

Renewable Energy Projects in Rural China: A Systemic Capacity Approach

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SPREE, UNSW

Overview

1. What is capacity development?
2. Overview of case studies
3. Analysis of case studies
4. Lessons learned



'Giving a fish'



entrench dependency

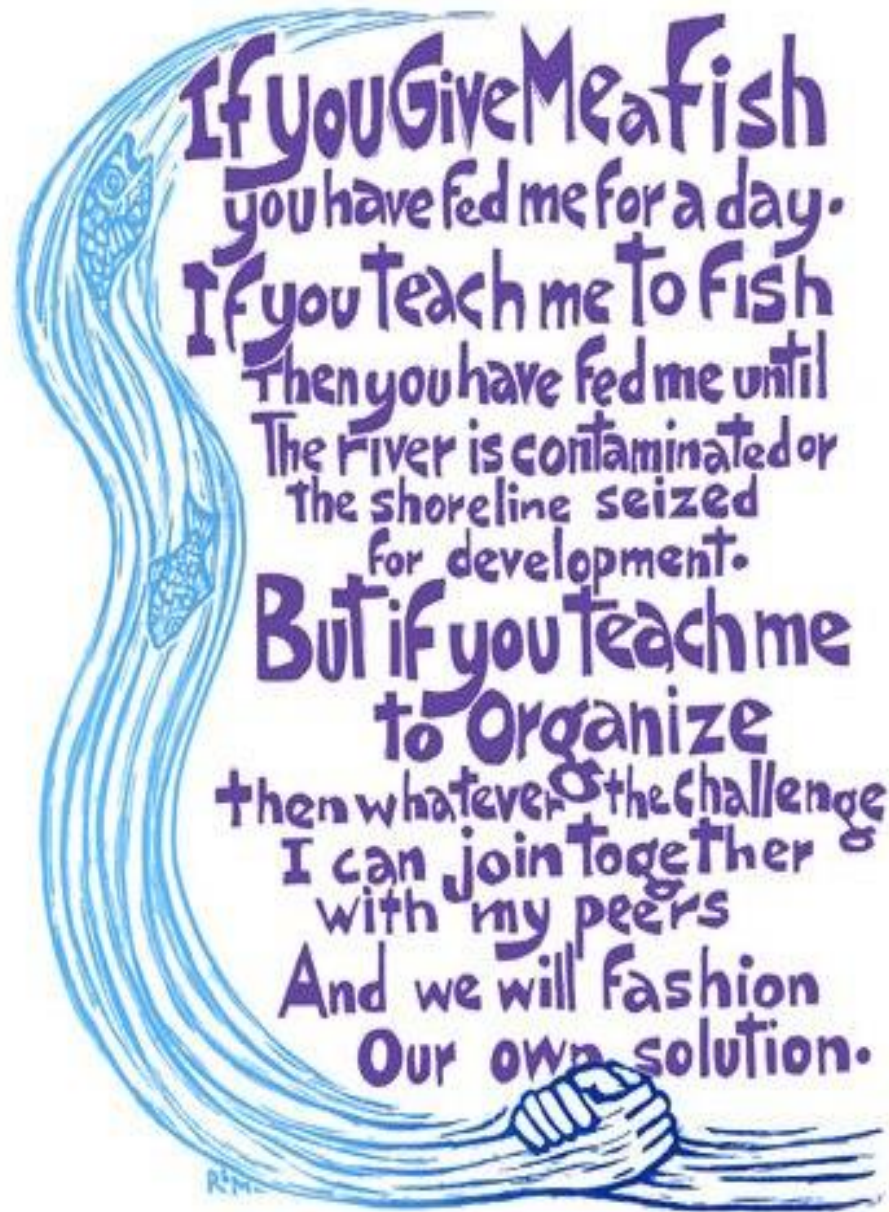
1. The community may not be able to operate and maintain it
2. The community can't do it themselves next time
3. The community may not value it
4. May take local jobs!



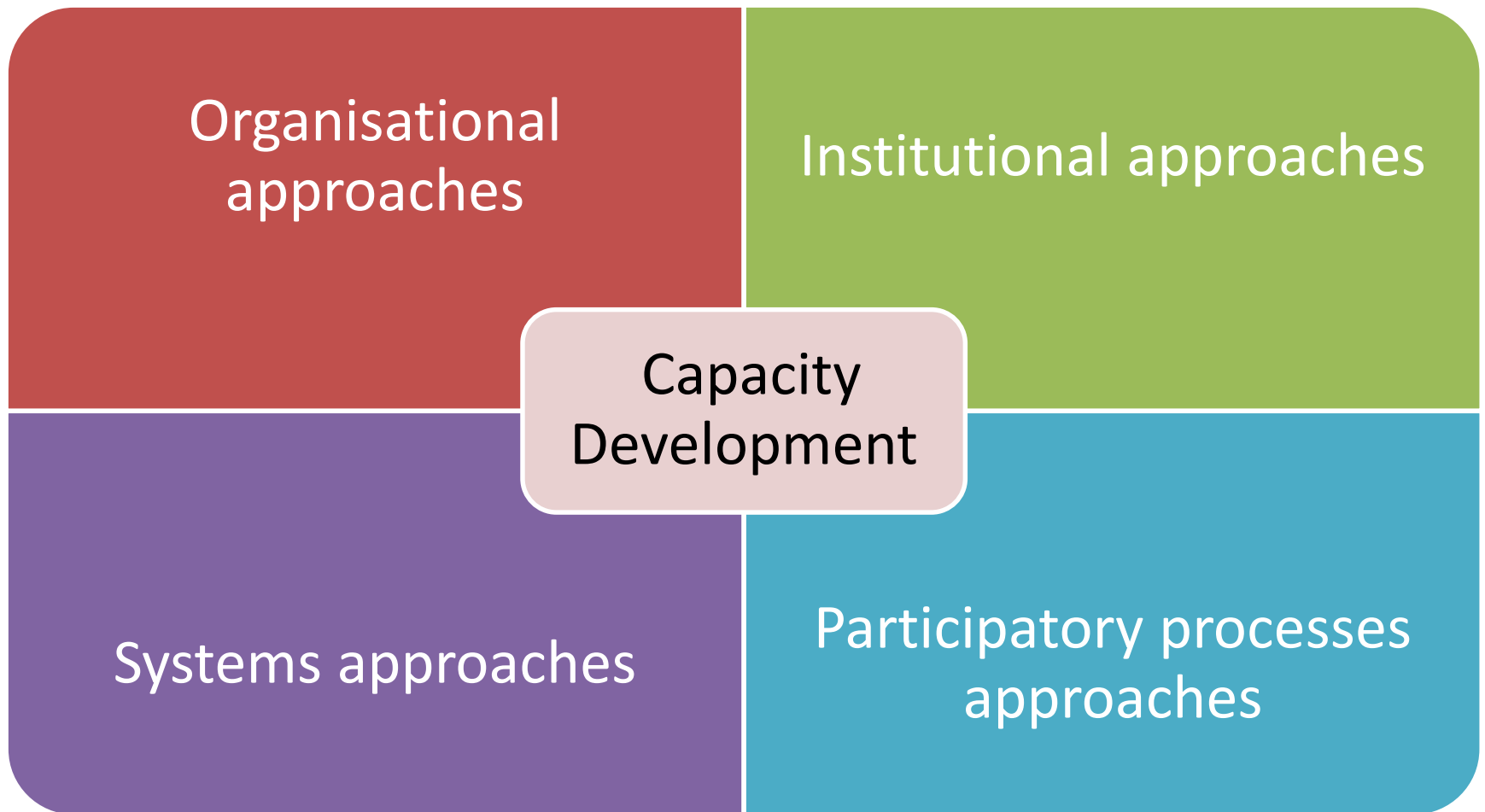
‘Teaching to fish’

Is this capacity development?





Approaches to Capacity Development



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Background on Inner Mongolia Autonomous Region, China



	IMAR	China
Population	24.22 million	1.33 billion
Area	1,183,000 k m ²	9,596,961 km ²
Population density	20.2/ km ²	139.6/km ²
GDP	US\$145.05 billion	US\$4.909 trillion
GDP per person	US\$5,561	US\$6,600
HDI	0.803 (high)	0.772 (medium)
Electrification rate	-	98 %

Sources: CIA (2010), China Data Online (2010), Peng (2006), UNDP (2009)



Brightness Program, China



INSTITUTION	DATE	AIM	SCALE	LOCATION
State Development Planning Commission (now the NDRC)	1996 – 2010	100W/ person for 23 million people in remote areas using wind and PV	> 106,000 people* for pilot projects	<i>Gansu, Inner Mongolia, Tibet, Xinjiang & Qinghai</i>

* Assuming 4 people/ household



A typical solar PV / wind hybrid household system



Inverter and battery box
for PV/ wind hybrid
household system



Local PV/wind business:

1. retail shop
2. Installation
3. repairs

Township Electrification Program, China



INSTITUTION	DATE	AIM	SCALE	LOCATION
National Development & Reform Commission (NDRC)	2001 – 2003	Provide electricity via renewable energy to 1061 townships that could not be feasibly reached by grid extension.	~ 1 million people	Xinjiang; Qinghai; Gansu; Inner Mongolia; Shaanxi; Sichuan; Hunan; Yunnan; Tibet

Township Electrification Program: Centralised System





1. Second-hand PV panels for sale
2. Supplementary power source at general store
3. Empty school buildings



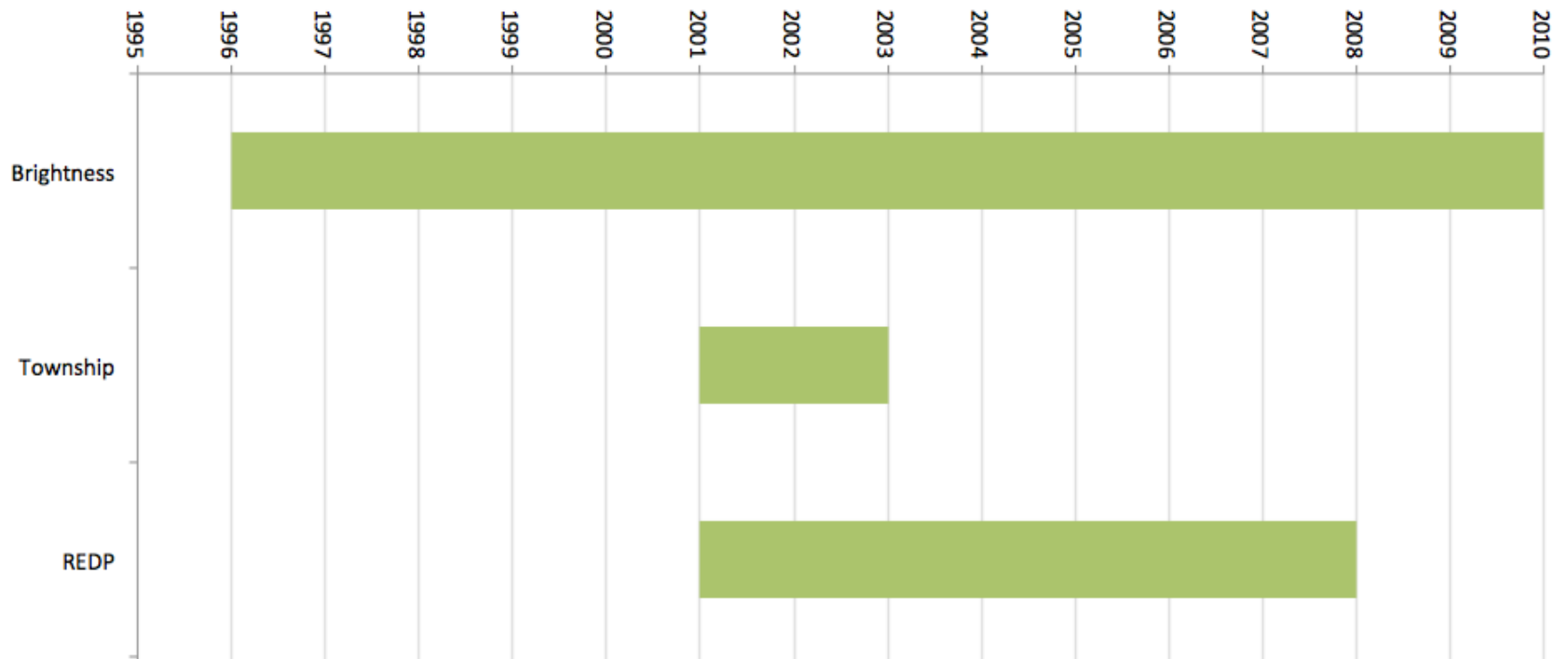
REDP, China



INSTITUTION	DATE	AIM	SCALE	LOCATION
National Development & Reform Commission/ World Bank/ Global Environment Facility	2001 – 2008	Reduce the cost of PV systems, improve PV product quality, develop the potential rural PV market and improve after-sale services for PV systems in remote rural areas.	1.61 million people*	Inner Mongolia; Gansu; Qinghai; Xinjiang; Tibet; Sichuan; Ningxia; Shan'xi and Yunnan.

* Assuming 4 people/ household

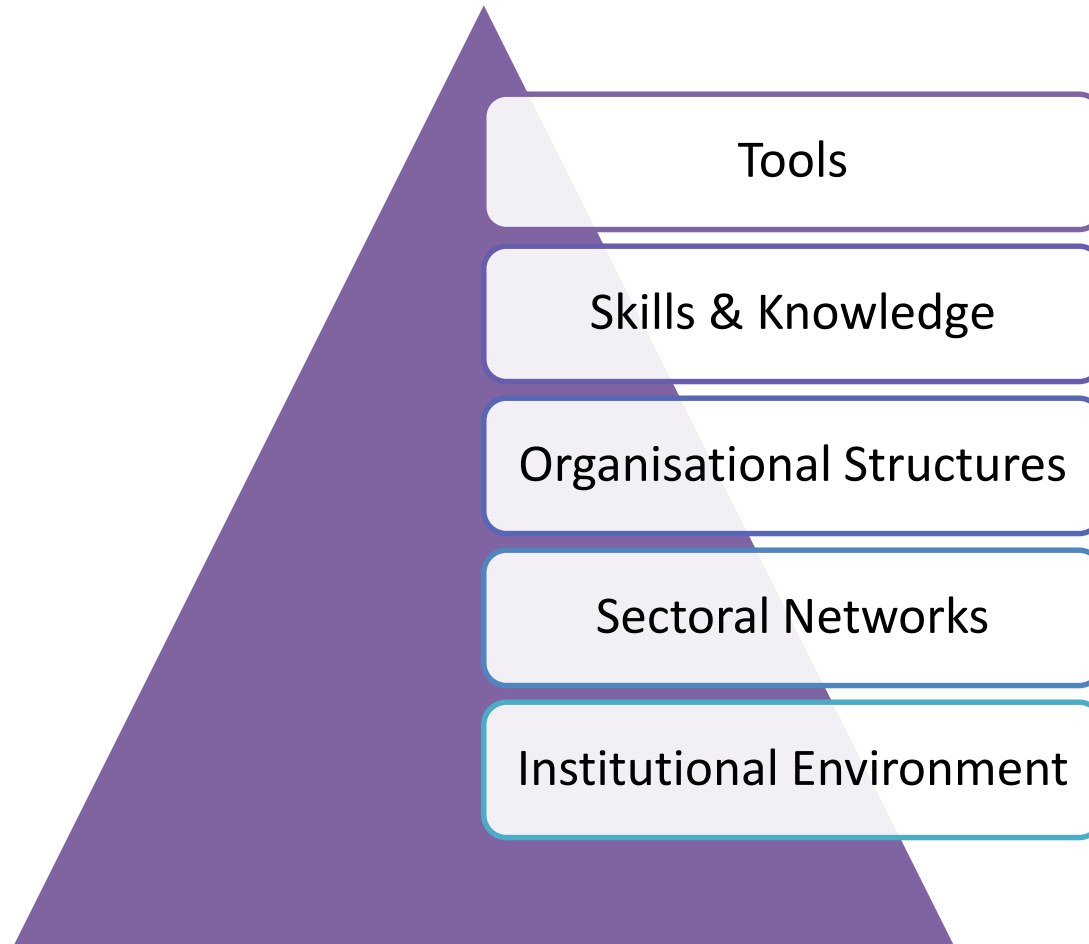
Timeline of Projects



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Analytical Framework: The RE Capacity Pyramid



Tools

Brightness Program

- Household wind/PV hybrid systems
- Subsidy

Township Program

- Wind/ PV hybrid mini-grid
- Initial grant

REDP

- Household wind/PV hybrid systems
- Subsidy

Skills & Knowledge

Brightness Program

- End-users: excellent
- Technicians: excellent

Township Program

- End-users: poor
- Local technicians: poor
- Engineers: excellent

REDP

- End-users: excellent
- Technicians: excellent

Organisational Structures

Brightness Program

- Technicians located in townships
- Established 'Brightness companies' through grants

Township Program

- Operator located in township
- Engineers located in capital city

REDP

- Technicians located in townships
- Participation from 'Brightness companies'

Sectoral Networks

Brightness Program

- Majority of supply chain located in IMAR
- Monopoly sales & service network by design

Township Program

- Majority of supply chain located in China

REDP

- Majority supply chain located in IMAR
- Monopoly sales & service network in practice

Institutional Environment

Brightness Program

- Long-term, coherent policies
- Linkages with other sectors through NDRC
- Favourable macro-economic environment

Township Program

- Good policy environment, but project did not fit with other RE in IMAR
- Needed more time for planning & consultation with other sectors
- Favourable macro-economic environment

REDP

- Flexible implementation meant that project fit with other RE in IMAR
- Long-term, coherent policies
- No linkages with other sectors
- Favourable macro-economic environment

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Tools

- Reliable hardware

Skills & Knowledge

- End-user awareness of renewable energy
- End-user technical skill
- Supply chain technical skill
- Supply chain commercial skill

Organisational Structures

- Sustainable financial arrangements
- Effectiveness
- Flexibility

Sectoral Networks

- Organisations along the whole supply chain
- Learning networks
- Advocacy coalitions

Institutional Environment

- Long-term policy frameworks
- Integrated planning
- Alignment with values & norms
- Favorable macro-economic environment

Conclusion: Success Factors

- Continuity, rather than individual projects, is most important.
- An incremental approach is useful.
- Capacity at the local, provincial and national levels.
- Resilience is an important property of capacity.

Take Home Message

1. It's always better to assess and build on existing capacity.
2. Context matters!

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