

Ears to the ground: scaling-up grassroots socio-technical innovations for adaptation in India and Africa

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I. A new politics of technology (and innovation)

Global climate policy has historically been mitigation centric. The Paris Agreement (PA) was a “significant, but not overwhelming step forward”³ in terms of the attention it gave to adaptation - attention that is critical from the perspective of India and African nations, both with populations that are particularly vulnerable because of their low adaptive capacities. Adaptation is critical to sustain economic growth and development that Africa and India are now experiencing.

The call for a ‘technological revolution’ to address the challenge of climate change is frequently echoed in the global climate policy arena⁴. Innovation is seen to be central to this revolution. However, the ‘technology innovation’ discourse continues to focus on large-scale energy and industrial technologies for mitigation. The poor in India and Africa do not benefit from sufficient technological input in their everyday lives to cope with climate impacts that are already visible. Coping with these impacts will require technological change in areas such as agriculture, water resources, disaster management, health, and human habitation.

Government led innovation initiatives and policies, for example in India, support centers of scientific research, facilitate partnerships between firms and technology institutes, foster ‘startups’ and incentivize private investment in innovation ventures. Private firms support their own technological innovation for ‘product development’ to stay in the race, catch up with competitors or leapfrog ahead in globalizing markets.

Humble technologies and grass-root innovations in sectors, which might hold promise for building adaptive capacities of communities, rarely feature in the formal foresight efforts of innovation pundits. Market signals and incentives alone are not sufficient to generate technological applications for the poor⁵. There is a need for a new politics of technology⁶.

This paper has examined documented success stories of grassroots socio-technical innovations for adaptation in India with a view to examining the enabling factors behind their success and exploring the possibility of their spread. We find that innovation and diffusion of these innovations has as much to do with the hard ‘technology’ and formal government policies as it is to do with the cultural norms and practices within which technology is embedded. Transfer of technology and ‘scaling

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³ Ian Fry, *The Paris Agreement on Climate Change and its Implications for Adaptation and Loss and Damage*, Seminar Magazine, July 2016

⁴ Mathur, V & Mohan, A, *Technology and climate change: innovation and partnerships for transformational change*, ORF Issue Brief, November 2015

⁵ Mathur, V, *Putting Technology in its place*, ORF Primer eds. Ritika Passi, 2016

⁶ Mathur, V, *Technology and Development in Africa and India: Need for a New Politics*, ORF Volume: Asia with Africa: Opportunities and Challenges eds. Urvashi Aneja, 2016

up' of success stories – for example from India to Africa, is thus likely to be a complex social process. The adaptation research community needs to outline a new research and policy agenda for scaling-up grassroots innovations.

II. Why grassroots innovation?

The dominant 'predict and provide' paradigm, for adaptation planning seeks 'downscale' global scenarios driven models outputs to local scales to predict local impacts, identify vulnerabilities and define adaptive actions. The focus of adaptation research and policy has been on reducing scientific uncertainties in the physical science basis of climate impacts rather than understanding local vulnerabilities and social responses. Lack of spatially and temporally precise and accurate foreknowledge of future climates has been used to justify inaction, confusion and the proliferation of investment in 'hard infrastructure' for adaptation. We argue, that rather than fretting over model accuracy and 'over determining fragile impact data', there needs be better understanding of how communities cope with current climate variability and extreme weather events to generate strategies and practices for coping with future impacts. For this understanding examining grassroots innovations related to current coping: dealing with droughts and extreme weather events and promoting climate smart agriculture and alternative livelihoods (that are not climate sensitive) are critical.

Grassroots innovations are socially inclusive towards vulnerable communities and seek to link science with other knowledge systems, traditional technologies, local tools and skills. We conceive these as socio-technical innovations - technologies embedded in institutions and movements/social processes, which use existing knowledge (rather than long range climate forecasts/predictions) and respond to current challenges. 'Socio-technical' regimes collate the complex interconnections between institutions, agents for technological change and social relations between actors⁷. These responses combine local/non-expert and scientific knowledge - civil society organizations, communities and expert institutions and have been successful in specific contexts but also hold potential for wider applicability. Grassroots innovations can provide benefits for adaptation where top down policies struggle as a result of their community based, contextual and localised nature⁸.

III. Some Bright spots

Grassroots innovations that address current variability can provide some basis for preparing for more extreme variability in the future.

1. Drought

With increasing unpredictability of rainfall in India on which most agriculture in the country is dependent, the Indian government is looking for ways and means to provide mobile phone based weather forecasting data. SMS based weather alert services are being provided by the Indian Meteorological Department for farmers across India. The information is then used to determine when to plant, fertilize, harvest crops and how to increase yield. While the technology is yet to be fully adopted in India with limited penetration, it has already attracted the interest of

⁷ Seyfang, G and Smith, A, *Grassroots Innovations for Sustainable Development: Towards a new research and policy agenda*, Environmental Politics, Vol 16, Aug 2007

⁸ Ibid.

African countries. The World Meteorological Organization (WMO) is working to assist African countries adopt this technology for their farmers in need of weather and market data⁹.

Another successful innovation story is the revival of traditional water conservation structures in the Bundelkhand regions of two Indian states – Uttar Pradesh and Madhya Pradesh. Failure from the government to provide adequate support during five years of drought led to villagers going back to traditional water conservation techniques. Groundwater recharge pits were dug as well renovation of wells and installation of handpumps for community use was undertaken. Ponds were also built with the help of the local village council. The initiatives led to the availability of drinking water in these villages as opposed to other rural areas nearby which continue to suffer from drought amidst lack of government intervention¹⁰.

2. *Climate Smart Agriculture*

The drought tolerant maize initiative in Africa is an example of an African success story that has potential for replication in India. The initiative was launched in 2006 through support from the Bill and Melinda Gates Foundation among others and aims to increase maize yields per hectare in conditions of moderate drought. The initiative has benefited 30-40 million people across 13 African countries through collaboration with national agricultural research systems in partner nations¹¹.

An Indian example of climate smart agriculture is the System for Rice Intensification in India (SRI) scheme. The technology developed saves water as well as enhances the yield of rice. Raising bed nursery, transplanting 8-10 day old seeding with a wider spacing as well maintaining water to saturation levels and using organic fertilizers are some of the techniques of SRI. It is estimated that SRI techniques result in savings of 30-40% of irrigation water, 80% on seed and chemical fertilizers as well as improves soil health¹². The initiative was first piloted in the Indian state of Tamil Nadu and has since gained popularity in other states across the country.

3. *Alternative Livelihoods*

Alternative ways of generating income in the face of climate change are gaining traction across India. Seaweed farming presents itself as an unusual yet potentially effective avenue to synergize the efforts to reduce both poverty and the effects of climate change. Contrary to what the name suggests, seaweed is much more than an unwanted wild plant, with a whole range of potential uses stretching across the food, textiles, pharmaceutical, and even energy industries. A tested model estimates income between Rs. 3000-4000 a month from seaweed farming¹³, which greatly exceeds the

⁹ CGIAR, April 2012, India to Triple Number of Farmers Using Mobile Phones to Get Weather and Market Data, https://ccafs.cgiar.org/news/press-releases/millions-indian-farmers-use-mobile-phones-get-weather-and-farm-advice#.V3DP_ZN95mB

¹⁰ Water Aid, *Drought and drinking water crisis in Bundelkhand*

¹¹ CIMMYT, Drought Tolerant Maize for Africa Initiative
<http://dtma.cimmyt.org/index.php/about/background>

¹² TM Thiagarajan, National Consortium on SRI, *Transforming Rice Production with SRI*,
http://www.agsri.com/images/documents/sri/sri_book_final_version.pdf

¹³ Radhika Rajasree SR & S Gayathri, *Women Enterprising in Seaweed Farming With Special References Fisherwomen Widows in Kanyakumari District Tamilnadu India*, Journal of Coastal Development, April 2014,

average monthly per capita consumer expenditure (MPCE) of Rs. 1054 in rural India. Alternative livelihood schemes, which allow a transition away from climate sensitive sectors, hold great potential for Africa as well.

4. Disaster Preparedness

Barmer Aashray Yojna is a people driven initiative with support from the SEEDS (Sustainable Environment and Ecological Development Society) in partnership with Christian Aid and ECHO (European Commission Humanitarian Aid Department) which constructed 300 houses across 15 flood-affected villages to meet immediate housing demand. The project specifically targeted marginalized families with small land holdings and lacking resources to rebuild homes after the floods. SEEDS decided against building temporary housing and instead intermediate shelters were constructed with greater strength and with in built provisions for them to be gradually altered to permanent housing. Houses were built in sync with local practices but also considering the hazard and vulnerability mapping of the area to ensure safety from future disasters¹⁴.

The Lutheran World Relief Organization is implementing a cross border early warning system in India and Nepal in Narayani/Gandak and Koshi river basin. The aim of the project is to help trans boundary communities prepare for the impact of floods as well as adapt to new conditions. Early Warning Systems (EWS) are being established along with an undertaking to strengthen local institutional capacities and mitigation measures

IV. Scaling Up?

The grassroots innovations studied have emerged in locally specific contexts. Supporting their spread – appropriation/transport to a new reality and culture is a significant challenge for research and policy. A framework of action is essential to allow for local innovation to have global impact.

Attempts to spreading adaptation successes discussed above would benefit from understanding experiences from previous grassroots movements that are relevant to adaptation efforts. In India, previous grassroots innovations movements include for example: the appropriate technology movement in the 1970s around development assistance; the People's Science Movement in the 1980s and the more recent Honey Bee Network. These movements put communities at the centre of efforts to both diffuse technologies developed by experts and incubate local efforts.

Grassroots innovations often face challenges in commercialization. Commercialising can produce dilemmas as it can seek to modify existing objectives and modes of production and resource utilisation. Attempts to anchor in government support regimes at times may not guarantee a neat 'institutional fit' resulting in stagnation and inability to consolidate innovations¹⁵. More obviously, small scale and geographical

<http://www.omicsonline.com/open-access/women-enterprising-in-seaweed-farming-with-special-references-fisherwomen-widows-in-kanyakumari-district-tamilnadu-india-1410-5217.1000383.pdf>

¹⁴ Change Alliance, Barmer Aashray Yojna, <http://www.changealliance.in/wp-content/uploads/2015/04/barmer-shelter-report1.pdf>

¹⁵ Seyfang, G and Smith, A, *Grassroots Innovations for Sustainable Development: Towards a new research and policy agenda*, Op. cit.

and contextual rootedness make scaling up and transposing challenging¹⁶. Finding a viable socio-technical niche within wider regimes is also a constraint¹⁷.

There is the question of expectations. Applying strategic niche management (SNM) theory to grassroots movements reveals the importance of managing expectations with lack of realistic and clear expectations hampering the chances for technology development and innovation¹⁸.

Despite the challenges supporting grassroots innovations should to be high on the adaptation policy agenda. Grassroots innovations can help create new institutions that may seek change at regime levels or influence incumbent interests in mainstream initiatives¹⁹. This is especially likely when regimes feel pressure for reform and radical departures from existing 'business as usual' modes. Grassroots innovations can help in "creating a space for: developing new ideas and practices; experimenting with new systems of provision; enabling people to express 'alternative' green and progressive values; and the tangible achievement of sustainability improvements albeit on a small scale²⁰."

South-South cooperation and technology transfer are much hyped yet not realized agendas. Significant opportunities exist for India and Africa work together on grassroots innovations for adaptation within the framework an existing and expanding development partnership.

¹⁶ Ibid.

¹⁷ Seyfang, G and Haxeltine, A, *Growing grassroots innovations: exploring the role of community based initiatives in governing sustainable energy transitions*, Environment and Planning C: Government and Policy 2012, volume 30, pages 381-400

¹⁸ Ibid.

¹⁹ Seyfang, G and Smith, A, *Grassroots Innovations for Sustainable Development: Towards a new research and policy agenda*, Op. cit.

²⁰ Seyfang, G and Haxeltine, A, *Growing grassroots innovations: exploring the role of community based initiatives in governing sustainable energy transitions*, Op. cit.