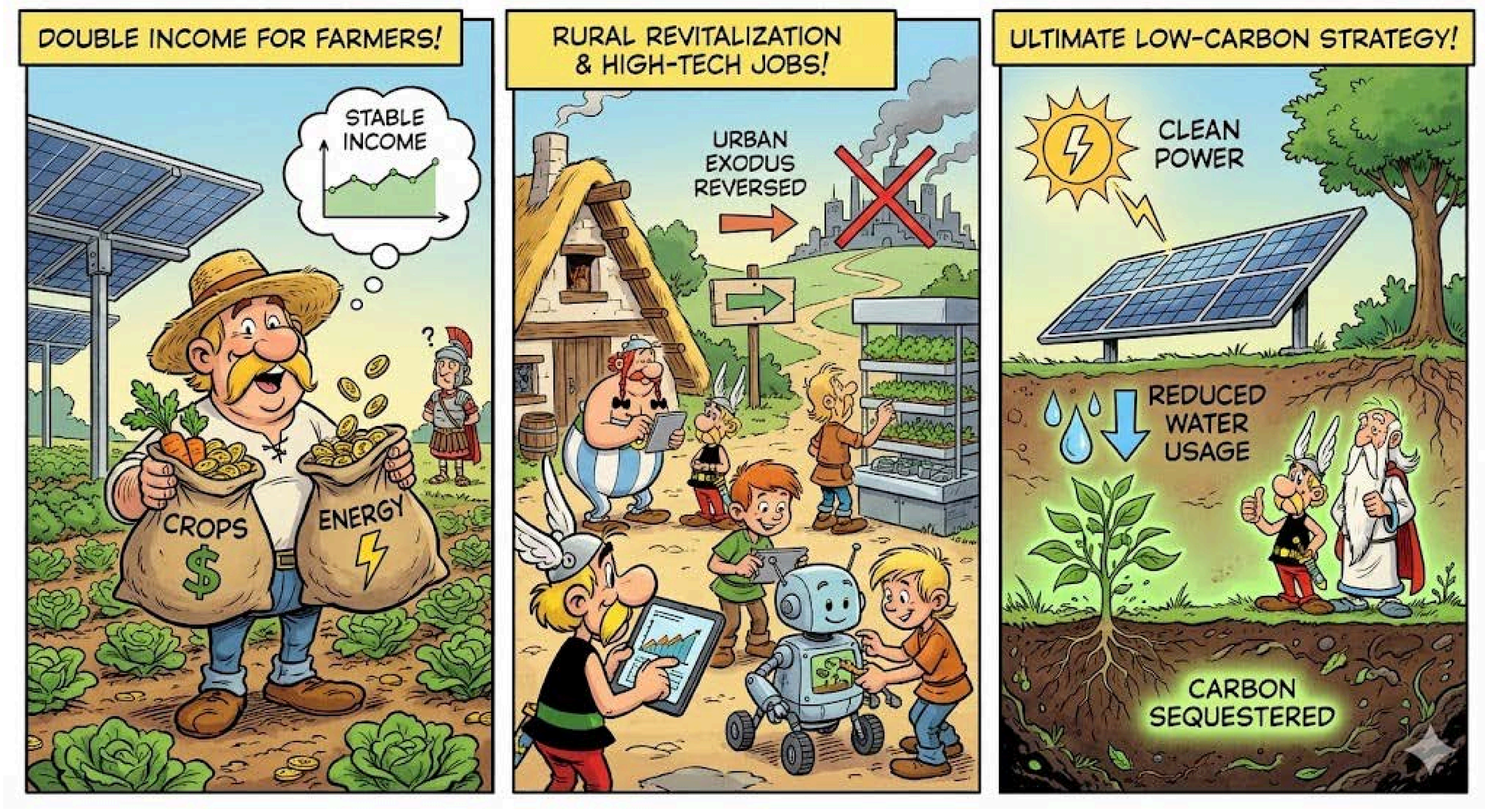
- CO_2 Reduction **50,000 tons/year**
- Water Saving **40%**
- Energy Production **15 MWp**
- Yield Increase **+20-30%**
- Income **+25%**

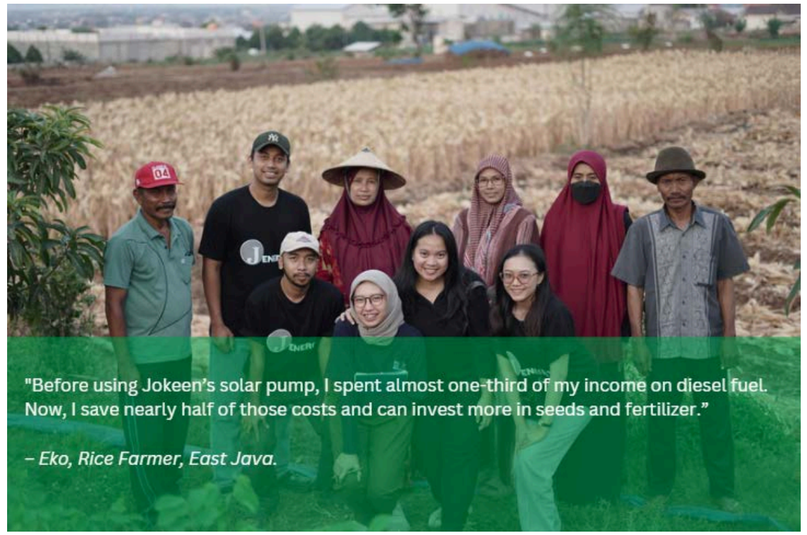
AGRIVOLTAIC BEN

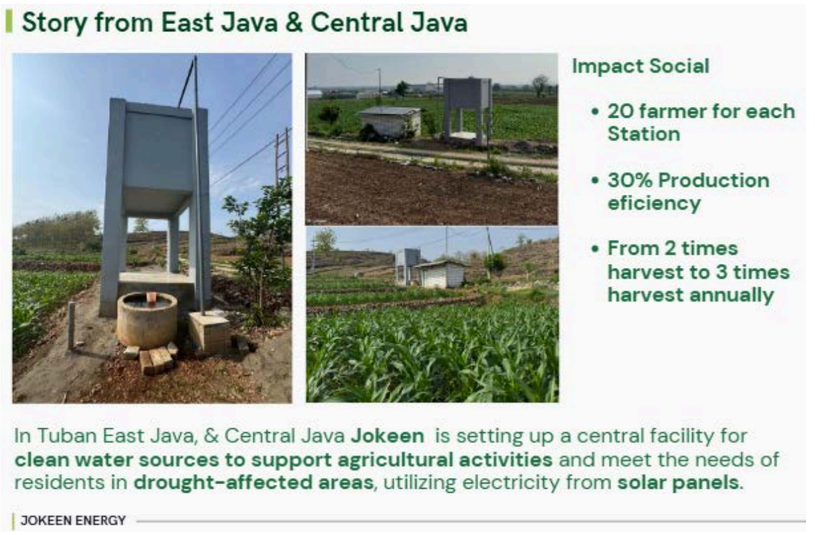
- Dual Land Use
- Clean Energy
- Food Security
- Climate Mitigation
- Farmer Income

Sustainable · Scalable · Profitable · Climate-R

OUR IMPACT


DOUBLE INCOME FOR FARMERS!
STABLE INCOME
CROPS
ENERGY
RURAL REVITALIZATION & HIGH-TECH JOBS!
URBAN EXODUS REVERSED
ULTIMATE LOW-CARBON STRATEGY!
CLEAN POWER
REDUCED WATER USAGE
CARBON SEQUESTERED





Our Stories

Field-tested prototypes deployed in East Java & Central Java farming communities, with ongoing performance monitoring and user feedback for scale-up.

Farmers confirm lower fuel expenses & easier access to irrigation.

Feedback from local farmers has been incorporated into the next iteration to improve durability and ease of use.

Our SIte

Location:
Tuban, East Java

OUR TEAM

Mukhammad Muryono, Phd

CEO of IDM

- Functional Ecology, Plant Biotechnology
- Public Policy & Rural Development Expert
- 10+ Years Experience in Institutional & Strategic Leadership
- Specialized in Sustainable Agriculture & Climate Policy
- Experienced in Government & Multi-Stakeholder Partnerships
- Leading Low-Carbon Agriculture & Agrivoltaic Ecosystem Development
- Strategic Direction & International Collaboration Expansion

Alexa Emeralda Agung, B.sc, S.M

CFO of IDM

- 3 Years experience in Financial Strategy & Planning: Leads budgeting, forecasting.
- Capital Management: Skilled in fundraising, investor relations, and maintaining cash-flow health through phased growth and ASEAN expansion.
- Track Record: Proven success managing finance operations and structuring deals for technology-driven companies.

Puguh Pambudi, ST

CTO of IDM

- **Mechanical Engineering**
- 5 years Experience in Tech Business
- Experienced in handling 1MW++ Solar Panel Project in 2 Years
- Startup Winner ISDP by BSI Maslahat
- Startup Fund by Ministry of Cooperatives and SMEs of The Republic of Indonesia.

Shintami Chusnul Hidayati, S.Kom., M.Sc., Ph.D.

COO of IDM

- Agricultural System & Program Management Specialist
- 10+ Years Experience in Research & Field Implementation
- Expertise in Smart Agriculture & Climate Adaptation Programs
- Monitoring, Evaluation & Data-Driven Operational Systems
- Managing AWD, Biochar & Agrivoltaic Deployment
- Ensuring Scalable & Impact-Based Field Execution

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THANK YOU

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