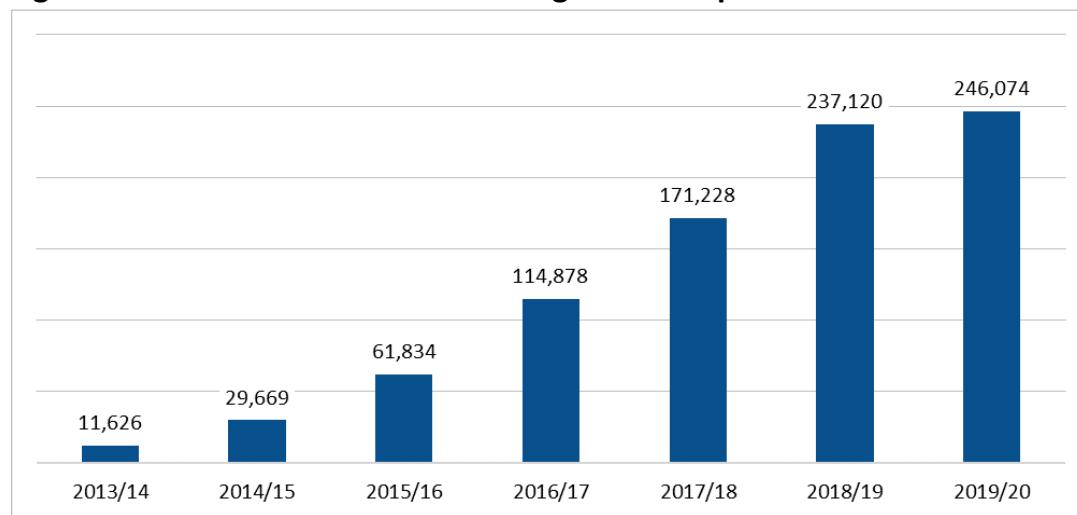


Figure 1: Number of Off-Grid Solar Irrigation Pumps Installed



Source: MNRE Annual Report FY2019/20.

Based on a literature review of various studies by electricity-related research groups¹⁰ on the implementation of solar irrigation pumps in India, we note some of the key bottlenecks slowing the uptake of solar pumps:

- **Coordination among state-level bodies:** As discussed earlier, solar irrigation pumps can help in resolving the challenges pertaining to the water-energy-food nexus. Information asymmetry across various state government bodies regarding farming issues makes the process slower. There is also a lack of coordination among the various government bodies and mismanagement of the sharing of subsidies.

For example implementation of components A and C requires coordination between the state discoms, agricultural department, minor irrigation department and any other department designated by the state government.

- **Affordability:** For components B and C of the scheme, the central and state governments provide financial assistance for 30% of the cost, the farmer pays 40% and bank financing is available for the remaining 30%.

Even then, investing in the upfront cost of the pump and accessing formal bank credit remains a challenge for small and marginal farmers.

The difficulties farmers have in accessing financing for pumps is evident in the state of Rajasthan. Reportedly, out of 623 farmers shortlisted based on their applications, 201 have deposited security money of Rs5 lakh/MW for grid-connected solar plants to power irrigation pumps. However, only 170

¹⁰ CEEW, Prayas, IISD, Dalberg.

have signed agreements with the state discoms.¹¹

Further, out of the 170 farmers who have signed agreements with discoms to set up solar plants, only around 15 have started working on these projects. The rest have yet to tie up bank funding.

Reportedly, the discoms' weak financial position and poor track record on payments are a major obstacle to banks lending for these projects. In addition, banks do not consider farmers' land to be strong collateral against the loan due to the politically sensitive nature of agriculture issues in India. Also, administrative delays could be contributing to the sluggish implementation of this pilot.

The irrigation pumps could also be used for drawing excess water and provide water-as-a-service, allowing additional revenue for the pump owner.

The assumed financial benefits of additional revenue for the pump owner from water-as-a-service has not worked out as the irrigation (water) needs are seasonal. Also, underutilisation and frequent breakdowns of the pumps further deteriorate their economic viability.

- **Asset ownership:** The different models of asset ownership – farmer, discom or developer – can play a big role in the resulting viability of the pump sets.

Also, these models could control the negative externalities such as depletion of ground water, land as well as power usage (allowing free-rider behaviour).

The International Institute for Sustainable Development (IISD) has identified four key models of asset ownership of solar irrigation pumps or solarised agricultural feeders. We list some of the key features, benefits and drawbacks of these models in the following table:

¹¹ ET Energy World. [Rajasthan: Banks' refusal to fund hits solar scheme for farmers](#). 13 April 2021.