

# Agrivoltaics as a Pathway to Regional Resilience: Applying Japanese Good Practices to ASEAN

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# **Key question and argument**

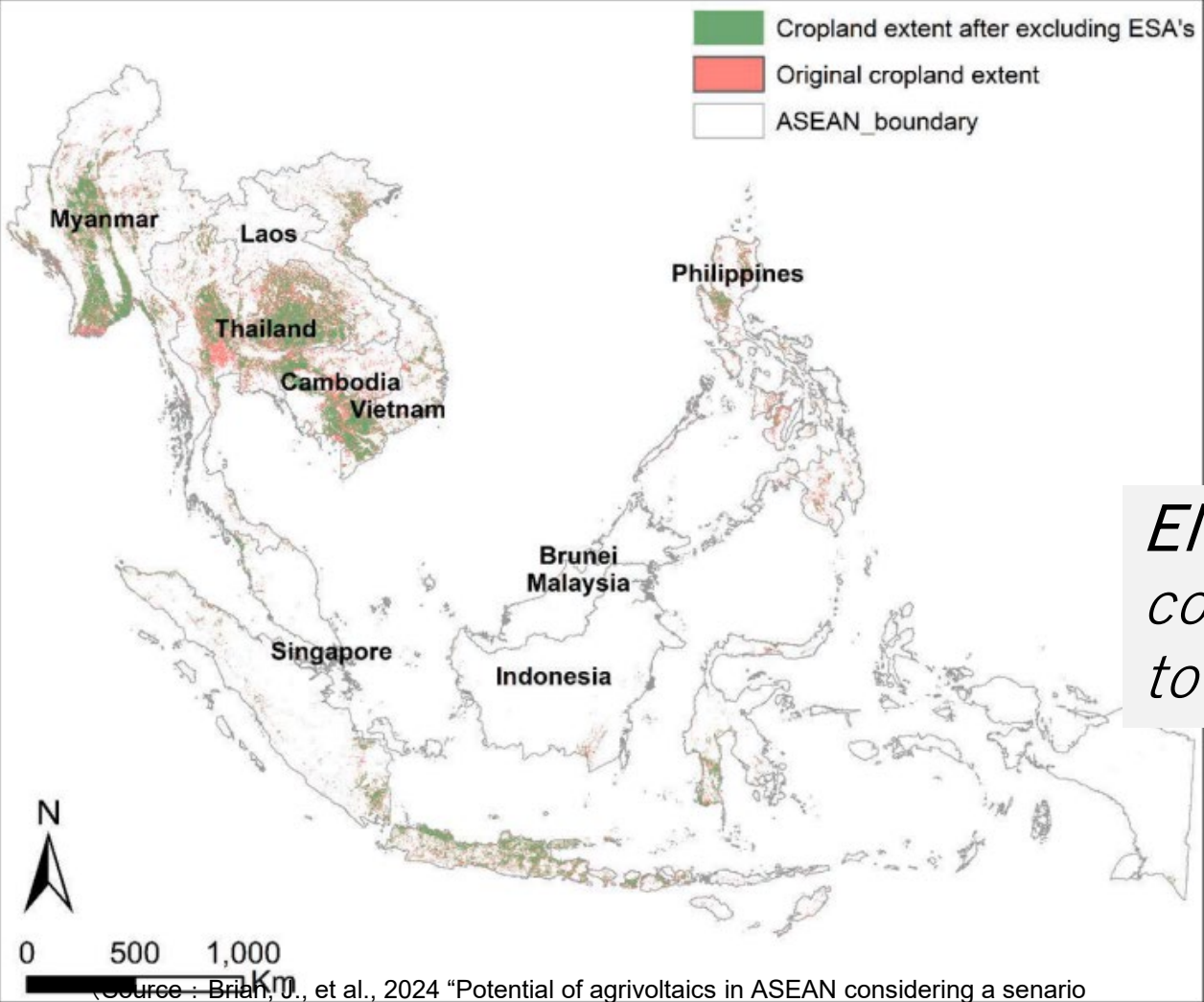
## **Question:**

**Under what governance conditions can agrivoltaics genuinely function as a pathway to regional resilience in ASEAN countries?**

## **Argument:**

**Only when it is embedded in strong local governance systems, rather than being treated merely as a technological or investment opportunity**

# Why Agrivoltaics in ASEAN?



(Source : Brian, U., et al., 2024 "Potential of agrivoltaics in ASEAN considering a senario where agroforestry expansion is also pursued)

## Huge potential

- Food-energy land competition
- Climate stress → need adaptation
- Decentralized energy resources

	Annual electricity generation from agrivoltaics with 1% of potential utilised	Annual electricity generation from agrivoltaics with 10% of potential utilised	Annual electricity consumption in 2050 under the APS scenario (ASEAN Center for Energy)
	TWh	TWh	TWh
Brunei	0	0	9
Cambodia	25	252	17

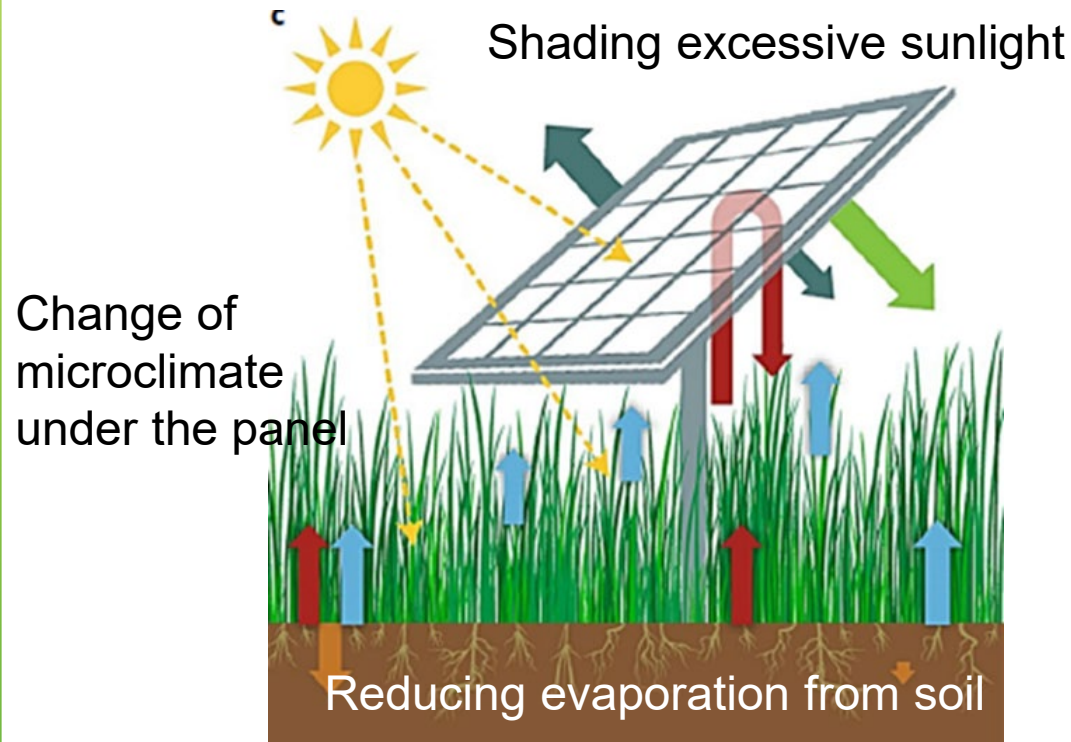
*Electricity demand in 2050 can be covered by introducing agrivoltaics to 10% of farm land in ASEAN*

			642
			48
			221
			33
Philippines	12	116	232
Singapore	0	0	68
Thailand	73	733	355
Vietnam	23	227	483
Total	244	2,546	2,108

# Why Agrivoltaics in ASEAN?

## Huge potential

- Food-energy land competition
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*Agrivoltaics can improve quality of crops if appropriately designed*

(Source: Barron-Gafford, G.A., Pavao-Zuckerman, M.A., Minor, R.L. et al. Agrivoltaics provide mutual benefits across the food–energy–water nexus in drylands. *Nature Sustainability*, 2, 848–855 (2019))

(出典：農林水産省「営農型太陽光発電高収益農業実証事業の概要」 URL: <https://www.maff.go.jp/j/shokusan/renewable/energy/attach/pdf/yosan-45.pdf>)



# Agrivoltaics in reality in ASEAN

Reported agrivoltaic projects without meaningful farming activity (in Vietnam)

Gia Lai省



Binh Phuoc省



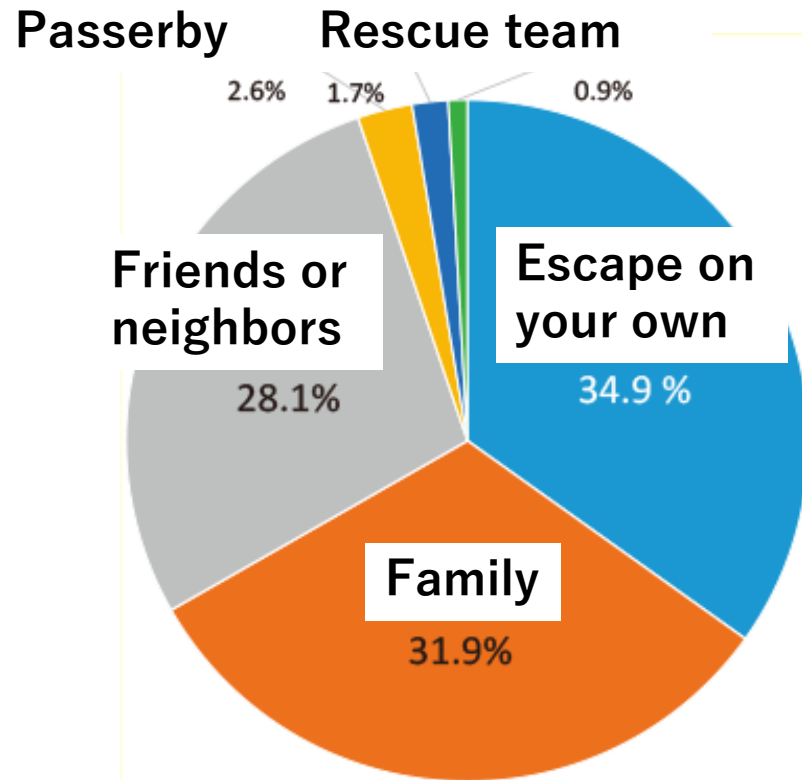
(Source : Agritree Co., Ltd.: Examples in Vietnam)



# Does agrivoltaics enhance regional resilience?

It may improve resilience in terms of agriculture, energy, rural economy  
However, not just “hardware” but “software” matters

Who rescued people buried alive or trapped  
in Great Hanshin-Awaji Earthquake?



*Resilience is an integrated adaptive and transformative capacity of society, not just physical robustness*



(Source : Kobe city)

# Local decarbonization initiatives

## 1 Ownership

**Bottom-up approach: Initiatives of each local community are quite important.**

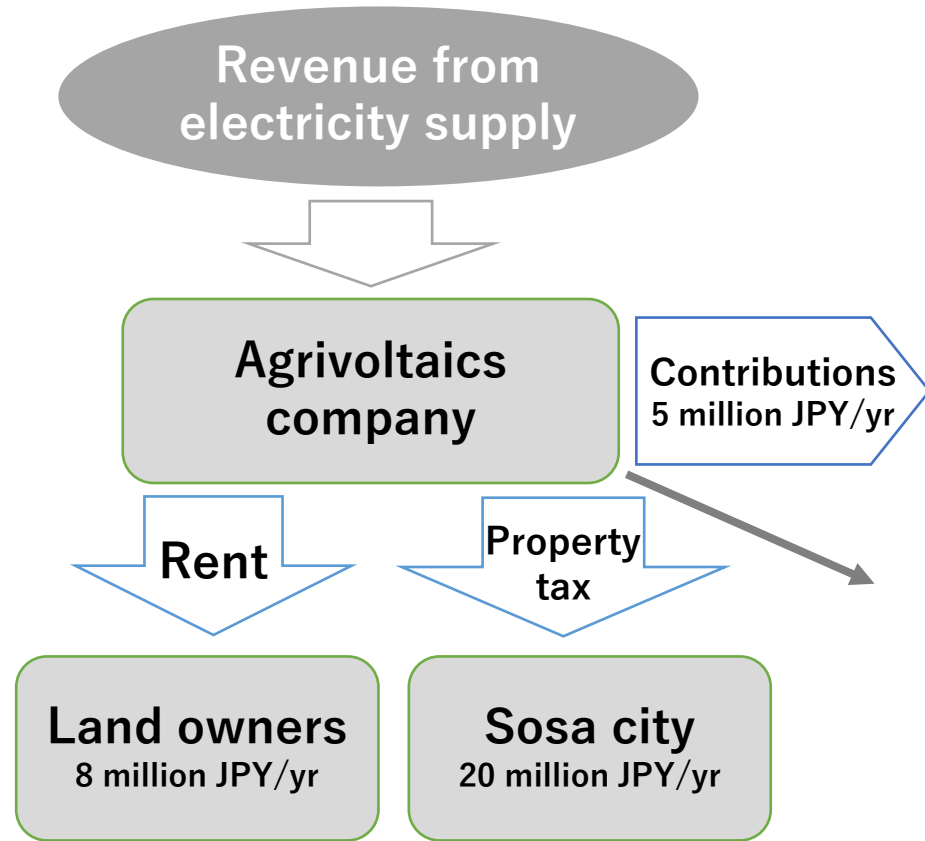
## 2 Partnership

**Re-constructing network between rural and urban areas is very important. Private and public partnership in implementation.**

## 3 Integrated solutions

**Integrated development and synergetic benefits of environment, economy, society. e.g. resilience, energy access, food security**

# Case1 : Sosa Model



*Almost ten percent of the company's revenues are **redistributed to community***

- Childcare
- Environmental conservation
- Urban-rural linkage
- Events etc.

*Agrivoltaic facilities are provided as **free emergency power during disasters***



(Source : Citizen Energy Chiba, Co., Ltd.)

(Source : Renewable Energy Institute)



## Case2 : Rikuzentakata Model

*While enhancing agricultural resilience, agrivoltaics enabled highly value added economic activities at underutilized land*

**Clearance=bird net**

**Panel=rain shelter**



**Root area restricted**



**Structure=trellises**

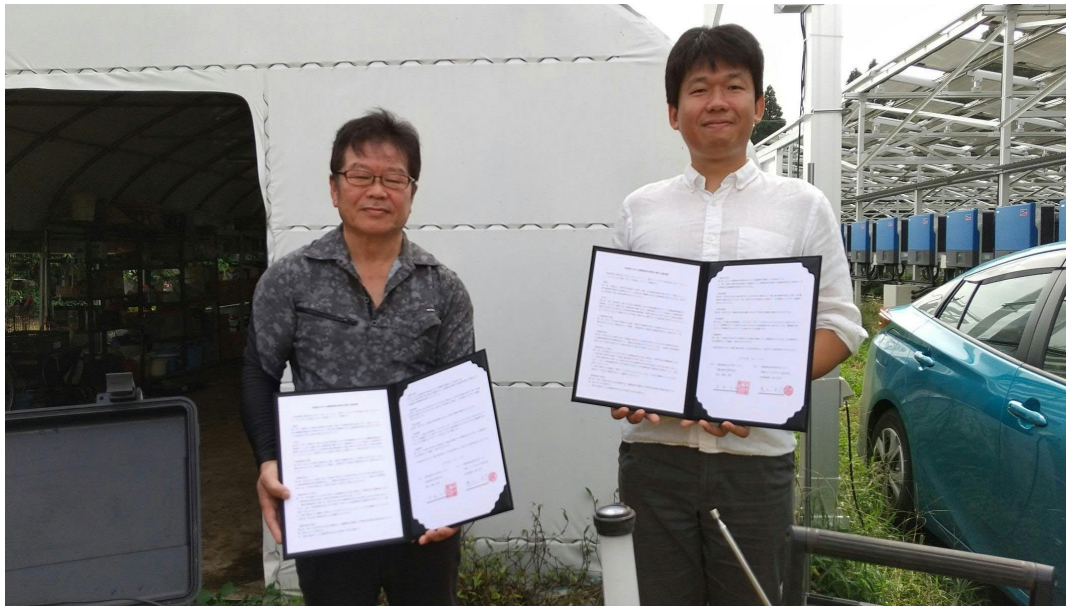
**Automatic irrigation  
and fertilization**

(Source : Rikuzentakata Shimin Energy Co., Ltd.)



# Case3 : Chiba Model

*A disaster response agreement enables agrivoltaic facilities to contribute local disaster risk management*



# Implications for ASEAN

- **Local ownership:** co-designed and co-governed by local stakeholders
  - **Agriculture must remain central:** food security and rural resilience should be strengthened
  - **Institutional and operational preparedness:** clear operational protocols must be established for emergency situations.
- **institutional capacity building and governance innovation** are key