The Final (3rd) Workshop on the National Long-term Roadmap to Synergise Mitigation and Adaptation in the ASEAN Region

Key findings: #3 Integrated Transition Synergising Mitigation and Adaptation

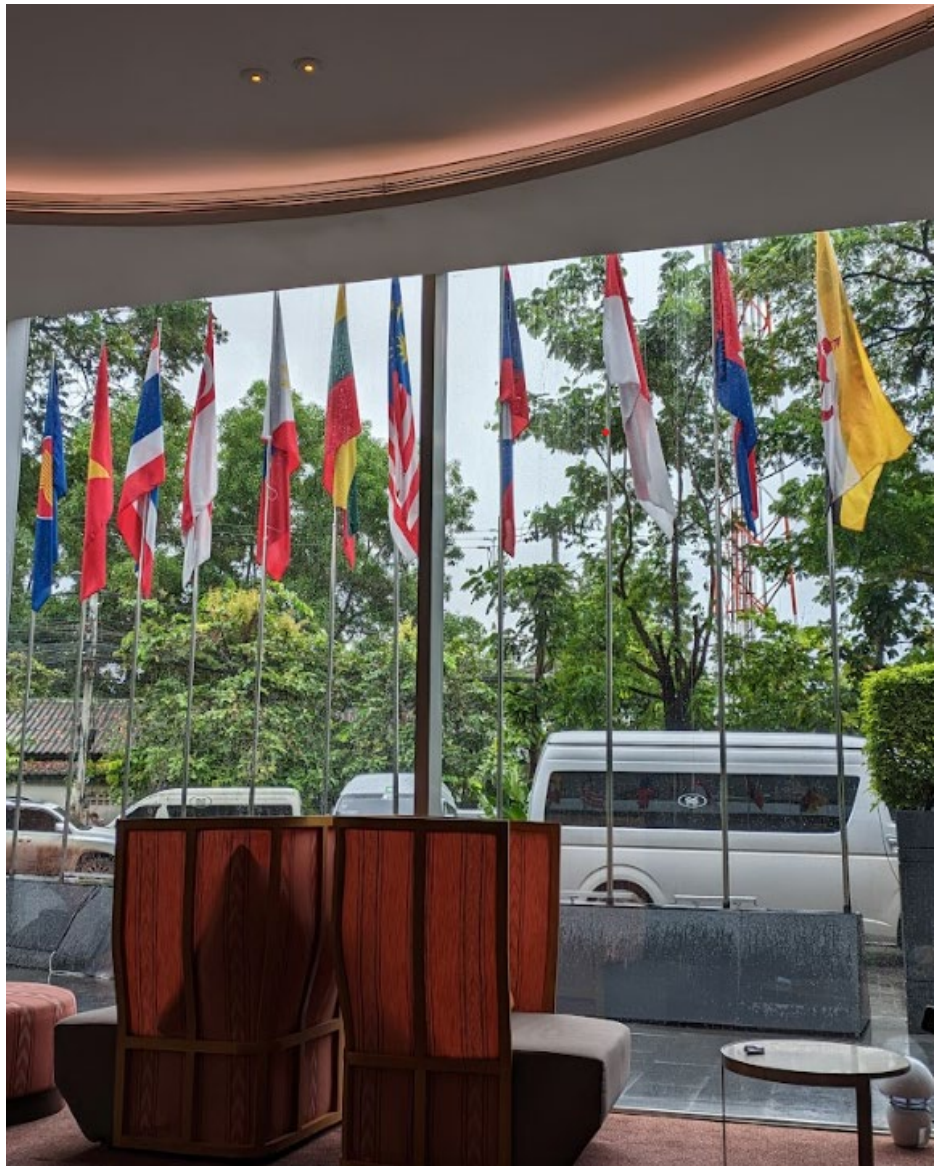
Online, 31st March 2025

Yosuke ARINO, IGES

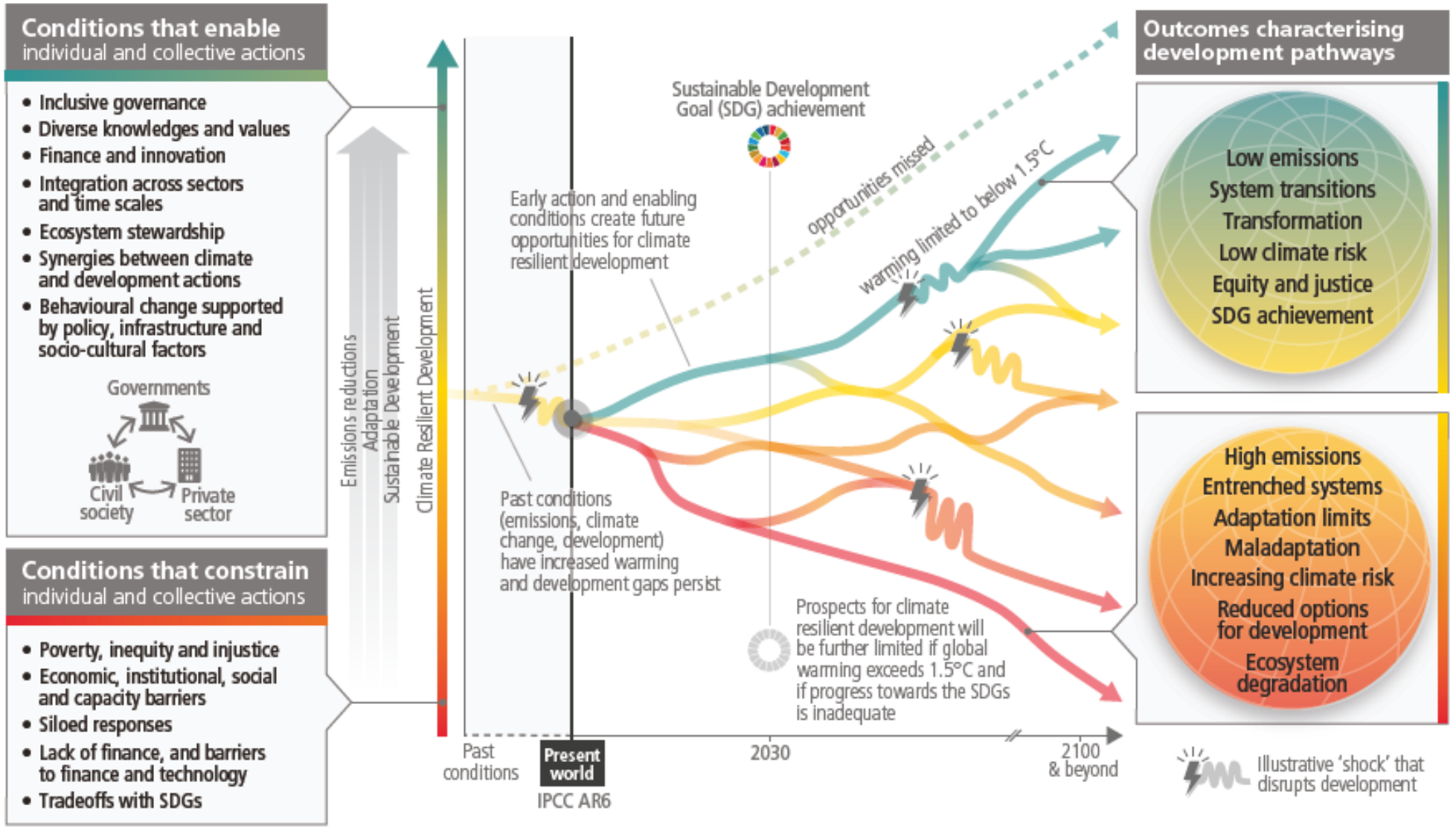
The research project on long-term roadmap to synergise mitigation and adaptation, aiming for developing methodology (guidance) for ACCSAP, is supported by the Environment Research and Technology Development Fund (JPMEERF20221C06) of the Environmental Restoration and Conservation Agency provided by MOEJ.

Outline

- Introduction (Background)
- Integrated Transition Synergising Mitigation and Adaptation
  -Case Study on Solar PV impact on resilience and adaptation in the Philippines
  -Case Study on policy frameworks of four countries
- Stakeholder Consultations
- Macro-frame of Long-term Roadmap to Synergise Mitigation and Adaptation



What is a “Climate Resilient Development Pathway (CRDP)”?



- *Mitigation and adaptation need to be synergised*
- *There is a rapidly narrowing window of opportunity to enable “Climate Resilient Development”*
- *Multiple interacting choices and actions can shift development pathways towards sustainability*

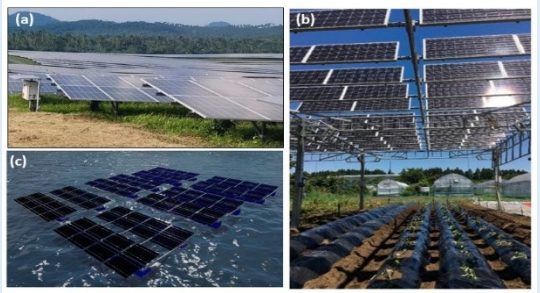
Source: IPCC AR6 Synthesis Report

Integrated Transition Synergising Mitigation and Adaptation

Solar PV's impact on climate-resilient agriculture and fishery/aquaculture in Laguna Lake watershed

We evaluated perceived impacts on climate-resilient agriculture including environmental, technical, socio-economic impacts.

Solar PV (land- and water-based)



Positive (co-benefits)/ Negative (risks) Impacts (Scores 0-5 by 29 stakeholders)

71 Indicators of Climate-Resilient Agriculture

Climate-Resilient Agriculture indicators

Agricultural productivity (P)
- Land / labor productivity
- Capital productivity
- Productivity of intermediate inputs
- Agricultural policy

Farmer income (I)
- Production value
- Welfare and tax revenue

Climate adaptability (A)
- Eco-environment
- Network marketing of agricultural products
- Infrastructure
- Agricultural management model

Green development level (E)
- Greenhouse gas emission level
- Water saving

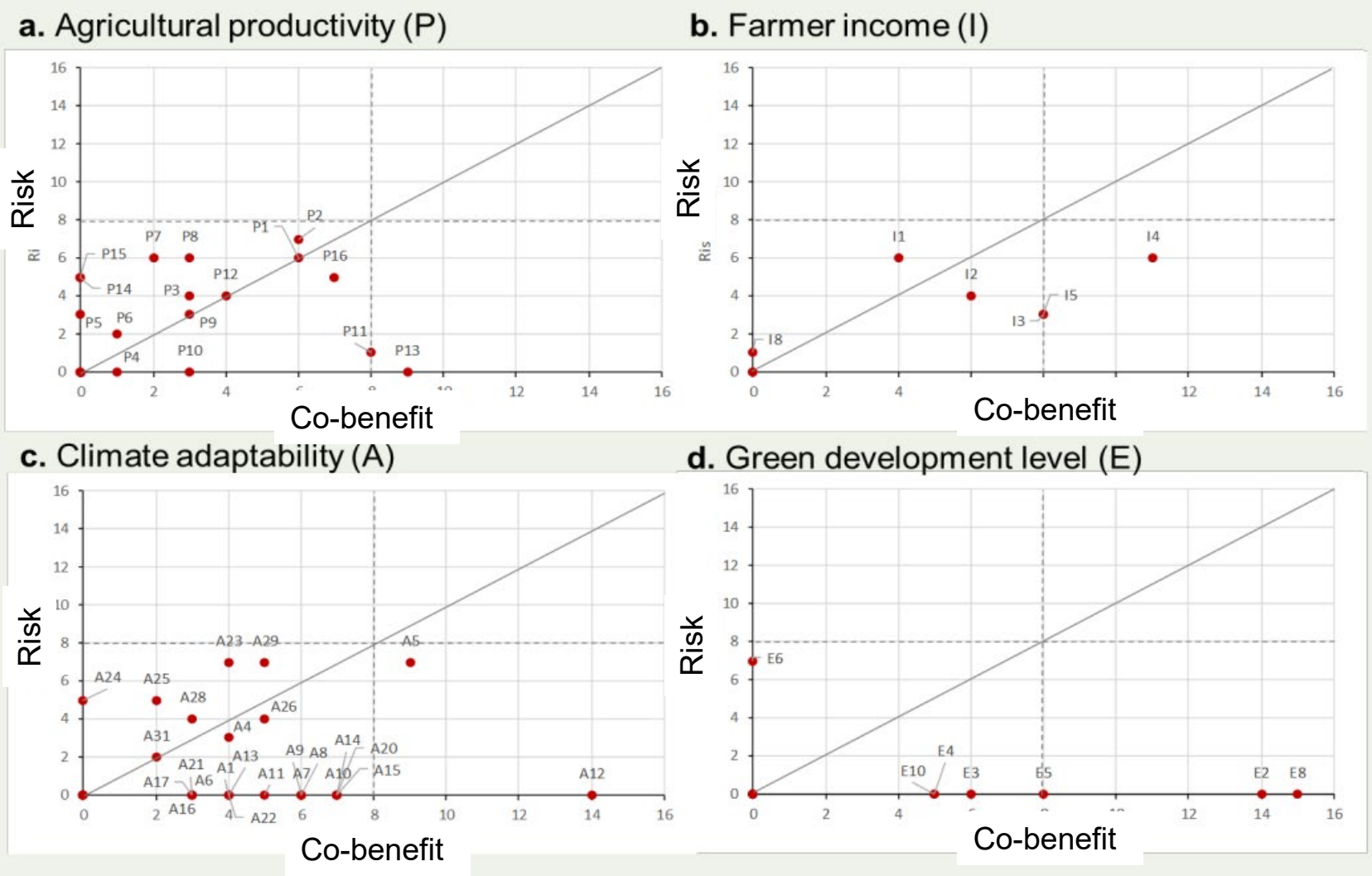


Figure 2. Relationship between co-benefits and risks of land-based solar PV measured by impacts on CRA indicators

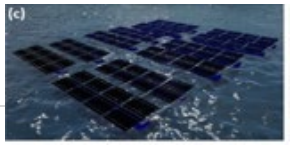
Source: Arino, Magcale-Macandog, Johnson, Murun, and Laruya. (2025) Solar Photovoltaic (PV) Diffusion and Synergies with Resilience and Adaptation: A Case Study in Laguna Lake watershed, the Philippines (under review)

Solar PV's impact (co-benefits and risks) of land- and water-based solar PV on agriculture and fishery/aquaculture in Laguna Lake watershed, the Philippines

15 Sub-categories of CRA indicators are evaluated and found differentiated impacts across both types of solar systems.

Land-based solar PV systems

Water-based solar PV systems



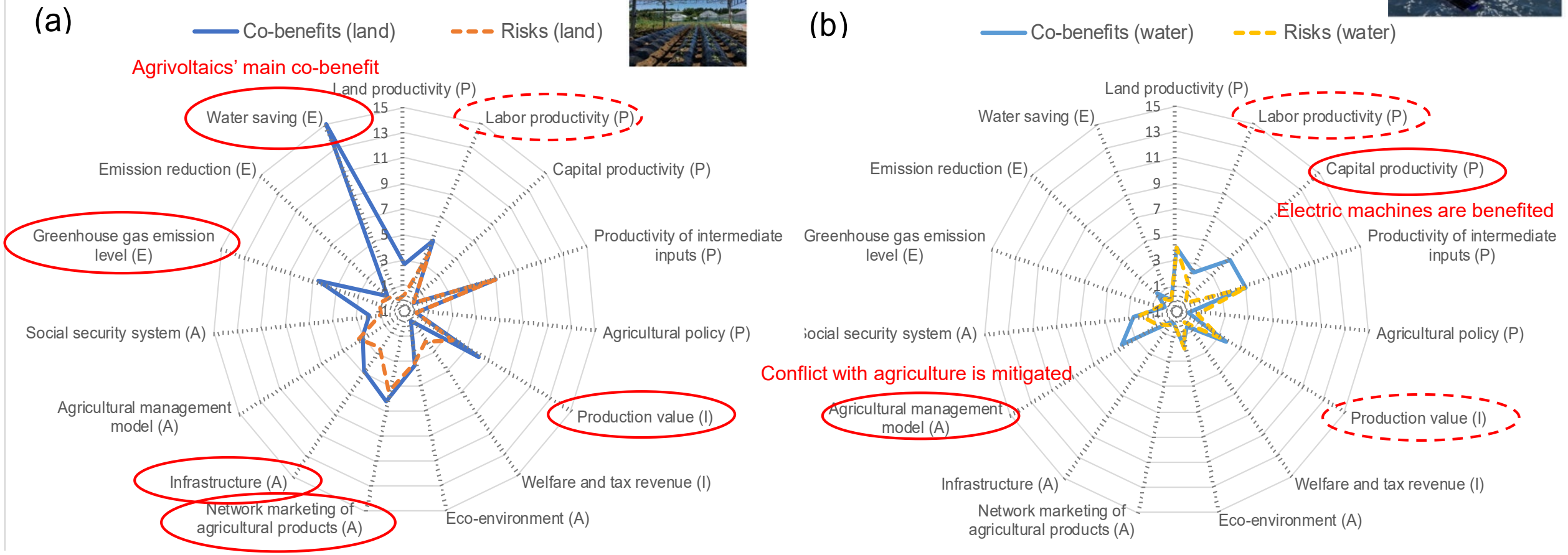
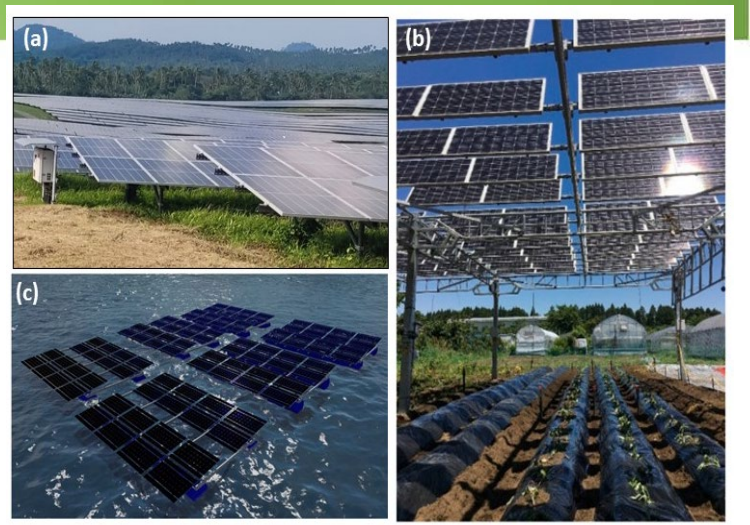


Figure 3. Impact (co-benefits and risks) of solar PV systems on major climate resilient agriculture indicators

Solar PV's impact on climate-resilient agriculture and fishery/aquaculture in terms of SDGs

- Both land- and water-based solar PV have a non-negligible impact on ending poverty (SDG 1), hunger (SDG 2), education (SDG 4), gender equality (SDG 5), economic growth and employment (SDG 8), climate change action (SDG 13) and global partnership (SDG 17).
- The impact of water-based solar PV is slightly lower than land-based solar PV in terms of both co-benefits and risks.



Impact on sustainable development (SDGs)

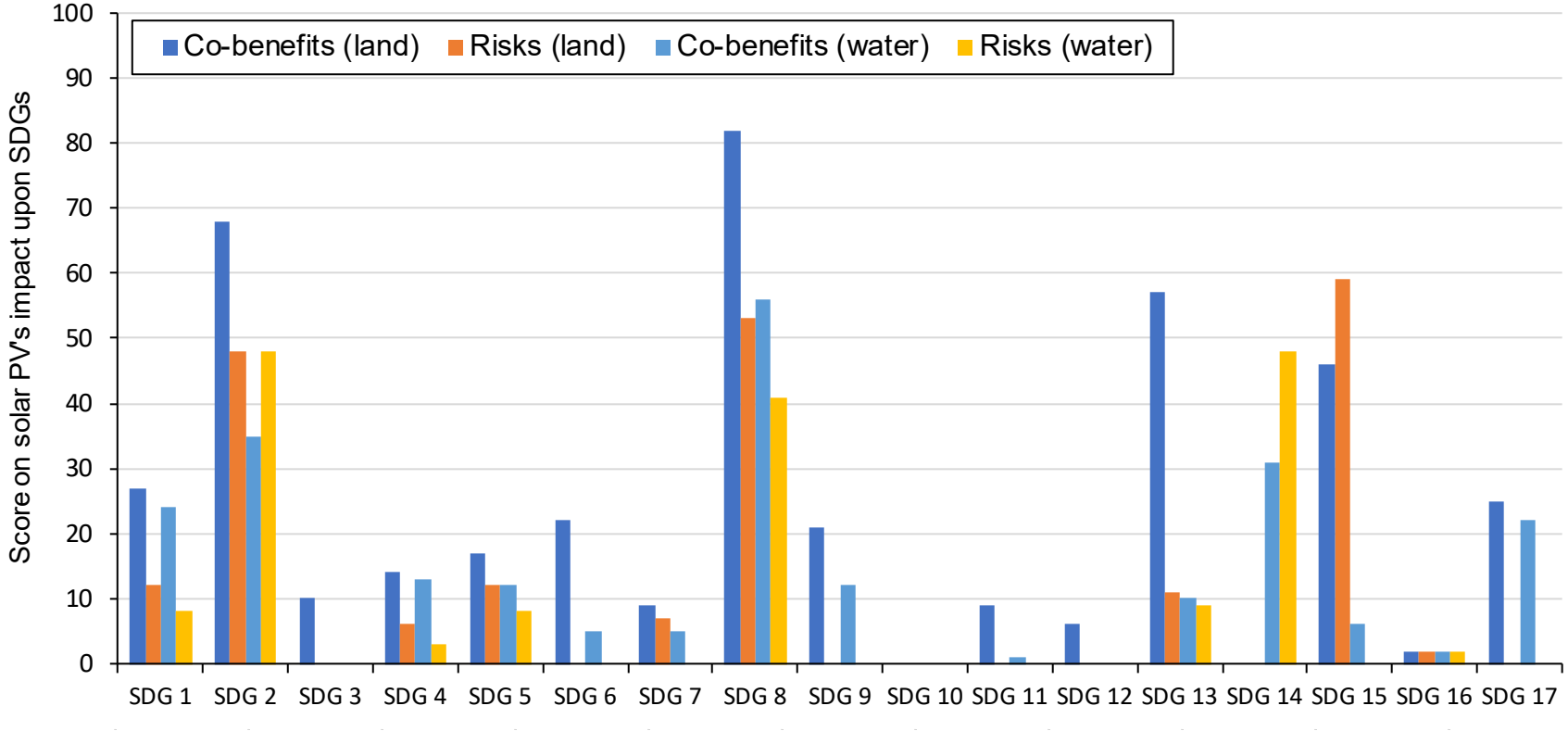


Figure 4. Co-benefits and risks of land-based and water-based solar PV with regard to SDG areas

Future tasks:

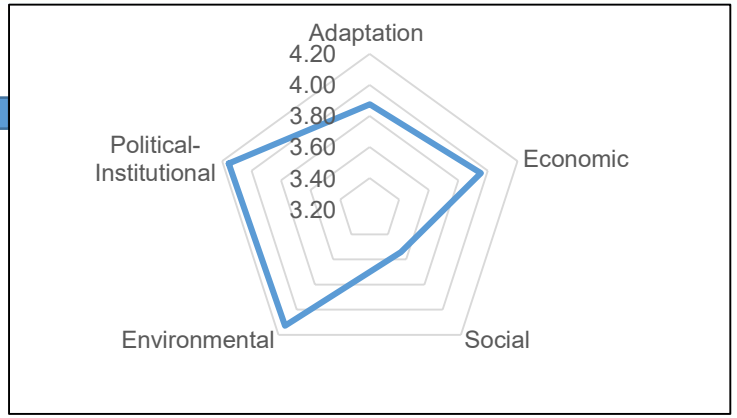
- Empirical knowledge needs to be accumulated through **ex-post (ex-post) analysis such as LCAs**.
- In addition to co-benefits and risk assessment, it is also important to identify **cost-effectiveness** and the systemic and institutional challenges of agriculture and energy.

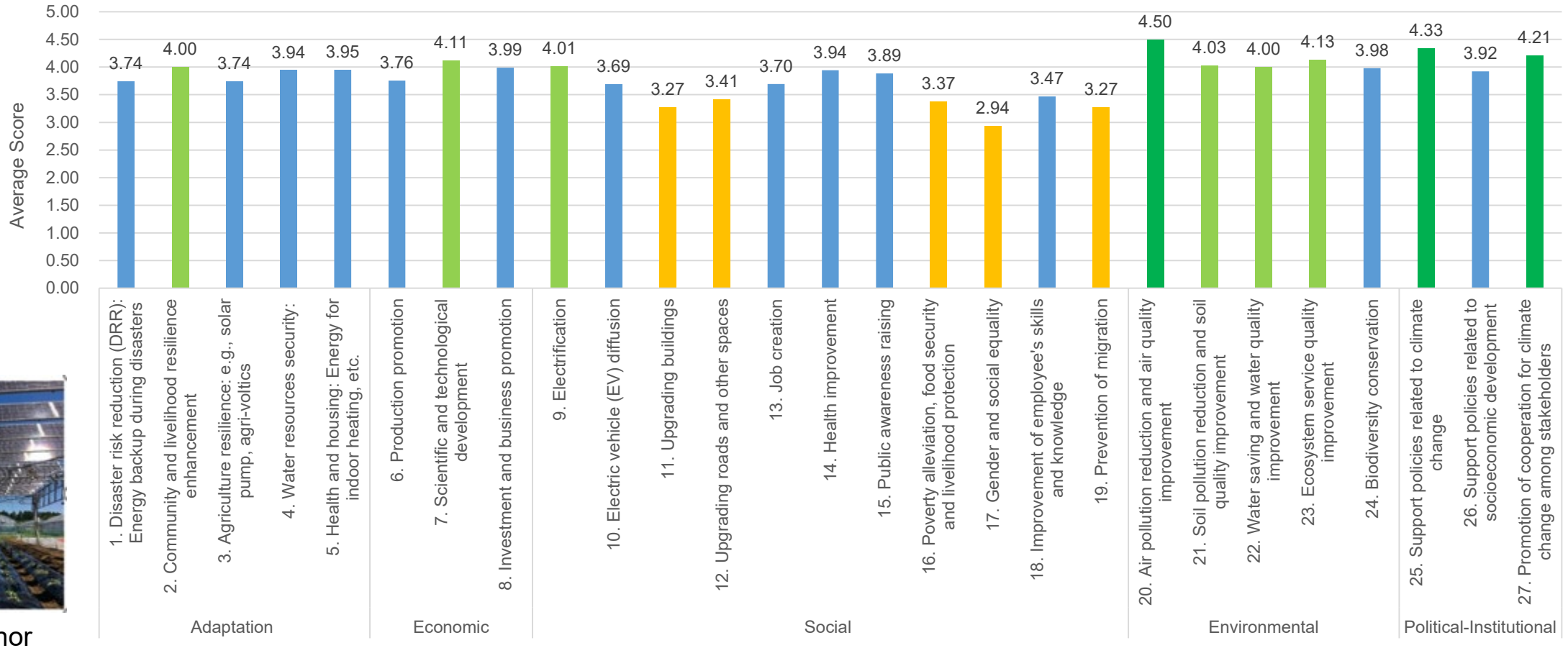
Source: Arino et al. (2024) Solar Photovoltaic (PV) Diffusion and Synergies with Resilience and Adaptation: A Case Study in Los Baños, Philippines (under review by a journal)

Co-benefits of solar PV system in Indonesia (N=106)

- **High co-benefits** on political-institutional, environmental, economic and adaptation areas.
- **High co-benefits** (green coloured):
  Air pollution prevention; support of climate policy; promotion of cooperation; ecosystem, soil, and water quality improvement; scientific and technological development, electrification, and community resilience

Average scores in each category



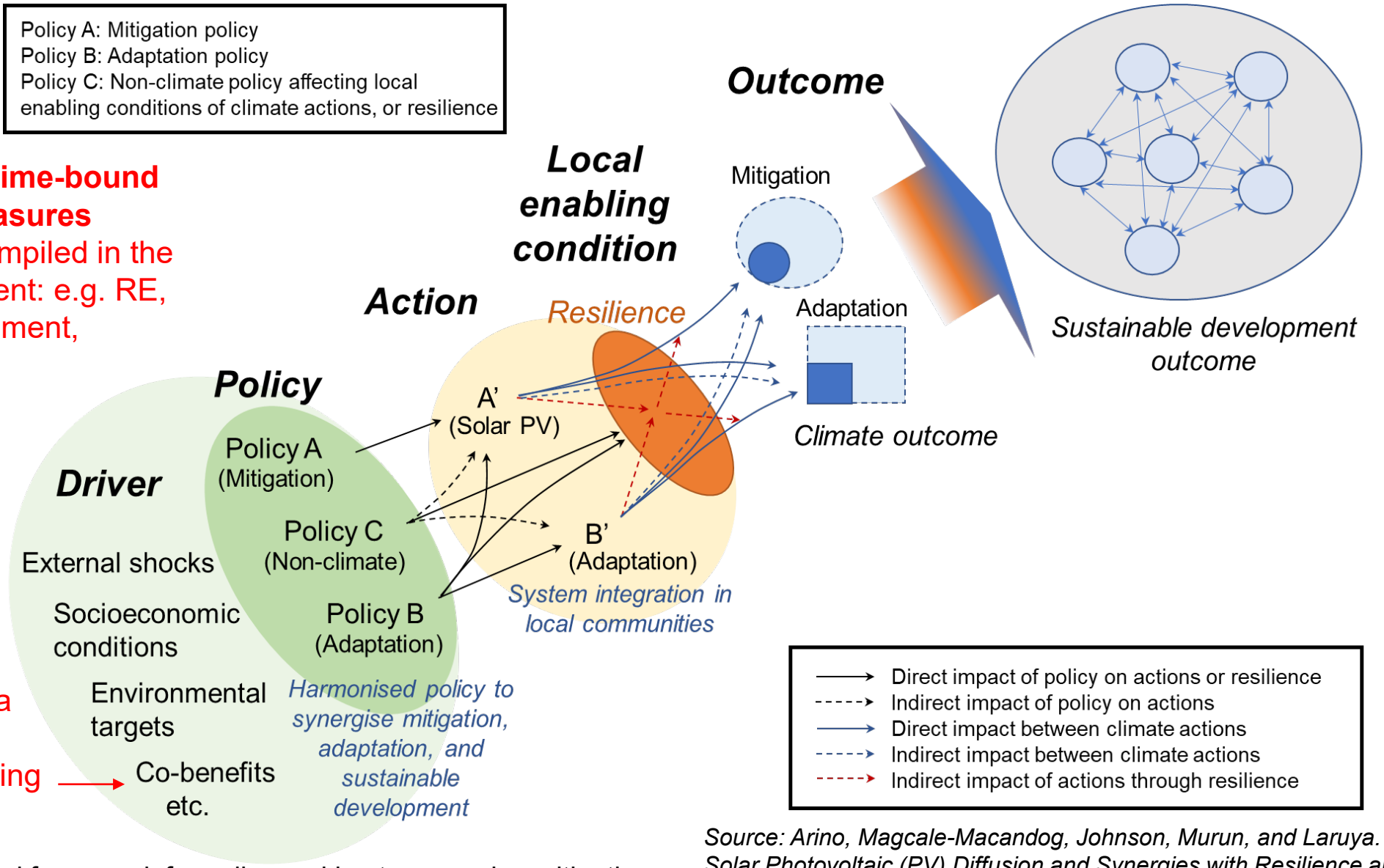


Source: Author

A generic conceptual framework for policy-making to synergise mitigation and adaptation for sustainable development

Policy A: Mitigation policy
Policy B: Adaptation policy
Policy C: Non-climate policy affecting local enabling conditions of climate actions, or resilience

Key cases with time-bound Policies and Measures (PaMs) will be compiled in the Guidance document: e.g. RE, Peatland management, agrivoltaics.



Co-benefits can be a driver of synergised transition by harnessing resources

Figure. A generic conceptual framework for policy-making to synergise mitigation and adaptation for sustainable development by bringing about local- and system-level integration

Source: Arino, Magcale-Macandog, Johnson, Murun, and Laruya. (2025) Solar Photovoltaic (PV) Diffusion and Synergies with Resilience and Adaptation: A Case Study in Laguna Lake watershed, the Philippines (under review)

Summary of policies and actions to increase and protect solar PV as well as to protect communities

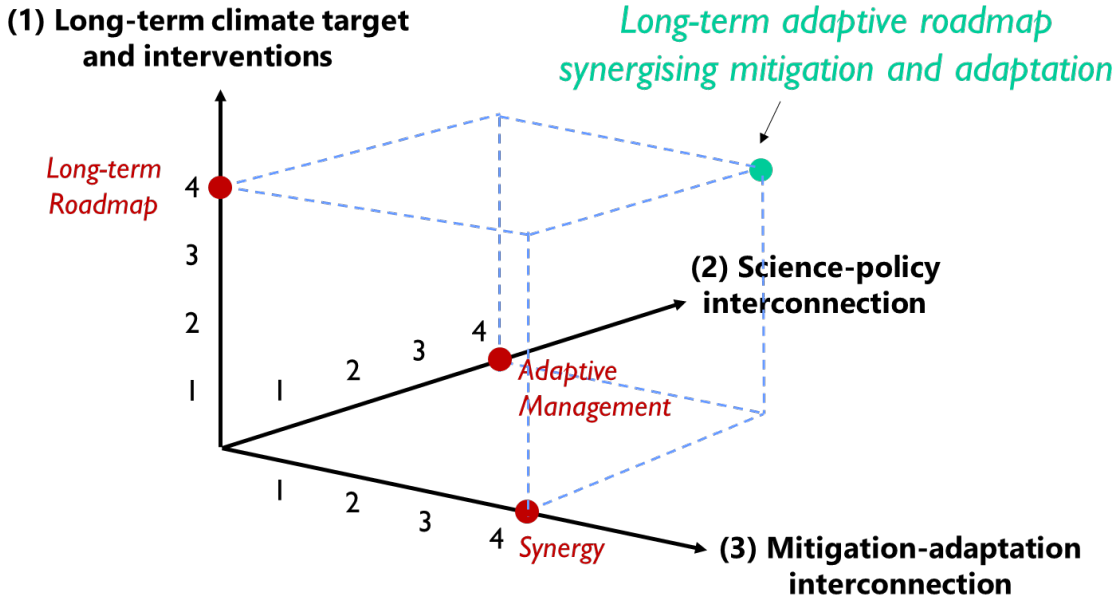
Policy type	Policies and actions
1. Increasing solar PV (Mitigation as well as adaptation)	a. Adopting cheaper solar panels b. Flexible/adaptable solar PV design c. National policy on agrarian reform for renewable energy production, including ownership such as public, titled, or permits d. Policies to promote flexible and adaptable use of solar PV e. Economic instruments to incentivise the use of renewable energy
2. Protecting solar PV infrastructures (Adaptation)	a. Local government unit (LGU) on adaptation to prioritise renewable energy b. Increasing social acceptability by households, community, investors c. Information, education, and communication (IEC) on solar PV d. Collaboration between the energy sector, particularly Meralco (Power distributor)
3. Protecting the communities surrounding solar PV infrastructures (Adaptation)	a. Focusing on long-term benefits of renewable energy b. Mainstreaming of the utilisation of renewable energy and sustainable practices on policies and agendas c. Policies to regulate the design or location to avoid potential risks d. Increasing water-based PV for reducing competition in cropland e. Well implemented LCCAP & DRRMP f. Inclusion of solar farms in the local comprehensive development plan (e.g., Comprehensive Land-Use Plan: CLUP) and local development investment program (LDIP) g. Continuing innovation

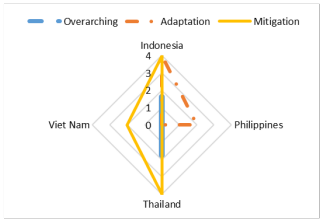
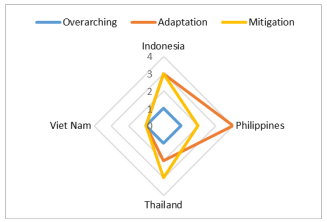
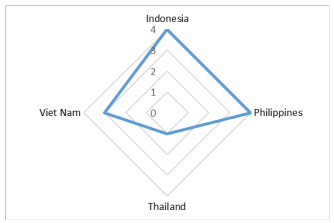
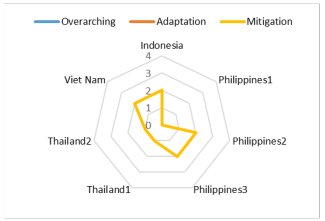
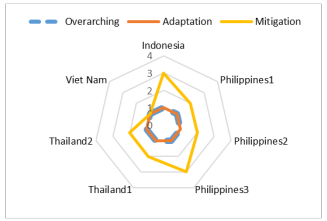
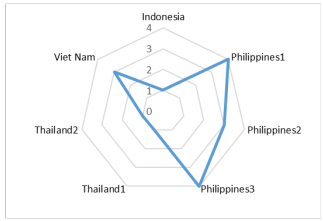
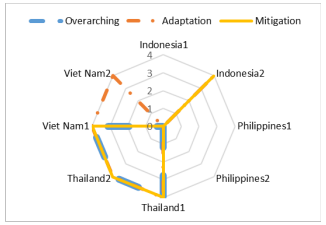
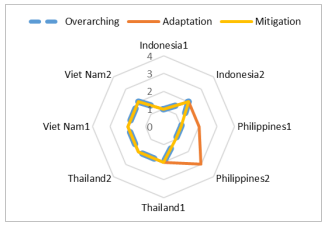
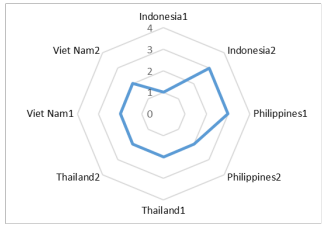
Source: Arino, Magcale-Macandog, Johnson, Murun, and Laruya. (2025) Solar Photovoltaic (PV) Diffusion and Synergies with Resilience and Adaptation: A Case Study in Laguna Lake watershed, the Philippines (under review)

Assessment framework of national policy to enable a net-zero climate resilient transition pathway

Critical enabling conditions

(1) Long-term climate targets and interventions (incl. roadmap)
(2) Science-policy interconnections (incl. adaptive management)
(3) Mitigation-adaptation interconnections (incl. synergy)



	(1) Long-term policy target and interventions	(2) Science-policy interconnection	(3) Mitigation-adaptation interconnection
	Scores 0-4 for Overarching, Adaptation and Mitigation: Target (Score 2) and Roadmap (Score 2)	Scores 1-4 for Overarching, Adaptation and Mitigation: Score 1: no model nor M&E, Score 2: Either, Score 3: Both, Score 4: Adaptive management	Score 1: Separation Score 2: Complementarity Score 3: Co-benefits/Trade-offs Score 4: Synergies
Climate Policy LTS, etc*. *Vietnam's (3) considers its NDC. Philppines' (1)-(3) consider the National Climate Risk Management Framework .			
► LTS mainly focuses on mitigation. Synergies are not well defined as policy targets or interventions, while synergies of mitigation and adaptation are recognized. Indonesia and Thailand lead the science-based roadmap development in LTS but still room for adaptive management.			
Energy Policy* *Examined policy targeting after 2030.			
► Adaptation synergy in the energy sector is well recognized in the Philippines. However, neither adaptation nor synergies are well defined as policy targets or interventions. Science on adaptation of energy infrastructures is not interconnected with policy.			
Agriculture Policy* *Examined policy targeting after 2030.			
► Adaptation-mitigation co-benefits in the agriculture sector are recognized in three countries, but synergies are not well recognized. Thailand and Vietnam show overarching policy targets and interventions. Science-policy interconnection is slightly stronger for adaptation than mitigation.			

Source: Arino et al. (2024) IPCC meeting in Tokyo, September 2024

Challenges and Opportunities

Challenges

- Understanding of **typical cases** of synergy among **mitigation, adaptation**, and **sustainable development**
- **Quantitative knowledge on synergy and trade-off**, including costs and benefits
  - Understanding of **longer-term**, **site-specific (local), dynamic** nature of mitigation and adaptation synergy, capturing **resilience** and **vulnerability**
- Specific **policies and measures (PaMs)** for promoting mitigation and adaptation synergy in LTS, NDCs, or sectoral policies
- Identification of **long-term national development vision** and priorities
- Development of long-term **climate goals** and **roadmaps** toward net-zero resilient emission targets

Opportunities

- **International science / knowledge base**
  - IPCC AR7's discussion to address synergies
  - ASEAN Guidance on the Synergy to be utilised for the ASEAN Climate Change Strategic Action Plan 2025-2030 (ACCSAP)
  - ASEAN Centre for Climate Change
- Functioning **PA's rachet-up mechanism** as an enabling condition of CRDP
  - Describing in the Biennial Transparency Report (BTR) **co-benefits / synergies and trade-offs** based on best available science

    ➔Especially, **mitigation's co-benefits / synergies with adaptation and sustainable development** ➔ **Improving benefit-cost ration and harnessing investments for net-zero**

  - Describing **policy actions** to enhance synergies
- Mutual **learning** across countries and sharing lessons and political will to enhance ambition

Actions to strengthen national enabling conditions to promote climate resilient development pathway (CRDP) in LTS / NDCs in ASEAN countries

Five steps

a. **Scientific modeling capacity building for long-term projections** for mitigation, adaptation, and their synergies and trade-offs:
b. **Facilitating reporting of methodology about projections** of GHG emissions, vulnerability and risks, and climate change in the BTR, with due care about mitigation and adaptation synergy:
c. **Development or updating of LTS and NDCs in line with the core elements of CRDP (climate resilient development pathway)** (or macro-frame: a comprehensive framework for mitigation-adaptation integrated transition) :
d. **Co-creating robust methodology for a long-term roadmap** that integrates the multiple elements of CRDP:
e. **Applying the co-created methodology** (e.g. Guidance document on the national long-term roadmap to synergise mitigation and adaptation) into national climate policy (e.g. LTS, NDCs, NAPs), sectoral policies, and cross-sectoral policies such as national development plans, national land use plans, urban and rural development plans, investment plans, etc.

Stakeholder Consultations

National Government Workshops (Viet Nam and Thailand)

Viet Nam
’24.7

Thailand
‘24.9

For synergising mitigation and adaptation

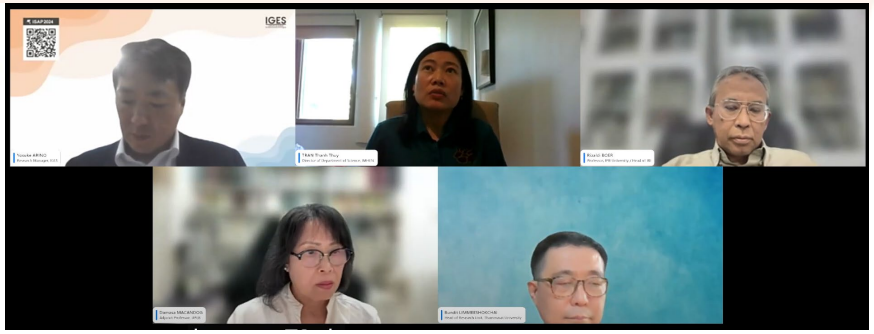
- Synergies between forest systems and net-zero and their integration into the national LTS need to be considered.
- The transition to net-zero energy needs to balance technological upgrades to reduce emissions and the phase-out of coal power generation.
- An early energy transition to net-zero energy is needed, but policy and institutional barriers exist.
- Current funding can only meet 30% of adaptation needs and there is no dedicated adaptation fund, which needs to be integrated with existing programmes and plans.
- Monitoring systems: up-to-date monitoring systems for climate adaptation are important. Ensuring continuous tracking and evaluation of adaptation plan implementation. The Climate Change Authority will need to regularly update the status of the effectiveness of plans and systems.

Adaptive management frameworks

in preparation for more than 1.5-2°C warming

- **Mitigation**: Determining CO_2 emission thresholds, etc. Strengthening measures and campaign awareness of hotspots such as transport sector. Binding legislation. Promoting CCS. Economic mechanisms for diffusion of new technologies. Revision of NDC targets.
- **Adaptation** (e.g. water, disasters, agriculture): Risk mapping with expanded data and forecasts to identify vulnerable groups. Early warning and awareness raising, evacuation plans and business continuity plans. In agriculture, including a shift to high temperature resistant varieties, etc.
- **Improved synergies**: prioritising actions considering maximum co-benefits, scale of co-benefits (e.g. community income), and trade-offs. Policy makers can change taxation and other policy /institutional systems. Setting short-, medium- and long-term targets. Understanding available resources (e.g. adaptive capacity).

1 November 2024 JST 15:00 - 16:30 (GMT+09:00) Simultaneous interpretation



Co-creating the National Long-term Roadmap to Synergise Mitigation and Adaptation in ASEAN

1. In all countries, renewable energy (RE)'s co-benefits on political-institutional, environmental, economic and adaptation areas are high. These co-benefits can increase the benefit-cost ratio, thereby harnessing more finance to RE investments. It will help overcome the barriers of weak national policy support of solar PV and other renewables.
2. In the long run, toward 2100, most countries pursue RE- or clean energy-centered net-zero energy systems, and natural forest-centred net-zero/negative forest.
3. Scientific understanding on the synergy will help cross-sectoral coordination at the national policy, thereby helping unlock the policy and institutional barriers for net-zero transition.
4. Net-zero system's synergy on development priorities will need to be considered in the long-term national development vision, LTS, NAPs, NDCs and NDC implementation plans.
5. Net-zero resilient energy transition requires the system of RE, battery, and rural electrification, and we need to overcome the trade-off of waste issues by promoting a circular economy.
6. Agriculture and forestry areas have a huge synergistic potential for both mitigation and adaptation, such as peatland management incentivized by carbon credit and national policy, floating solar PV (e.g. Laguna Lake in the Philippines), and agrivoltaics.
7. Clean energy transition can prioritize RE such as solar PV in the short-term toward carbon neutrality, while actions on forest and other land areas will be long-term options toward net-zero GHG.

Macro-frame of Long-term Roadmap to Synergise Mitigation and Adaptation

Macro-frame to Synergise Long-term Mitigation and Adaptation toward Sustainable Development

Eight key contents of the "macro-frame" (a comprehensive framework)

1. Guiding principle

- Integrative (Synergistic)
- Scientific
- Inclusive
- Adaptable
- Resilient
- Sustainable

2. Basic conceptual framework of the synergy

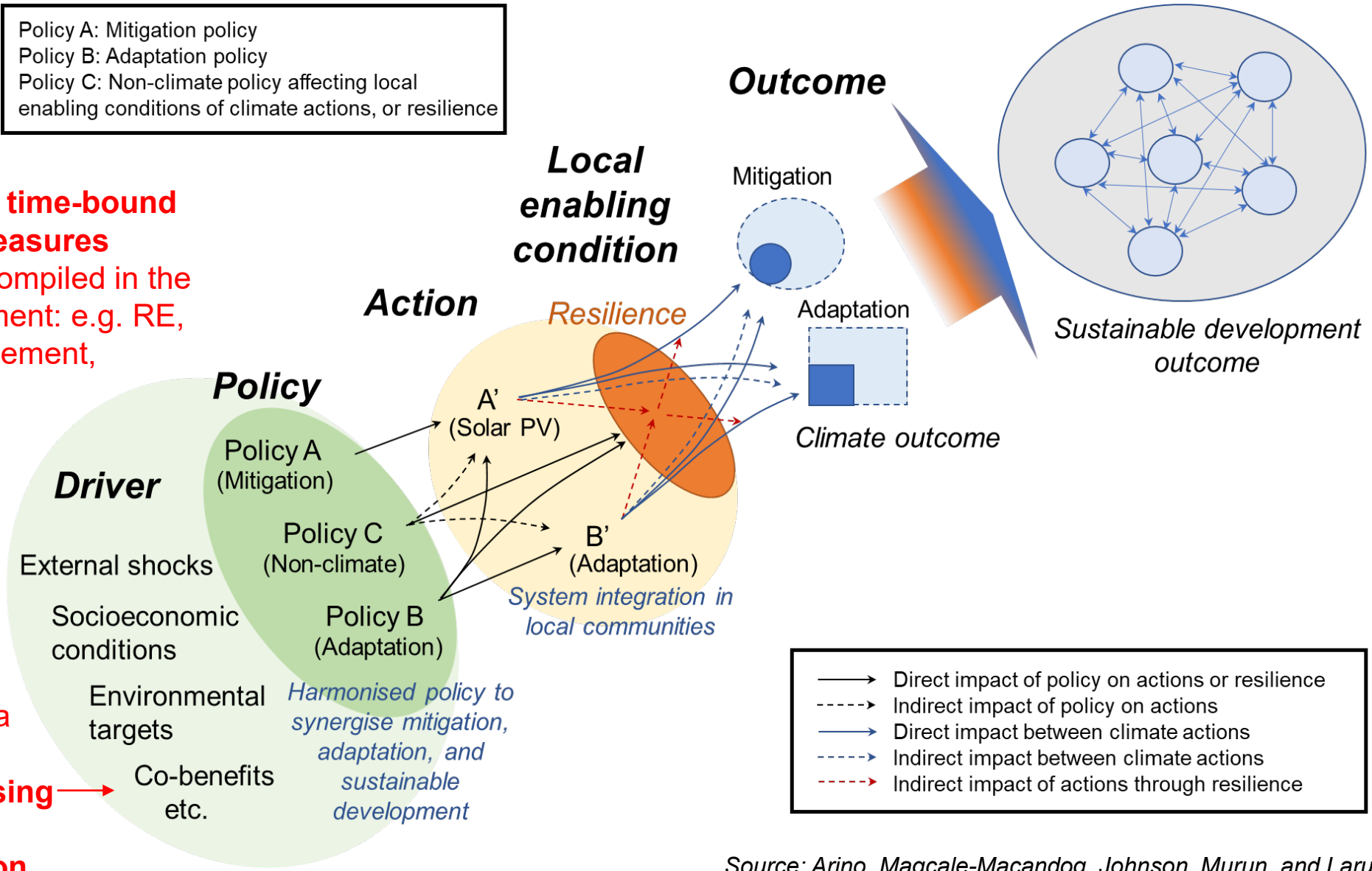
3. Three-layer structure: development vision, climate goal, and pathway
4. Science-based policy
5. Inclusive policy with care for local communities considering vulnerability and resilience
6. Critical enabling conditions for resilient net-zero transition
7. Adaptive (flexible) management of climate policy
8. Resource mobilization to enable mitigation-adaptation integrated transition

The Guidance on Long-term Roadmap will be published in March 2025. It will be utilized for ACCSAP, AMS' LTS, NDCs, NAPs and sectoral policies (e.g., energy, development and land use plans)

2. Basic conceptual framework of the synergy

Policy A: Mitigation policy
Policy B: Adaptation policy
Policy C: Non-climate policy affecting local enabling conditions of climate actions, or resilience

Key cases with time-bound Policies and Measures (PaMs) will be compiled in the Guidance document: e.g. RE, Peatland management, agrivoltaics.



Co-benefits can be a driver of synergised transition by **harnessing resources + cross-sectoral coordination**

Figure. A generic conceptual framework for policy-making to synergise mitigation and adaptation for sustainable development by bringing about local- and system-level integration

Source: Arino, Magcale-Macandog, Johnson, Murun, and Laruya. (2025) Solar Photovoltaic (PV) Diffusion and Synergies with Resilience and Adaptation: A Case Study in Laguna Lake watershed, the Philippines (under review)

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