



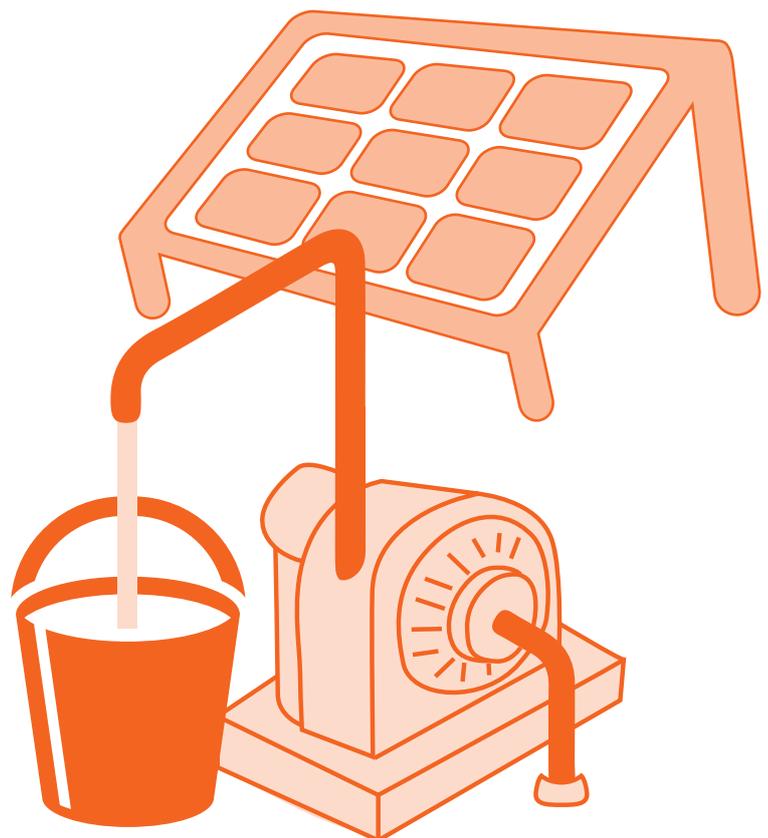
Findings from the workshop on energy and agriculture for smart villages in India



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Agriculture continues to be central to the lives and economies of rural communities in India. Many of those communities have little or no access to modern energy services. These realities motivated the holding of the workshop “Energy and agriculture for smart villages in India” in September 2016 at the International Crops Research Institute for the Semi-Arid Tropics (ICRISAT) in Patancheru, Telangana, India. The workshop was organised jointly by ICRISAT and the Smart Villages Initiative. Its aim was to examine the role of sustainable energy services in enabling rural communities in India to realise the full potential of the agricultural value chain.

This brief summarises the key findings and recommendations of the workshop for policymakers, development organisations and other stakeholders as follows:



1. India was a signatory to the agreements reached on the Sustainable Development Goals (SDGs) as well as the Paris Agreement at the UN Climate Change Conference, which commit all countries to invest in renewable energy, energy use efficiency, and energy access, including both electricity and clean cooking. Estimates suggest that agricultural productivity must increase by 70% to feed

the world population, which is expected to reach nine billion people by 2050. There is an urgent need for decision-makers to focus on promoting productive uses of energy in agricultural communities and not just household electricity connections. They must also encourage smart food production that reduces agriculture’s substantial contribu-

tion to greenhouse gas emissions.

2. India ranks second in the world in farm output, and agriculture is still the main source of income for a substantial portion of the rural population. Supply-side improvements in outputs and the efficiency of production are a priority. Moreover, access

to modern energy services is essential if rural communities are to create, and capture, more value from the agricultural value chain. Energy access creates new opportunities at every stage of the value chain, for example, through supporting pumped irrigation for increased production, enabling refrigeration, drying, etc. to reduce post-harvest losses, powering post-harvest processing to increase the value of products, and by facilitating enhanced connectivity through information and communication technologies, maximising the prices realised in the market. But to date, policies and initiatives on agricultural development in India have neglected this crucial link to energy, and in particular to the use of modern renewable energy sources such as solar, wind, and hydro. Policymakers and development organisations concerned with agriculture in India need to bring energy access to centre stage. To do so will require new initiatives to familiarise policymakers and development organisations with the opportunities arising from new energy technologies that can be applied at the village level.

3. An integrated and holistic approach to village-level development is necessary to maximise benefits: initiatives on agriculture and energy access should be closely coordinated and complemented by actions on education, healthcare, clean water and sanitation, and the stimulation of productive enterprises. Effective engagement between key actors is needed, including government (national, state,

and local), NGOs and self-help groups, corporate organisations, academia, village committees, and micro-financing institutions (including banks and international funds). Care should be taken that individual organisations, for example, providers of energy services, are not required to act outside their area of competence.

4. Farmer producer organisations, such as those supported and promoted by ICRISAT, can provide an appropriate entry point for farm interventions, encouraging interactions between farmers, research organisations, agribusinesses, and markets. Interventions should ensure that poorer farmers can participate and benefit fully, otherwise the value from schemes may gravitate towards those who are already better off.
5. Initiatives should be undertaken to promote and nurture entrepreneurship at the village level and to increase villagers' awareness of potential markets for products in rural and urban communities. Associated training schemes should be put in place, providing for the development of the relevant technical and business skills. Women have a track record as successful entrepreneurs building on their networks of contacts with family, friends, and community more generally. They have first-hand experience of the deprivations arising from a lack of energy access and the benefits that can flow from energy services. Recognising that social norms may hinder the realisation of the potential of

women as village level entrepreneurs, schemes should target women and tailor training and support to their particular challenges and opportunities.

6. Affordable finance must be made available to farmers, local businesses, and households so that they can make the necessary investments in energy access and the use of that energy to create and capture value in the agricultural value chain. This finance should preferably come through the formal and regulated financial sector rather than the informal sector, which historically has charged punitive interest rates. The banks therefore need to be motivated to provide the necessary funding through appropriate regulatory frameworks and government initiatives by building their confidence to invest in the sector (possibly with the aid of government-backed credit guarantees as an interim measure), and through initiatives to raise their awareness of the issues and opportunities in the sector. Financing schemes need to be streamlined, flexible to reflect the profile of the incomes of farmers through the year, and capable of supporting poorer farmers who may not be able to present reassuring credit histories. Well-targeted subsidies may have a role to play for such farmers.
7. Lack of access to energy is a severe restraint on opportunities for gainful employment both in the agriculture sector as well as in the non-farm rural economy. In absolute numbers, it is estimated that at least

240 million people in India are without access to electricity of which more than 90% are based in rural areas. Power capacity in India in 2015 was about 280,000 MW, of which about 80,000 MW was generated from renewable sources (hydro, 45,000; wind 25,000; solar 5,000 and solid biomass 5,000 MW). Modern renewable energy technologies should now be a priority: they can be installed quickly, and they should be deployed at the village level to provide cost-effective electricity and reduced greenhouse gas emissions. Off-grid technologies can provide electricity to remote villages where national grid extension is uneconomic; moreover, they are also needed in the many Indian villages where grid electricity supplies exist but are intermittent and unreliable. However, subsidised electricity from the grid and a lack of clarity in grid extension plans is hampering the deployment of village-level energy schemes: national and state-level policymakers need to address these sensitive issues if the contribution of local renewable energy sources is to be realised. Action should be taken to address the perception that local electricity generation provides a “second-best” option in comparison to grid electricity: in practice, it can provide villagers with a more reliable supply more quickly and contribute to meeting India’s climate change commitments.

8. Significantly more efficient technologies to use energy in the household and in the agricultural value chain are becoming available, and further developments are in the pipeline. It is important that financing is available for this energy efficient equipment as well as for electricity generation. Efficient direct current (DC) appliances powered by solar photovoltaics could play an important role substantially reducing losses in distribution and transformation. Policymakers should note the opportunities for Indian entrepreneurs to establish new manufacturing enterprises producing DC appliances which are compatible with solar PV power production.
9. Electricity access enables the deployment of modern information and communication technologies (ICT), which open up a raft of new opportunities for village level enterprises. For farmers, particularly when working collaboratively through farmer producer organisations or cooperatives, ICT enables participation in electronic markets for their products resulting in better and more secure prices, which in turn can provide them with the confidence to invest in and to trial new technologies. Governments and development organisations should support the growing range of applications of ICT to support farmers and associated local enterprises, including weather forecasting, soil health, irrigation systems,

precision agriculture, monitoring wastewater systems, and advance warnings of extreme weather events associated with climate change. Inefficient and expensive traditional extension services can be replaced by ICT-based approaches that provide up-to-date and accessible knowledge sharing and information about best practices for smallholder farmers.

10. The concept of smart villages provides a helpful holistic and appropriately ambitious vision for the development of rural communities in which agriculture and associated activities will continue to play a key role. India has an increasing number of examples of villages that are becoming smart through the catalytic impact of energy access and associated development initiatives: the experiences of these villages should be well publicised to motivate others to take the necessary steps. With the expansion of smart villages in India and elsewhere in the world, measures should be developed and deployed to evaluate progress towards achieving the vision encapsulated in the Smart Villages Initiative. Such measures should focus on the quality of life for villagers, and consequently, should include outcomes such as income levels and number of jobs created, improvements in food security, health, and education, and participation in democratic processes.

Notes

The Smart Villages Initiative

We aim to provide policymakers, donors, and development agencies concerned with rural energy access with new insights on the real barriers to energy access in villages in developing countries—technological, financial and political—and how they can be overcome. We have chosen to focus on remote off-grid villages, where local solutions (home- or institution-based systems and mini-grids) are both more realistic and cheaper than national grid extension. Our concern is to ensure that energy access results in development and the creation of ‘smart villages’ in which many of the benefits of life in modern societies are available to rural communities.

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ICRISAT

The International Crops Research Institute for the Semi-Arid-Tropics (ICRISAT) is a non-profit, nonpolitical organization that conducts agricultural research for development in Asia and sub-Saharan Africa with a wide array of partners throughout the world. Covering 6.5 million square kilometers of land in 55 countries, the semi-arid tropics have over 2 billion people, and 644 million of these are the poorest of the poor. ICRISAT innovations help the dryland poor move from poverty to prosperity by harnessing markets while managing risks – a strategy called Inclusive Market- Oriented development (IMOD). ICRISAT is headquartered in Patancheru, Hyderabad, Telangana, India, with two regional hubs and six country offices in sub-Saharan Africa. ICRISAT is a CGIAR Research Center. About ICRISAT: www.icrisat.org; For ICRISAT’s scientific information see: <http://EXPLOREit.icrisat.org>

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