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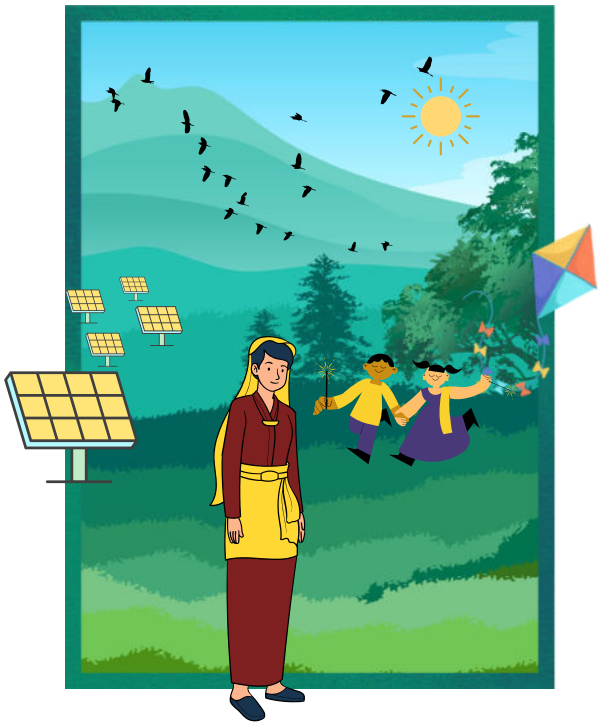

Improving equity outcomes in the solar irrigation subsidy delivery mechanism in Nepal

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Shisher Shrestha, Labisha Uprety, Kashi Kafle, Gitta Shreshtha and Aditi Mukherji

As of 2021, Nepal has installed over 2000 solar pumps. The Alternative Energy Promotion Centre (AEPC) provides a 60% subsidy to install these pumps. Data from AEPC shows that in the five years between 2016 and 2021, a total of 9100 farmers had applied for solar pumps, and 21% of those farmers, mainly from Nepal's Tarai, got these pumps. The number of pumps given was limited by budget allocation but increased over time as outlays increased. The applicant pool tended to be relatively large holder male farmers from upper castes. While choosing beneficiaries for these subsidized solar pumps, officials of the AEPC managed to allocate a larger share of pumps to those with comparatively smaller landholdings, and 22% of the beneficiaries were women. However, with no formal criteria for selecting beneficiaries, the actual allocation process is subject to the discretion of the officials. Currently, the subsidy delivery policy is being revised. Transparent and inclusive criteria for beneficiary selection, greater involvement of local government institutions in the subsidy delivery process, better after-sales services, and periodic revisions of solar pump prices are recommended. These steps will likely help create demand from more diverse groups of farmers and ensure equity outcomes in the distribution of solar irrigation subsidies.

Introduction

Tarai – the narrow strip of plains in the Himalayas' foothills – is Nepal's breadbasket. Here, groundwater is abundant, but affordable means of irrigation are lacking. Farmers rely heavily on diesel-based irrigation pumps, but with the rising costs of diesel, irrigation is becoming unaffordable for most small farmers. Affordable groundwater irrigation can help farmers intensify and diversify their cropping systems (Nepal et al. 2021). Such intensive groundwater use and consequent lowering of water tables before the monsoon through growing a dry season irrigated crop can lead to higher recharge during the rainy season in groundwater-abundant regions like Nepal's Tarai (Shamsudduha et al. 2011). However, intensifying groundwater use through diesel pumps can also increase carbon emissions. Solar irrigation pumps (SIPs) offer a low-carbon, climate-resilient technological solution. Solar irrigation is also embedded in Nepal's plan to generate more than 5000 megawatts (MW) of renewable energy by 2030, unconditionally, without external assistance, as per its Nationally Determined Contributions targets (GoN 2020a).

Subsidy-based solar irrigation pump dissemination policy of Nepal

However, the high upfront capital costs for installing SIPs can dissuade small and marginal farmers (including those from disadvantaged groups) from using these. In response, the Government of Nepal (GoN) has rolled out programs for subsidized SIPs to promote these pumps equitably throughout the country. The Alternative Energy Promotion Center (AEPC), the government nodal agency for renewable energy promotion, has financed and installed around 2433 subsidized SIPs till July 2022. Of these, a large share (~80%) of the subsidized SIPs are installed in the Tarai districts (Figure 1) (Kafle et al. 2022).

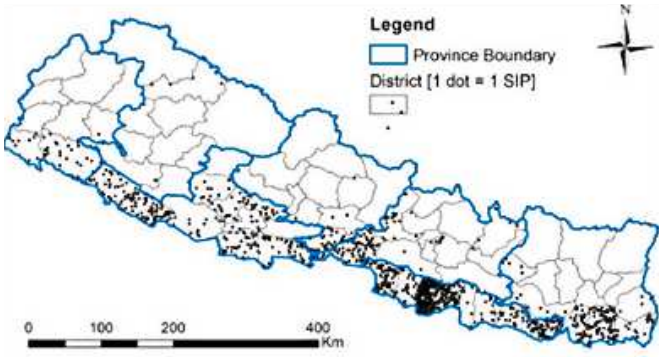

Figure 1. Distribution of SIPs in Nepal.
Source: Pandey et al. 2020

Guided by the GoN's Renewable Energy Subsidy Policy, 2016, and the Subsidy Delivery Mechanism Guidelines, 2016, AEPC offers a 60% subsidy on SIPs. The implementation of the subsidy program is a five-step process (Figure. 2) and involves several private and public entities, including the local governments or 'palikas' (Figure. 2) (Shrestha and Uprety 2021). IWMI researchers analyzed AEPC's data and conducted a desk assessment of Nepal's renewable energy policies and subsidy delivery mechanism. The study was supported by additional qualitative data from Focused Group Discussions (FGDs) and Key Informant Interviews (KIIs). Based on those interviews

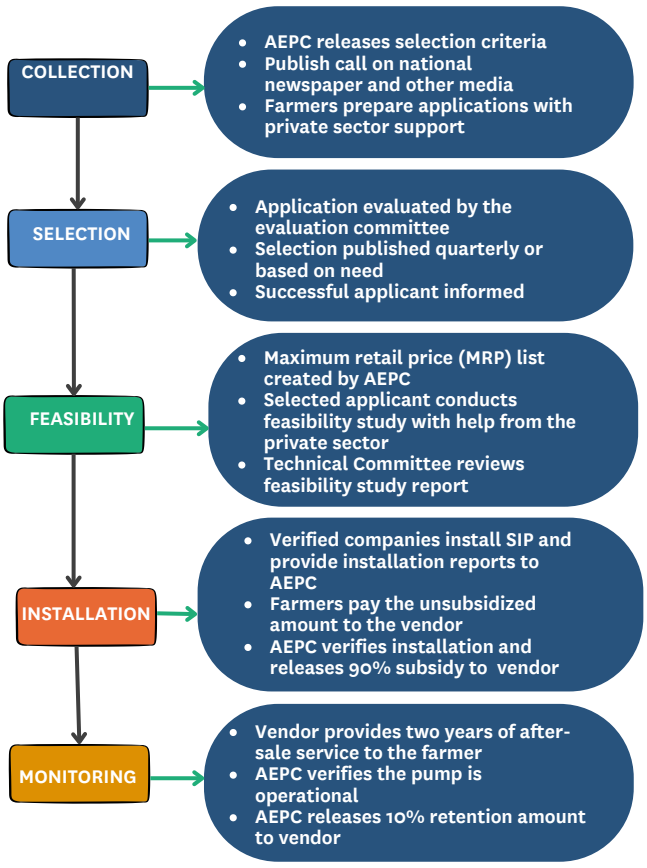

Figure 2. Process flow of AEPC's subsidy delivery mechanism
Source: Shrestha and Uprety 2021.

and data from the AEPC, the following are the main insights about Nepal's current subsidy delivery mechanism.

SIP demand is increasing, but allocations are limited due to budgetary constraints

Data from AEPC shows that in the five years between 2016 and 2021, a total of 9100 farmers had applied for solar pumps, and 21% of those farmers, mainly from Nepal's Tarai, got these pumps. The number of pumps given was limited by budget allocation but increased over time, from only 75 SIPs in 2017 to 1056 in 2019. The GoN was also actively increasing its allocation to various solar irrigation projects from USD (US dollar) 30 million in 2018 to nearly USD 90 million in 2019 (GoN 2020b). However, the number of SIPs granted dropped in 2020 due to COVID-19-related restrictions (Figure. 3).

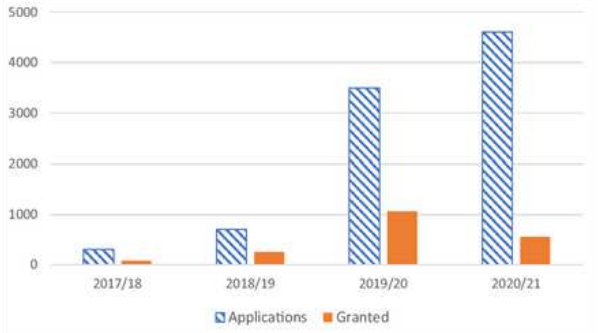

Figure 3. Number of SIP applications made vs. the number of SIPs approved by AEPC
Source: Kafle et al. 2022.

Lack of periodic SIP price revisions leads to a higher-than-necessary subsidy burden

The relevant SIP policy manuals recommend regular review of the maximum retail price (MRP) for SIPs. Yet, the lack of periodic price revision means that price of subsidized SIPs remain above the market rate. The maximum retail price of one horsepower (HP) solar pump reported by a local firm in Nepal in 2020 was USD 2500 (Kafle et al. 2022). At 60% SIP subsidy, the government doles out USD 2400 on a 1HP pump (inclusive of the cost of a 150 ft borewell), which is almost comparable to the open market price of a 1 HP pump without subsidy (Kafle et al. 2022). Downward price revision will allow the government to increase the number of beneficiaries without adding further to its subsidy burden.

Current demand collection procedures and other structural barriers discourage applications from a diverse pool of farmers

Private sector solar companies play a significant role in reaching out to farmers, informing them about the subsidy policies, and convincing them to apply for subsidized SIPs. For obvious reasons, they prefer to deal with elite farmers who have the means to pay for the upfront costs. Documentation needed for the application process, such as citizenship, land ownership, or lease agreement documents, is also not readily available to all farmers. There is also a lack of clarity on the documentation needed. For example, while recommendation from palikas is not mandatory as per the policy documents, certain palikas make such recommendations compulsory for moving the application forward (Kafle et al. 2022).
Given the structural barriers and a private sector-driven demand collection process, better-off and socially well-connected farmers were likelier to know and apply for the subsidized SIPs. Econometric analysis of SIP allocations showed that Madhesis, Dalits, and Muslims (all disadvantaged groups in the region) were about 9 % less likely than upper caste Brahmin/Chhetri applicants to get subsidized SIPs even after controlling for all other eligibility criteria (Kafle et al. 2022).

AEPC selected a higher proportion of smallholder and women farmers from the skewed applicant pool

As already mentioned, the applicant pool comprises larger farmers, with an average land holding of 3.5 bighas (~1 hectare). More than 80% of the applicants were males, and around 40% were upper-caste farmers. While no specific selection criteria for allocating subsidized solar pumps were stated in the relevant subsidy policies, AEPC officials tended to grant these subsidies to those with comparatively smaller landholdings (Figure. 3), and 22% of the beneficiaries were women. However, the overall pool of applicants was skewed towards more affluent farmers due to structural barriers preventing marginalized groups from applying. Similarly, there were no specific selection criteria, and any positive discrimination in favor of marginalized groups was based on the discretionary power of the AEPC officials and may vary from year to year.
There are at least three ways AEPC could improve its subsidy delivery performance. First, through the increased involvement of the palikas in applicant selection based on the mandated criteria; second, by explicitly stating selection criteria that

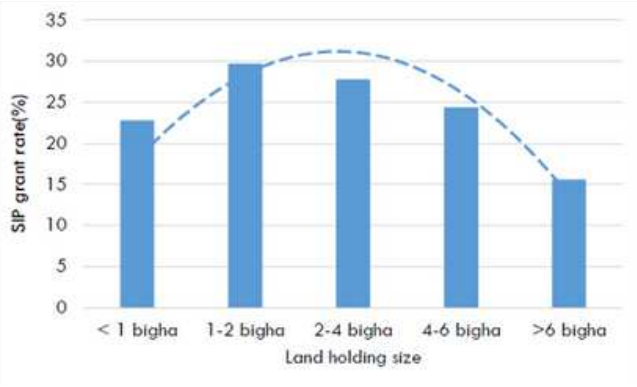

Figure 3. SIP grant rate by categories of land holding size .
Source: Pandey et al. 2020

prioritize smallholder farmers, women farmers, and farmers from disadvantaged castes and ethnic groups; and third, by providing better after-sales services, including training local technicians.

Formalizing the role of local government in the subsidy disbursement process

Even though not formally included in the subsidy disbursal policies, the palikas are already playing a critical role in the process in many ways. For example, they help solicit applications, vet applicants and act as facilitators between the private sector and the AEPC officials. In addition, many palikas are offering a top-up grant to SIP farmers to help them pay a part of the 40 % upfront costs from their budget on renewable energy. However, in the absence of institutional clarity on their role in the SIP subsidy delivery process, the palikas often exercise their discretionary power in including (or excluding) beneficiaries of their choice during the application process. Formalizing their roles in the SIP programs can minimize the chances of such discretionary exclusion while leveraging their network of social mobilizers/community volunteers to create awareness about the SIPs and improve their adoption through better targeting of beneficiaries. AEPC can train the palika representatives on the process of SIP promotion and application screening and independently monitor the process to ensure transparency and accountability. Additionally, palikas could help translate the calls into local languages (e.g., Maithili) to increase information dissemination.

Explicit selection criteria that prioritize smallholders, women farmers, and farmers from disadvantaged castes

The AEPC is currently revising its subsidy delivery policies. Based on its experience with thousands of applications and the need to choose among them, AEPC can produce a list of criteria for selecting beneficiaries. These criteria can be gender, equity, and social inclusion compliant ensuring that applicants from marginalized backgrounds get preference at the selection stage. This will ensure that the limited subsidy available for this scheme goes to the section of farmers who may need it the most.

Note: 1 Bigha = 0.677 Hectare

Improving post-installation monitoring and after-sales services

While private service providers are needed to provide 2-year complimentary after-sales service, AEPC does not monitor whether farmers receive these services regularly. As service providers are based in Kathmandu or some other regional city, many farmers report having had to wait months had to wait months to get their SIPs repaired (Shrestha and Uprety 2021). Such poor after-sales services can slow down the adoption of the systems. Capacity building of local technicians, better and prompt after-sales service with remote monitoring systems (RMUs), and third-party monitoring, are some of the policy measures that AEPC can take to ensure better operations and maintenance of the SIPs.

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The authors

Shisher Shrestha, Labisha Uprety, Kashi Kafle, Gitta Shreshtha and Aditi Mukherji are affiliated to the International Water Management Institute (IWMI).

Project

The Solar Irrigation for Agricultural Resilience in South Asia (SoLAR-SA) project aims to sustainably manage the water-energy and climate interlinkages in South Asia through the promotion of SIPs. The main goal of the project is to contribute to climate-resilient, gender-equitable, and socially inclusive agrarian livelihoods in Bangladesh, India, Nepal and Pakistan by supporting government efforts to promote solar irrigation. This project responds to government commitments to transition to clean energy pathways in agriculture. All countries in this project have NDC commitments to reduce GHG emissions and SIPs can play a significant role in reducing emissions in agriculture. https://solar.iwmi.org/

About SDC

The SoLAR -SA project is supported by the Swiss Agency for Development and Cooperation (SDC). SDC is the agency for international cooperation of the Federal Department of Foreign Affairs (FDFA). Swiss Agency for Development and Cooperation, which is an integral part of the Federal Council's foreign policy, aims to contribute to a world without poverty and in peace, for sustainable development. SDC, through its Global Programme Climate Change and Environment (GPCCE), helps find solutions to global challenges linked to climate change. It engages in global political dialogue and manages specific projects in the fields of energy, climate change adaptation, sustainable development of mountainous regions and prevention of natural hazards that are likely to influence regional and international policy.

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Contacts

Please send inquiries and comments to iwmi-solar@cgiar.org
IWMI, Nepal Office:
Manbhawan, Lalitpur – 05, Kathmandu, Nepal
Email: iwmi-nepal@cgiar.org

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International Water Management Institute (IWMI)
Headquarters
127 Sunil Mawatha, Pelawatta
Battaramulla, Sri Lanka

Mailing address:
P. O. Box 2075
Colombo, Sri Lanka
Tel: +94 11 2880000
Fax: +94 11 2786854
Email: iwmi@cgiar.org
www.iwmi.org

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