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Setup and implementation of National Systems of Innovation

Good practices and lessons learned

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Objective and scope of analysis

Objective:

- To understand what lessons can be learned from setting up and implementing National Systems of Innovation (NSIs) for the use of developing country policymakers looking to strengthen their NSI in the context of climate action
- To deepen the understanding of NSIs – or parts thereof - and identify measures and approaches which have improved the effectiveness of innovation systems in specific cases and translate them into good practices that can be replicated in other countries

Scope:

'National Systems of Innovation, or parts thereof' for climate technology:

- In-country systems to produce, diffuse and use innovations at the national, sectoral or technology level
- Innovation can relate to processes (organizational and technological changes) or 'products' (changes in materials, goods, services):
 - Relates not only to new knowledge and products, but also to first use in a certain context
- Climate technology for mitigation and adaptation (IPCC definition)

Caveat:

Setup and implementation of a whole NSI is very complex since it is economy-wide and unlikely driven only by climate challenges. Hence, focus is on case studies with mitigation/adaptation gains from strengthening specific parts of NSIs, with concrete lessons and good practices pertinent to the climate context.

Approach

Assessing selected successful case studies based on a methodological framework developed to evaluate strengths and weaknesses of (parts of) NSIs:

1. Development of methodological framework

Focus on innovation functions and barriers that exist for the system to perform such functions for structural components actors, institutions, interactions & technologies

#	Function
F1	Knowledge development & diffusion
F2	Entrepreneurial experimentation
F3	Market formation
F4	Influence on the direction of search
F5	Resource mobilization
F6	Legitimation
F7	Development of positive externalities

2. Identification of case studies

Diversity in terms of:

- Regions and type of countries involved
- Mitigation and/or adaptation
- Sectoral/technology focus
- Different innovation functions

Considering:

- Maturity
- Data availability
- Potential for good practices
- Replicability
- Sustainability

3. Case studies analysis

Assessing:

- Delivery of the initiative's functions
- Contribution of the initiative in addressing barriers to climate innovation and strengthening core areas in the innovation system

to pinpoint success factors

Looks at initiatives' contribution to:

- Enhancing capabilities of relevant actors
- Strengthening institutional context in which actors operate
- Enhancing linkages between actors, and institutional settings
- Catalyzing changes for knowledge production and implementation to achieve climate mitigation and adaptation goals

More?

Selected case studies

Case study	Country - region	Mitigation/ adaptation	Sector	Type of country/ income level	Top-down/ bottom-up	Main IS functions
1st version (August)						
BEE Bureau of Energy efficiency	India – Asia	Mitigation	Energy efficiency – economy wide	Lower Middle Income	Top-down	F1 Knowledge development & diffusion F2 Entrepreneurial experimentation F3 Market formation
KCIC Kenya Climate Innovation Center	Kenya – Africa	Mitigation + adaptation	Energy (RE + EE), agriculture, water, waste, forestry	Lower Middle Income	Top-down	F1 Knowledge development & diffusion F2 Entrepreneurial experimentation F3 Market formation F5 Resource mobilization
Disaster Risk Reduction	Haiti - Caribbean	Adaptation	All sectors	Low-Income	Top-down & bottom-up	F1 Knowledge development & diffusion F4 Guidance of search F5 Resource mobilization F6 Legitimation
In 2nd version (after TEC Sept)						
Bio-ethanol programme	Brazil – Latin America	Mitigation	Transport (Energy/ Agriculture)	Upper Middle Income		Expected to cover most, if not all functions

Lessons learned: success factors

1. A systemic perspective, integrated with host country development objectives
2. A tailored approach to bridging sector- and innovation phase-specific gaps
3. Participation of local actors and inclusion of local knowledge and coordination among actors
4. Engage with international institutions and collaborations to help build local institutions, networks
5. Ensure that innovation and organizations are evolutionary and able to adapt to new circumstances
6. Pay attention to long-term planning and continuous monitoring and review

Recommendations

Overall recommendation

Implementation of the NSI is best guided through a systematic approach to help ensure that the NSI is organized and resourced to perform the functions required for successful innovation.

Given sector-specifics, the process preferably starts with identifying sectoral priorities aligned with national policy goals and socio-economic objectives to guide and facilitate the process of strengthening of NSI functions, marshalling of resources, and addressing weaknesses/gaps in structural elements in NSIs.

Specific recommendations based on identified good practices

Preparatory practices (continuing during implementation)

- Map the NSI before designing and implementing strategies
- Coordinate and integrate with long-term policy framework
- Engage both public and private sectors
- Look for win-win measures across the various stakeholders
- Establish a coordinating agency with clear roles and responsibilities

Implementation practices

- Focus beyond hardware innovation to include software and orgware (capacity building, communication, policies)
- Pay attention to market creation for climate technologies
- Design innovative, customized, and flexible funding frameworks
- Create complementary knowledge and servicing infrastructure
- Strengthen local capabilities, while ensuring coordination
- Use international collaborations to develop local capabilities and resources
- Allow flexibility in how policy goals are met

Evaluation and realignment practices

- Ensure there is adequate and systematic monitoring, evaluation and review
- Evolve and diversify through learning by doing
- Learn iteratively and be adaptive to evolving situations and needs

To be updated, confirmed and complemented after further case study analyses

Note:

Given the complexity of innovation activities, attributing outcomes exclusively to specific initiatives can be challenging. Nonetheless, the broader context in which the innovation is embedded and which leads to the delivery of particular outcomes can be used to identify good practices.

For further information:



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Case Study: BEE - India

Main IS functions	Specific activities (indicative, not an exhaustive list)
F1 Knowledge development & diffusion	<ul style="list-style-type: none">• Creation of a pool of energy auditors• Training of energy professionals• Awareness and capacity building on energy efficiency measures and merits
F2 Entrepreneurial experimentation	<ul style="list-style-type: none">• Innovative business models to bring down costs (e.g., bulk procurement, CDM credits, etc.), entice private investment, etc. to create win-win situations for both public and private actors• Innovative payment mechanisms by the consumers and other actors• Use of both carrot and stick to ensure implementation (e.g., E-certs and penalties in PAT)
F3 Market formation	<ul style="list-style-type: none">• Creation of market demand by awareness building (e.g., light program) and use of regulations (in PAT)• Promotion of local and global supply ecosystem of energy-efficient appliances/equipment• Incentive schemes/penalties• Use of rewards and penalties to promote a sustained demand and supply