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How the research outcomes contribute to promoting SDGs in an integrated manner?

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Institute for Global Environmental Strategies

MOEJ-IIASA Part B: Collaboration to Promote Integrated Actions for Clean Air and a Sustainable Future in Asia

17 November 2023

The role of integrated assessment models

- Climate change policies (SDG13) have synergies and trade-offs with many other SDGs, such as air pollution and ecosystems. It is necessary to clarify these synergies and trade-offs and take appropriate actions.
- Integrated assessment models (IAMs) can quantitatively assess how climate change policies impact climate change and other environmental problems, such as air pollution and ecosystems degradation and provide climate mitigation scenarios that take into account synergies and tradeoffs with other SDGs.
- IAM also can help to promote dialogues among stakeholders by providing scenarios.
- We still do not fully understand the interaction between climate change and ecosystems. Part B Project try to find out solutions by comparing the scenario results of globally well-known models (AIM, GLOBIOM and GAINS).

How can we tackle the problems?



- Implement soft policies to improve environment such as laws, regulations and carbon pricing
 Implement to provide climate
 - friendly infrastructures Provide information and education

IAM can help to understand the way how to solve the problem by providing several scenarios that could achieve a better world.

Citizens

Affected by climate change and pollution

- Stop using products that emit CO2 and pollutants
- Change life-style (ex. Food)Use renewables

Industry

Develop environmentally friendly products

 Promote the environmentally friendly product, including the distribution process

Maintain/ Improve the working environment

Synergies and trade-offs between mitigation options and the SDGs

Sustainable Development Goals 📕 SDG 1		SDG 2	SDG 3	SDG 4	SDG 5	SDG 6	SDG 7	SDG 8	SDG 9	SDG 10	SDG 11	SDG 12	SDG 14	SDG 15	SDG 16	SDG 17	Number	of	
		End	Zero	health	Quality	Gender	water	Affordable	work	innovation	Reduced	e cities	consumpti	E Life	Life on	justice and	Partner	Option w	vise
Secto	r Sector mitigation options	poverty	hunger	and	education	equality	and	energy	economic	economic	es	and	n and	water	land	strong	snip	Syne Mixed	No asses
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	Carbon sequestration in agriculture						_				-					_		3 2	' -
lture, y and nd use	² Reduce CH4 and N2O emissions in agriculture		ure										-					4 3	á
	Reduce conversion of forest and other eco		vstems															4 6	ă
	Ecosystem restoration, reforestation, affore		tation															5 4	ž
a str	Improved sustainable forest management		1.000															7 4	5
Agric Fores	Reduce food loss and food wast	e						1										11 0	5
	Shift to balanced and healthy die Renewables supply	ets			-													9 2	5
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fera	District heating and cooling netw	vorks	1		·													9 1	6
۲L کې	Urban green and blue infrastructures																	13 1	2
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8 B	Shift to bikes, ebikes and non mo	otorized tr	insport															1Ŏ 1	Š
S	Fuel efficiency- heavy duty vehic	le														1		50	11
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E C C C	50 Synergies	20	11	28	9	8	19	29	25	25	8	28	18	12	28	11	6	275119	294
5,49	Mixed evidence (Trade-offs & Both synergies and trade-offs)	8	15	12	Ŏ	Ŏ	12	7	13	9	9	2	11	7	2	1	Ĭ.	119	
∠∾ະບ	No assessment (due to limited literature	e) 15	17	3	34	35	12	7	5	9	26	13	14	24	13	31	36	294	
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(Note) Blue cells indicate synergies, orange cells indicate trade-offs, yellow cells imply both synergies and trade-offs and white represent "no assessment"; (Source) Halsnæs et al. (2023) Beyond synergies: understanding SDG trade-offs, equity and implementation challenges of sectoral climate change mitigation options.

Additional slides

Policy type classifications and criteria

Policy Type	Code	Criteria/ Examples
		1. Policy Type Code Criteria/Examples
Law/Regulation	LR	Law, order, legislation, act, decree, code, control program, regulation, agreement, reform, standards, quidelines
National Policy	NP	Policy, package
Strategy/Action Plan	SĂ	Strategy, action plan, plan, master plan, scheme, framework, roadmap, mission, a program that is broad or acts as an action plan for the entire issue (for example, a national program)
Enforcement	EN	Additional efforts or measures to enforce existing laws, regulations, etc. 2. Money-related Policies
Tax/Spending	TS	Taxes, government spending, investments, pensions, subsidies, insurance coverage (assumed government contributions), cash transfers, allowances, benefits, grants, aid
Pricing	PR	Price regulation
Finančing	FN	Fund, Ioan, scholarship, deposits, bonds
		3. Physical Infrastructure, Land Management
Infrastructure	IN	Physical infrastructure, equipment, buildings, roads, transportation infrastructure, digital infrastructure such as broadband networks, development of physical infrastructure
Protected Area/Park	PA	Physical area. May be created by a law, program, etc.
Forest/Conservation	FR	Planting trees, forest conservation
	_ .	4. Projects, Programs
Project/Initiative	PJ	Project, initiative (combined this as they are both focused actions to address something)
Program	PG	Smaller-type programs, more focused, less broad—not national programs
		5. Information-related Policies
		Monitoring, evaluation, observation, surveillance
Awareness Raising		Fublic information, promoting public awareness, etc.
Information/Data		Information systems directory data collection providing information to the public index catalogue
Intornation/Data	שון	providing guidelines
Certification/Labeling	CR	Certification labeling awards
Registration	RI	Registry
		6. Other
Agency/Department	AG	Creation of a new agency or department
Résearch	RS	Research, development of technology
Other	OT	Committees, hotlines, white papers, encouragement, general promotion, vague, or difficult to classify

(Source) Table 2 in Elder, M. and Newman, W. (2023) Monitoring G20 Countries' SDG Implementation Policies and Budgets Reported in Their Voluntary National Reviews (VNRs). Sustainability. 15, 15733. https://doi.org/10.3390/su152215733

Implications of afforestation and biomass production on SDGs, costs, equity and implementation challenges

Aspects	Afforestation	Biomass production
Equity	Host communities may not get any social and economic benefits (Peprah 2017)	If local food prices increase, it can lead to food insecurity for the marginalised, esp. women (Beuchelt 2016)Commercial biomass activities are often male centric, so income increase may not benefit women (Beuchelt 2016)
Implementation	 Farmers do not always prefer investing in afforestation (Źróbek-Różańska et al. 2014) Need involvement of forest communities (including fund transfer schemes), creating a knowledge pool from existing projects (Dasgupta and Srikanth 2021) Need international/national financing 	 Farmers perspectives: lack of profitability and lack of assurance of buyers, no organised biomass transport system to buyers (Roszkowska and Szubska-Włodarczyk 2022) Complementary measures—forest and water protection schemes, agricultural intensification and improved fertilisation efficiency helps in reducing trade-offs (Humpenöder et al. 2018) Creating new energy policies to support biomass investment (Kevser et al. 2022)
Costs	Depends on context, varies with scale, period and location	 Increase in land prices leading to increased investment cost of crop establishment and biomass transportation cost (Choi et al. 2019) Cost of transportation is too high for poor farmers (Singh et al. 2020; Kumar et al. 2015)
SDGs (trade- offs are indicated)	SDG 2: large-scale/massive afforestation will increase com- petition with agricultural land, leading to increased food prices affecting food security (Kreidenweis et al. 2016)	SDGs 1, 2 and 15: massive scale implementation, and without considering local circumstances, can lead to competition with land resources and can have an adverse impact on food security (increasing food prices), biodiversity and livelihoods (Humpenöder et al. 2018; IPCC 2022a, b)

(Source) Table 1 in Halsnæs et al. (2023) Beyond synergies: understanding SDG trade-offs, equity and implementation challenges of sectoral climate change mitigation options.

Implications of industry actions on SDGs, costs, equity and implementation

Aspect	Electrification in industry with renewable energy
Equity	Access to finance can be limited in both high- and low-income countries, which can exclude some industries from electrifica- tion (Wei et al. 2019; Pal and Hall 2021)
Implementation	Significant barriers are faced for electrification of industry including costs and risk aversion of the industry towards new tech- nologies. Other key barriers are heterogeneity of sectors and missing regulatory policies. The barriers exist in both high- and low-income countries (Wei et al. 2019; Pal and Hall 2021; Bataille 2020)
Costs	High costs associated with transformation from other energy systems to electrification based on study for EU and US (Wei et al. 2019)
	Electrification with renewable energy is costly compared with fossil fuel-based systems in some countries, e.g. India (Pal and Hall 2021)
	Electrification requires investments in several parts of the production system and can, therefore, be expensive (Wei et al. 2019; Pal and Hall 2021)
SDGs (trade- offs are indicated)	Many synergies are associated with renewable-based electricity, but costs are a major trade-off (Wei et al. 2019)

(Source) Table 4 in Halsnæs et al. (2023) Beyond synergies: understanding SDG trade-offs, equity and implementation challenges of sectoral climate change mitigation options.



(Note) Figure 4 in The size of the bubbles relates to the number of cases associated with each form of public engagement identifie (Source) : <u>Chilvers J, Stephanides P, Pallett H, Tom Hargreaves T (2023) Mapping Public Engagement with Energy, Climate Change and Net Zero. UKERC Public Engagement Observatory.</u> https://d2e1qxpsswcpgz.cloudfront.net/uploads/2023/07/UKERC BN Mapping-Public-Engagement-with-Energy.pdf

Challenges toward leveraging climate neutral societies (LCS) in

