Technical Expert Meetings on Mitigation
Speaker Information
Session 5: IRENA

Speaker Name: Dr. Petra Schmitter

Speaker Biography:

Petra Schmitter, is a Senior Researcher at the International Water Management Institute and leads the Research Group on Agricultural Water Management. Her main research focusses on developing suitable climate smart solutions for smallholder farmers to improve their agricultural resilience and to assess the impact of scaling those solutions on water resource availability and quality at different scales. Over the past 14 years she has mainly worked in interdisciplinary research for development projects in SE Asia, West and East Africa in the field of agricultural water management, land degradation and hydrological modeling. She enjoys evaluating suitable technologies with smallholder farmers, PhD and Msc. students and use the field evidence to drive changes in policy and development programs. She holds an MSc. in Bio-Engineering in Environmental Technology from the K.U. Leuven (2004), an Msc. in Water Resources Engineering from the K.U.Leuven – V.U.B.(2005) and a PhD in Agricultural Science from the University of Hohenheim (2011) for which she received an Award for outstanding research. She has more than 20 peer reviewed publications and contributed to book chapters around climate smart solutions to improve agricultural production.

Speaker Work/Project:

Testing of various modalities for solar based irrigation in Africa and Asia has yielded important lessons that can inform further promotion of this technology. The different modalities are variously aimed at safeguarding water resources, enhancing social inclusion and reducing the up-front cost of the technology.

In India, from just around 18,000 in 2014-15, solar powered irrigation systems (SPIS) have increased to nearly 200,000 in recent years, an annual growth rate of 68 %. The piloted Solar Power as a Remunerative Crop (SPaRC) model in Gujarat provides smallholder farmers with a remunerative incentive (US $ 109.7 MWh^{-1}) to sell solar energy to the grid in an attempt to reduce groundwater abstraction for irrigation. The pilot scheme has been providing grid-connected solar irrigation pumps to small-holder farmers under a long-term power buy-back scheme (25 years) at a remunerative price (i.e. a Feed-in-Tariff, FiT). After obtaining a 60 percent loan guarantee (and with an injection of development funds), the cooperative is in charge of covering operation, maintenance and monitoring costs of individual farms and compensating the farmers through the FiT. The Indian government has incorporated the model in its US$ 21 billion KUSUM (Kisan Urja Suraksha evam Utthan Mahabhiyan – Farmer Energy Security and Development Mission) scheme which aims at installing 2 million SIPs. Several government and donor initiatives are promoting SPIS through various subsidy modalities with the aim of reaching the poor. Examples are the support for 50,000 SPIS by 2025 under a 50 % subsidy and 30 % loan modality in Bangladesh; finance

modalities adapted to female land ownership to support the growing feminization in agriculture in Nepal and collective solar modalities to support landless and marginalized farmers in India.

Solar potential does not stay unnoticed in Africa. In Morocco, Crédit Agricole under a USD 220 million program combines subsidies for solar with drip irrigation to promote sustainable water use. The scaling of off-grid solutions in sub-Saharan Africa has seen a lower pace compared to other regions despite its huge potential and successful pilots. Barriers identified with solar scaling in sub-Saharan Africa are related to weak supply chains, high import taxes and lack of financial mechanisms. Under the Innovation Laboratory For Small Scale Irrigation funded by Feed the Future, piloting of small off-grid solar pumps resulted in the development of various business models in Ethiopia to mitigate prohibitive upfront investments costs for smallholder farmers and risks for technology suppliers and outgrowers. The Ethiopian government is about to roll out a policy to make agricultural water technologies – such as solar irrigation – tax exempt to support to stimulate the irrigation value chains in country. The aim is to increase accessibility of these technologies for farmers. IWMI is currently engaging with the Agricultural Transformation Agency to evaluate how the policy roll out in combination with financial mechanisms, to reduce upfront investment costs, should be facilitated to benefit smallholder farmers.

Moving forward learning from the success and challenges in SPIS modalities through south-south exchange is important. These learnings can help further develop context based solutions to ensure inclusive access to and benefits from SPIS whilst being environmentally sustainable:

Targeting of suitable off-or on grid solutions: A GIS based framework was developed in Ethiopia and validated for Mali and Ghana to help identify areas where off-grid SPIS would be feasible in relation to water resource availability, land use, market access, solar radiation etc. These tools can help pre-identification for SPIS investments. In Ethiopia the results showed that SPIS could transform 18% of the country's currently rainfed agricultural land and replace 11% of the hydrocarbon fuel pumps now in use.

Access to tailored financing: Contextual based innovative and inclusive finance solutions depending on the socio-economic, agricultural value chains and environmental conditions. For SPIS to be transformative and inclusive a better understanding of entry points for marginal users along the solar irrigation value chain is required. This would mean not stopping at the supply chain and access of solar but holistically bring in the various agricultural value chains and building in mechanisms for de-incentivizing over abstraction of groundwater.

Monitoring of SPIS: To ensure that solar pumping remains sustainable over the long term, however, policies and projects should encourage monitoring of environmental impacts, as on-and off-grid solar irrigation expands. With continuing development of solar pumps as well as the Internet of Things, new opportunities are emerging to provide digital and other information support for smallholder farmers, public and private sector, as they strive to adapt production to climate change, while safeguarding natural resources. Furthermore, whilst the use of renewable energy for irrigation reduces the GHG emissions from pumping the effect of agricultural

intensification through off-season cultivation and the intensification of livestock through increased access to water has not been addressed.