



Minigrids as examples of application of Elinor Ostrom's thesis on Common pool resources (CPR) management

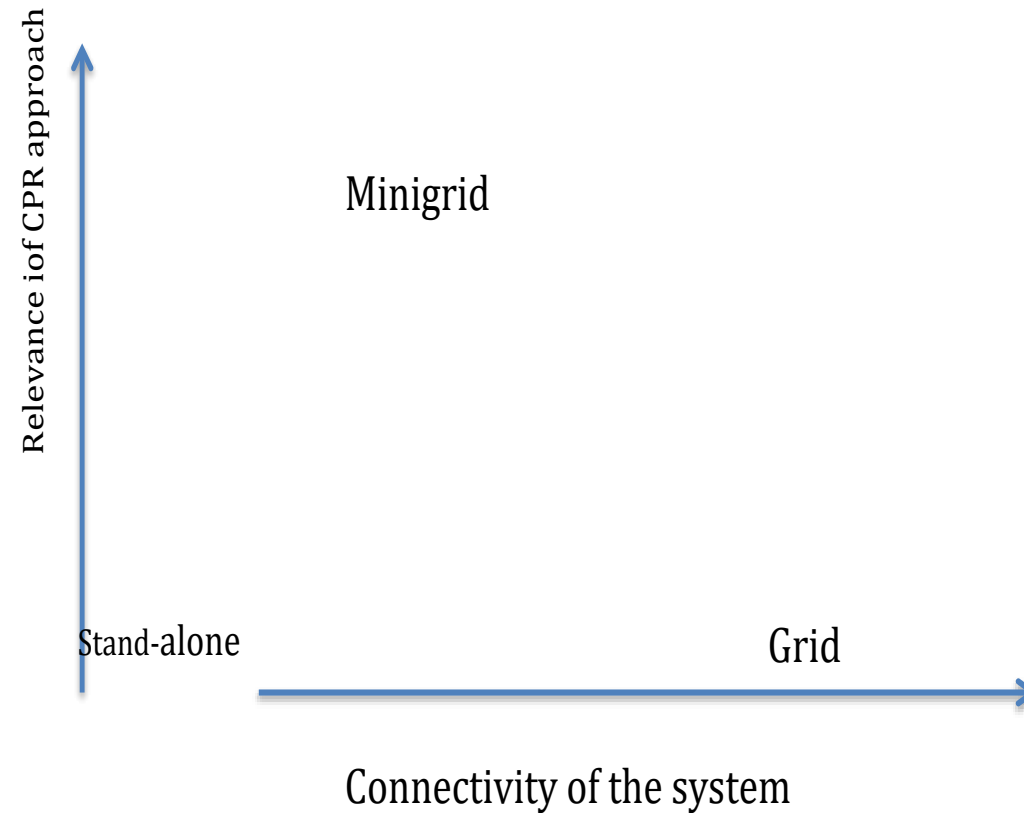
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Introduction

- National electric grids as counter-examples of Elinor Ostrom's CPR approach
 - Electrification policies are considered as optimally organized through large, centrally managed, grids
 - Centralized management provides significant economies of scale and smart grids technologies help optimize balancing
 - This optimistic view is challenged in developing country context by governance issues (free riding)
- Ostrom's approach applied to off-grid systems precisely helps solve free-riding

Situations where CPR approach is relevant



Comparison with best practices identified by Elinor Ostrom

Elinor Ostrom's design principles	Application to mini-grids
Clearly defined boundaries	Yes
Congruence between appropriation and provision rules and local conditions	Possible if stakeholders are involved
Collective-choice arrangements	Possible if local community is involved
Monitoring (accountable to the appropriators)	Possible if stakeholders are involved
Graduated sanctions	?? Few occurrences of violation of rules such as unpaid bill are observed
Conflict resolution mechanisms	Likely if local community involved
Recognition of the right to organize	Depend on appropriate regulatory framework

Synthesis of Ostrom 's principles for minigrids

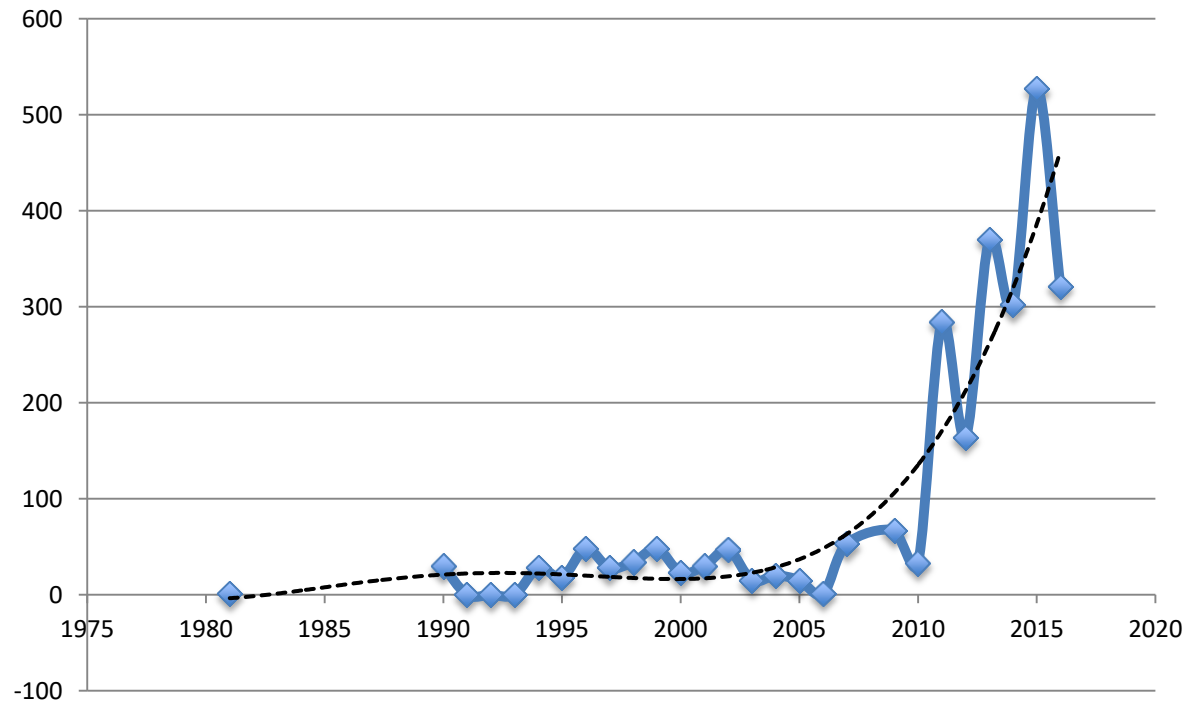
- The role of the local community governance is central. The local community must organize production and allocation of the resource, decide on tariffs, resolve conflicts, etc..
- The stakeholders must be involved and informed so that they build a sense of ownership
- The national regulator/rural electrification agency must provide a regulatory framework but also respect the principle of subsidiarity

Literature review

- The literature on application of Ostrom's CPR management principles to off-grid electrification is recent (from 2012)
- A few authors (Sovacool, Gollwitzer, Ockwell) have contributed papers on design principles
- There are also some case studies, principally on Eastern Africa and South/Southeast Asia, despite a large and fast growing economic empirical literature on off-grid electrification
- There are few comparative studies, and none on large samples of countries, thus is where the FERD's I project (CoSMMA) intends to contribute.

The renewed interest for decentralized electrification

We have built, based on published evaluation papers, a database collecting information on implemented decentralization projects and their impact evaluation (CoSMMA). This database shows the rapid expansion of such projects.



I.D. of CoSMMA

- The largest database on off-grid electrification. More than 400 project registered.
- Combines project characteristics (technical, economical, organizational) and their impact evaluations (electricity access, economic transformation, social transformation, environment, etc.)
- Depends on published sources; few sources detail organizational characteristic and issues related to CPR management
- Such gaps are dynamically overcome in a collaborative way by direct contacts with authors

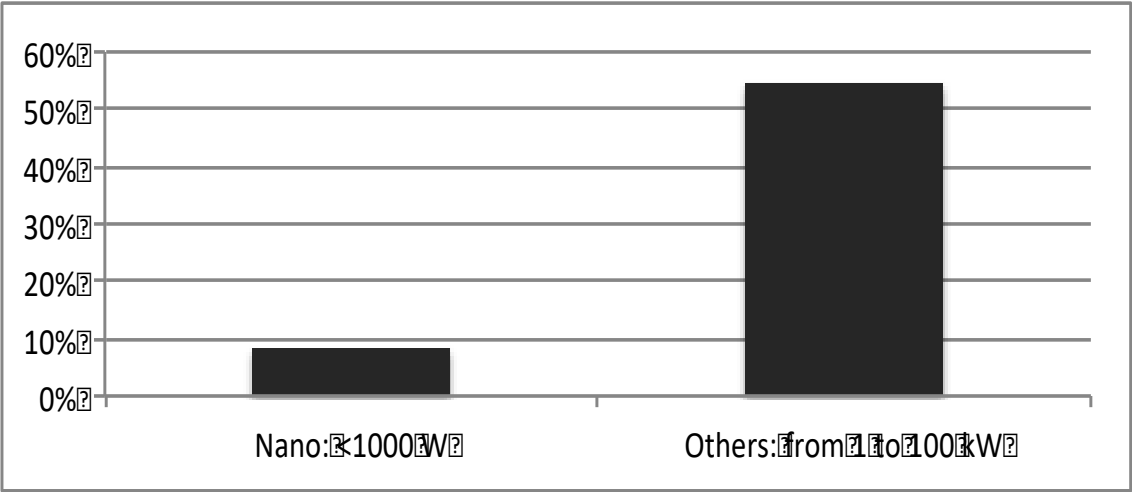
Preliminary lessons from CoSMMA

- Stand-alone systems are the least efficient in generating positive impacts
- Locally initiated projects, which could suffer from inadequate expertise, may compensated this by the advantages of a bottom-up approach

	Positive	Unproven favorable	Proven unfavorable	Negative	Inconclusive
Power : (ref. = Nano)					
Nano: <1 kW	0.000	0.000	0.000	0.000	0.000
Micro: 1 to 100 kW	0.365***	-0.188**	-0.051***	-0.102	-0.025***
Mini: 100 kW to 100 MW	0.319***	-0.162***	-0.059***	-0.086	-0.012***
Programme Decision Level (ref. = Local)					
Country	0.086***	-0.099***	-0.008**	0.058*	-0.037**
Province	-0.173***	0.034**	0.014	0.155***	-0.031
County	-0.089***	-0.237***	0.109***	0.251***	-0.034**
District	-0.011**	0.050*	-0.029***	0.030	-0.041**
Local	0.000	0.000	0.000	0.000	0.000

Stand-alone systems have limited impacts

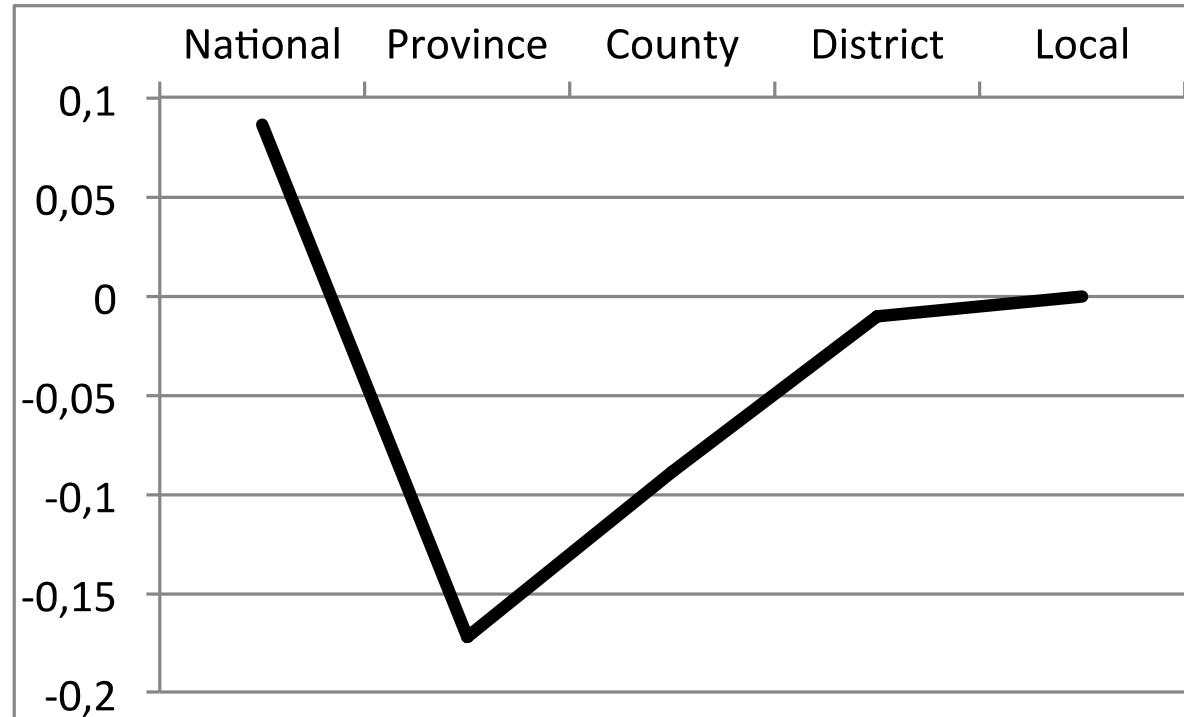
Projects with proven positive impact by size



All impacts	8%	55%
Energy	67%	38%
Individual well-being	40%	44%
Poverty reduction	0%	100%
Social well-being	67%	29%

The bottom-up approach is closer to Ostrom's design principles

Proposed interpretation: top down approaches benefit from higher expertise but bottom up approaches are closer to Ostrom's design principles of CPR.



Additional information on organizational characteristics (on-going additions to CoSMMA)

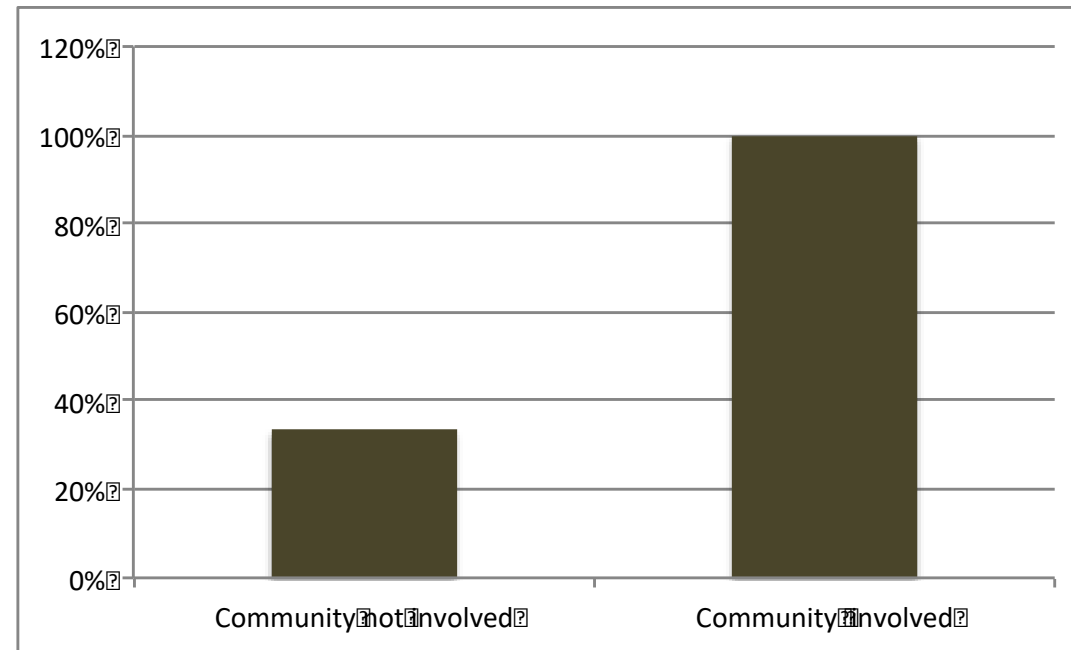
Stakeholders' involvement improves project positive impact



All impacts	14%	30%
Energy	60%	83%
Individual well-be	33%	50%
Poverty reduction	0%	17%
Social well-being	50%	100%

Additional information on organizational characteristics (on-going additions to CoSMMA)

Local community involvement improves project positive impact it



All impacts	33%	100%
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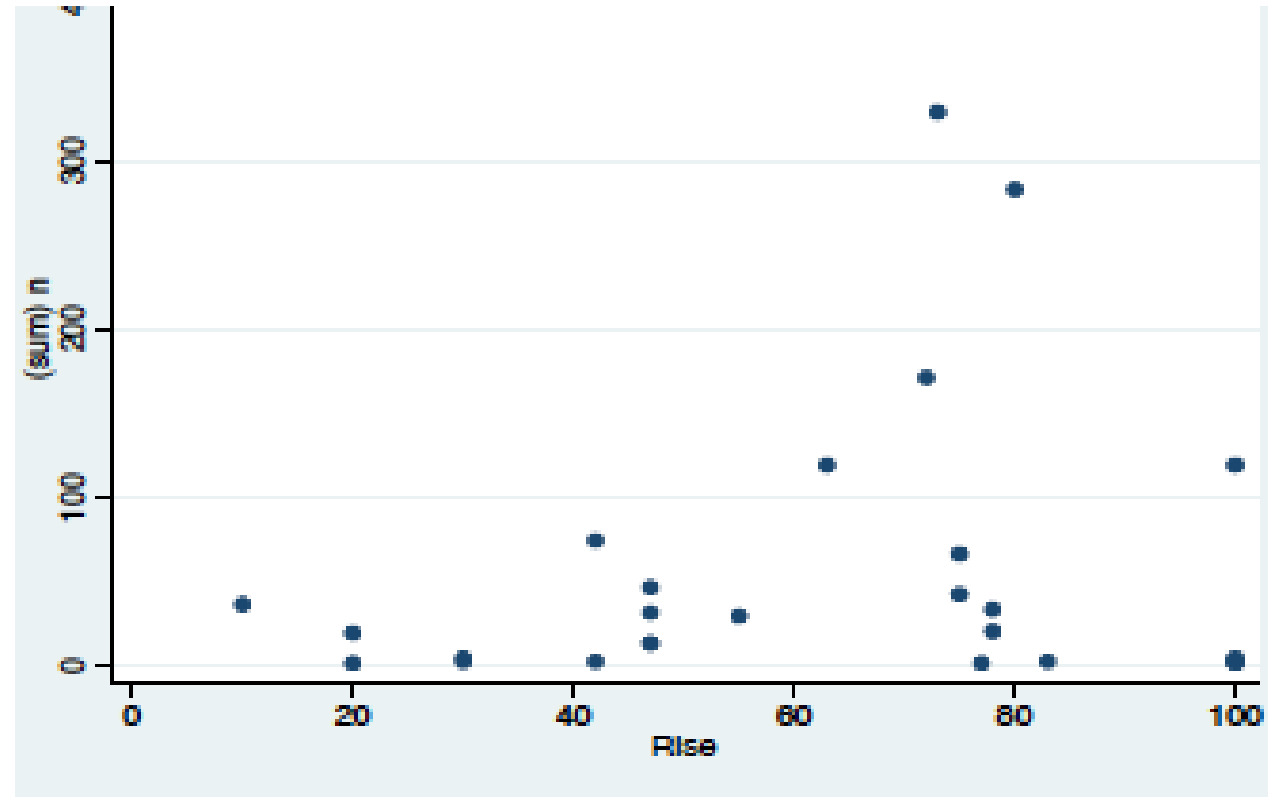
Additional information on the quality of regulation of the mini-grid sector (on-going additions to CoSMMA)

We use the sub-component « framework for minigrids » of the RISE (Regulatory Indicators for Sustainable Energy) developed by ESMAP & SE4all, based on the following indicators:

- Existence of national program
- Legal framework for minigrids operation
- Ability to charge cost-reflective tariffs
- Financial incentives
- Are there technical standards detailing the requirements for minigrids to connect the grid?

We compare this indicator with the number of projects per country in CoSMMA since 2010 (corrected for a national publication bias)

A good framework for minigrids is a necessary but not sufficient condition for minigrids expansion



Conclusion

- Decentralized electrification is growing fast creating new opportunities and challenges for the governance of electrification systems
- Feedbacks and identification of good practices are scarce but necessary to promote and improve decentralized electrification
- Elinor Ostrom's design principles for CPR management provide a useful analytical toolbox to identify good practices at the institutional/organizational level
- The CoSMMA helps identify good practices, and correlate positive impacts with characteristics (both technical and organizational) of off-grid projects
- Preliminary results confirm the respective roles played by local community involvement, stakeholders involvement and the regulatory framework