Enhancing Rural Livelihoods

March 2018

Aga Khan Rural Support Programme India

About the Authors

Keskine Owusu Poku assessed the state of the National Rural Livelihood Mission in the Narmada district. He makes use of stakeholder engagement and qualitative analytical skills acquired at the UBC School of Public Policy and Global Affairs to determine that challenges and the pivots points of the policy and makes recommendations to guide AKRSP(I)s policy intervention strategies. He is interested in Local Governance, Politics and Security, and Poverty Alleviation.

Luis Pablo Acosta Zamora wrote the chapter on decentralization and rural governance. He believes that planning and policy making are finally entering a long-awaited stage where technocratic- and expert-based solutions lose their preponderant role and take a subordinate –but still important– place in participatory decision processes. Therefore, he finds AKRSP(I)'s effort to turn a top-down approach to decentralization originally driven by technocratic considerations into a community endeavour aimed at democratizing decision making, particularly interesting and commendable.

Sarah Froese wrote the chapter on the groundwater-agriculture-energy nexus. Her approach combines the policy analysis tools she has gained through University of British Columbia's Master of Public Policy and Global Affairs program with research skills and behavioural perspectives from her background in social psychology. She is interested in collaborative decision-making, resource and energy governance, rural development, and community well being.

Table of Contents

Acknowledgements

The authors would like to extend a sincere thank you to everyone who participated in supporting this research and hosting us during our field work.

Ahmedabad Office
Mr. Apoorva Oza
Govind Desai
Umesh Desai
Swadique EK
Elizabeth Kuroyedov

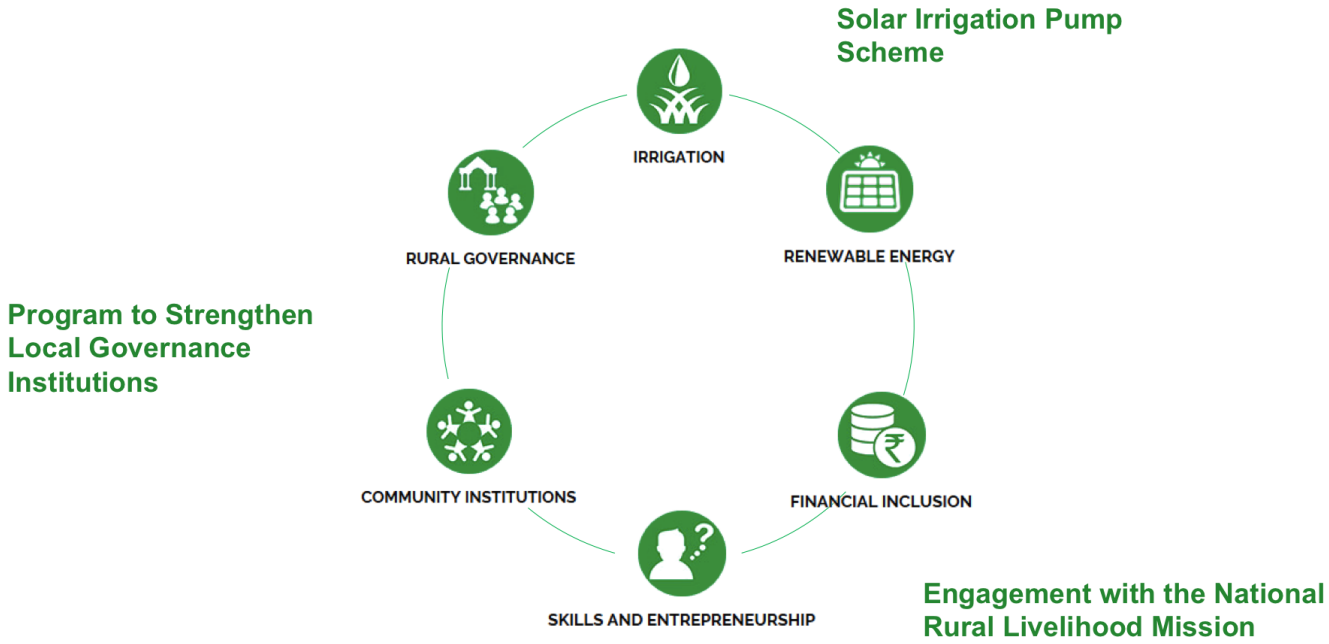
Netrang Office
Narendrabhai
Roshanbhai
Mohammad Irfan Ali
Amrutbhai
Minaben
Parsottam N. Vankar
Rakeshbhai
Mahendra Makwana
Truptiben
Saptami Dutta
Anu Shree
Gauravbhai

University of British Columbia
Shashi Enarth
Andrea Reynolds

Executive Summary

Purpose of this Report

This report was prepared by the authors, who are students in the University of British Columbia, Canada's Master of Public Policy and Global Affairs Program. The intention of this research project is to provide AKRSP(I) with valuable information and contextual insights in relation to capacity building and institutional strengthening for local governance, the National Rural Livelihood Mission (NRLM), and their solar irrigation pump (SIP) schemes. This report can serve as a resource as AKRSP(I) designs and implements its future activities.



Context

Chapter 1 has the double purpose of assessing the state of decentralization and local governance in the tribal areas of Gujarat and providing a summative evaluation of AKRSP(I)'s program for strengthening local governance institutions. The state of decentralization and local governance in Gujarat's scheduled areas is assessed by determining the degree of devolution of powers and authority to gram panchayats along the political, functional, and financial dimensions that AKRSP(I) cares the most about and is trying to impact through their program. The summative evaluation of AKRSP(I)'s program is an assessment of the consistency and perceived effectiveness of the program. Due to practical limitations described in detail in the chapter, AKRSP(I)'s model is evaluated by looking at its components and either determine if they are consistent with the policy context and the state of decentralization and local governance as perceived by the researcher or determine if they have been implemented in the field and seem to be in track of reaching it goals.

Despite the many and significant efforts undertaken by the federal government of India to decentralize governance powers and authority to gram panchayats and enhance local governance and development, these institutions remain weak and far away from the spirit and vision of the constitutional amendment that initiated the decentralization process.

Among the many factors preventing decentralization and local governance from working properly in rural Gujarat, four stand out. First, an incomplete law and policy framework that left many aspects of the

decentralization process to the discretion of the state. Second, political unwillingness on the part of the state to let go power. The best expression of this unwillingness is the small number of functions, funds, and functionaries that the state has devolved to the gram panchayats. Third, the policy inconsistencies and overlapping authority that have resulted from that absence of political will. Finally, lack of awareness and relevant skills at the local level, which are undermining the ability of rural bodies to make full use of their already limited set of powers and authority.

AKRSP(I)'s work in the field of local governance falls within this context of limited devolution, undermined autonomy and lack of skills and capacities, and is driven by the overall goal of strengthening the participation of rural citizens in local governance as a means to enhancing their access to the entitlements and basic services intended for them.

We found that AKRSP(I)'s program to strengthen local governance institutions is consistent with the policy context and the socio-economic conditions under which it operates, as well as with the organization's mission, goals and strategies. We also found anecdotic evidence that the program might be succeeding at strengthening mahila sabha and gram sabha and building capacity at the panchayat level. However, these findings must be taken with caution. On the one hand, the program has a heavy emphasis on capacity building and women empowerment, but does not aim to change the legal and policy framework of decentralization in rural Gujarat. The problem with this approach is that some of the main barriers to meaningful decentralization and good rural governance are of a legal and policy nature, which means that even in the case that the program succeeds in achieving its goals, its potential to help gram panchayats become the units of self-governance envisioned in the seventy-third constitutional amendment is limited and long term.

On the other hand, our findings cannot be used to assert that the program is successful and susceptible of being scaled up and adopted as a panchayat-led model of development planning and execution. Before such an assertion can be made, an external formal outcomes evaluation should be conducted. However, the program, as it is outlined in the internal documents we were provided with, lacks the necessary monitoring and evaluation mechanisms.

Chapter 2 focuses on the National Rural Livelihood Mission (NRLM) in the Narmada district. The pervasive nature of poverty in rural India, especially among women, Scheduled Tribes (ST) and Scheduled Caste (SC), and the inability of previous supply-driven poverty alleviation interventions of the Government of India (GOI) to resolve the poverty situation in India served as the reason for promulgating the NRLM in 2010. This policy was envisioned to be demand-driven and community owned. It is anchored on the formation of community based 10 to 15-member Self Help Groups (SHGs) in the villages who are aggregated to form Federations at the block and district levels. The NRLM has 4 guiding concepts:

1) The organization of vulnerable people into identifiable groups.
2) Training and skills development of vulnerable people.
3) Enhancing the financial inclusion of the poor as a means of harnessing their entrepreneurial abilities.
4) Livelihood empowerment and improvement.

In Gujarat, the Gujarat Livelihood Promotion Company (GLPC) is responsible for the implementation of the NRLM. It is charged with the pursuit of the following objectives:

1) Empowering the Poor by organizing them into SHGs/Federations/other Collectives.
2) Empower the poor through ensuring access to Financial Services.
3) Augmenting existing livelihoods and enhancing incomes.
4) Explore livelihood opportunities through newer ventures in rural service sector.
5) Developing inclusive value chains." (Commissionerate of Rural Development, 2018).

This section of the report makes recommendations to AKRSP(I) after identifying major pivot points of the policy that require policy interventions to augment the efforts of the GLPC. Considering the relatively

young nature of the policy and the fact that SHGs were not formed around the same time, the report is unable to conclude as to whether the policy is failing or its being successful. However, some challenges that have inherent implications for the success of the NRLM were identified.

Chapter 3 explores the impact of AKRSP(I) solar irrigation pump program and future plans in relation to salient issues in the groundwater-agriculture-energy nexus.

Perverse electricity subsidies and agricultural intensification have led to the depletion of groundwater resources in ten Indian states, including Gujarat. In the long term, water shortages may threaten the livelihoods that have been built upon these policies and practices. At the same time many farmers continue to rely on rain-fed agriculture or expensive, air-polluting diesel pump irrigation systems. Lack of access to dependable, affordable energy and irrigation systems hinders agricultural profitability and leaves farmers vulnerable to climate and economic shocks.

Although groundwater levels are more critical in other states, groundwater development in Gujarat is estimated at 67 % as of 2011 (PRS Legislative Research India). In many south-eastern districts such as Surat (the location of research) development is lower than in central and northern regions (Shag et. al, 2008). In the south-east many farmers do not yet have access to an agricultural grid connection (PRS Legislative Research, 2017). Joint national and state level schemes such as the Deen Dayal Upadhyaya Gram Jyoti Yojana and Pradhan Mantri Sahaj Bijli Har Ghar Yojana (or Saubhagya), however, continue to advance the project of rural electrification and last mile connectivity, which could allow farmers to pursue further groundwater development in these regions.

With respect to small-scale agriculture, solar photovoltaic pump irrigation systems are a proposed alternative to rain-fed, grid, and diesel powered systems. Solar power systems have the potential to serve as an energy resource for those not able to avail themselves of conventional electricity, and may be more sustainable in comparison to grid and diesel. However, groundwater scarcity in the region remains problematic and further groundwater development via any energy system must be undertaken cautiously. The challenge is to adopt irrigation practices in a way that promotes long-term sustainability. This is in the interest of the farmers and communities that AKRSP(I) works with.

Since 2016 AKRSP(I) has implemented 20 solar irrigation schemes in the districts of Dangs and Surat. The rationale for, and hypothesized benefits of solar irrigation in these regions are as follows.

1) There is low penetration of agricultural electricity connections in Surat. Transitioning to solar from rain-fed or diesel powered irrigation will increase economic benefits through enabling irrigation and reducing fuel costs, respectively.

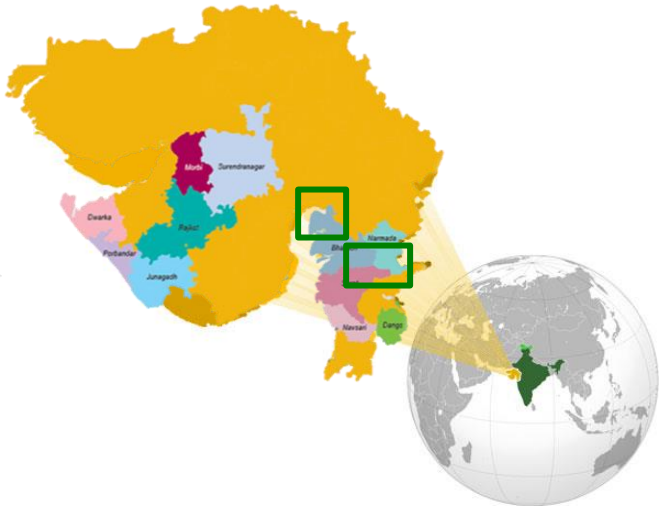
2) Low incremental costs of operating solar irrigation systems will provide an economic buffer against poor cropping seasons.

3) Solar systems will promote responsible groundwater use via their limited pumping depth capacity while meeting the irrigation needs of small shareholders.

The purpose of this report is to provide an interim assessment of AKRSP(I)'s Solar Energy Irrigation System program and analyse the technical, economic, and institutional viability of the program in relation to broader contextual economic, social, political, and environmental issues. This analysis will conclude with recommendations to AKRSP(I) on how the organization can promote agricultural livelihood development in the context of the groundwater-agriculture-energy nexus.

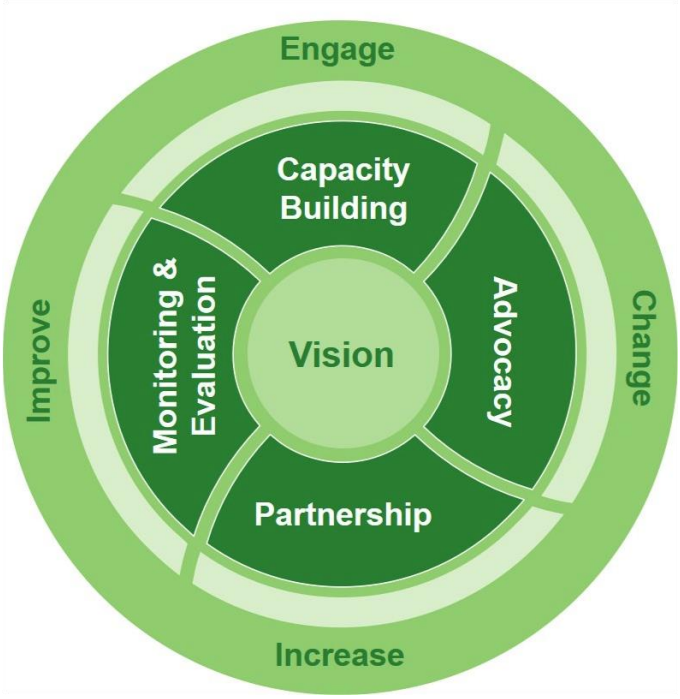
Research Methodology and Analytical Framework

This research involved literature reviews, stakeholder interviews, focus groups, and site visits in Ahmedabad, Netrang, and villages in Surat and Narmada Districts. Various stakeholders were engaged including AKRSP(I) staff, government representatives, local elected officials, program beneficiaries and participants, non-beneficiaries, and scholars and experts from other NGOs.



The following framework has been developed in order to understand the way AKRSP(I) engages with the restrictive, and sometimes inconsistent policy and legal context in which it operates. Each of these four components informs AKRSP(I)'s interventions. At the core of this is their vision of enhancing rural livelihoods.

The first strategy is capacity building. AKRSP(I) builds capacity among rural people so that they can effectively engage with their communities and relevant government schemes.



Secondly, They advocate for policy change directly by developing and proposing models and programs to the government, and indirectly through their capacity building efforts.

Thirdly, by forming partnerships with NGOs, government, communities, and business they aim to increase the scope and impact of their work

Finally, Monitoring and evaluation provides AKRSP(I) the insight it needs to improve its programs, present evidence based proposals to partners, and support its advocacy efforts.

As a holistic framework that situates each of AKRSP(I)'s activities within a cohesive set of strategies, the analysis and recommendations provided flow from this understanding.

Recommendations

Decentralization and Rural Governance

1) Regarding the capacity building strategy in the analytical framework described above, we recommend to AKRSP(I) to reinforce the budgeting and planning skills, as this was perceived as the weakest aspect of the program's capacity building component.

2) No single organization can address all factors of poor rural governance, particularly when top-down decisions are needed to improve the legal and policy framework and increase the degree of autonomy with which gram panchayats operate. In cases like this, partnership and advocacy are key. We suggest that AKRSP(I) partner with other organizations across India to form a coalition that calls for a more detailed description of the national laws, policies and processes underpinning rural decentralization. The states' willingness to decentralize power and authority to the rural governments is not likely to happen spontaneously; therefore, their margin of discretion must be reduced. Achieving this is of paramount importance, as the ability of the states to undermine the panchayats' autonomy makes unsustainable every single effort to build capacity in these rural bodies.

3) At the regional level, AKRSP(I) can partner with other organizations to develop and advocate for a shared road map for an orderly and mandatory transfer of functions, funds and functionaries to gram panchayats. Articulating a detailed road map for functional, financial and administrative devolution can be a powerful mechanism to achieve the spirit of the 73rd Constitutional Amendment, as it would stand as both a benchmark and an assessment tool for the state's actions (or inactions). In this road map, one of the first steps –both in chronological and relevance terms– should be to increase the fiscal domain of gram panchayats by allowing them to fully exercise their power to impose local taxes and fees and by transferring to them development budget from the state and district panchayats. This implies increasing the capacity of panchayats to enforce tax collection and administer revenue as well as creating the right incentives by paying elected members for their work.

4) In partnership with other state organizations, review the rationale behind the policy to not pay the elected members of the gram panchayats. If no good reason is found, pilot an innovative mechanism to demonstrate the effect of payment on commitment and performance, and afterwards advocate for a change in this policy.

5) The program's potential to develop a role model that could serve as a basis to advocate for policy changes is constrained by the lack of monitoring and evaluation mechanisms. The recommendation is straightforward: reinforce the program with the missing mechanisms, ensuring that the data required to conduct any type of evaluations in the future is being gathered, and conduct an external and independent outcomes-based evaluation once the program has been fully implemented. By doing this, AKRSP(I) would also be securing the information they need to determine whether this program is better –in terms of cost-effectiveness or sustainability– than their other programs aimed at improving local governance.

National Rural Livelihood Mission

The non-involvement of the local government bodies (Panchayats) and the knowledge gap that exist between community people and the bureaucrats presents an organizational challenge. Some participants of the research knew little or nothing about the existence of the policy. For example, the participants from Kolivada (a village within the Sagbara block) intimated that the village does not have a

single SHG and they were oblivious of the existence of the policy. Again, all Panchayat members that were interviewed, except for one, knew nothing about the operations of the GLPC in their community even though Panchayat leaders are required to play a role in identifying the vulnerable people in their area.

Financial inclusion remains a challenge. In a competitive financial market, money suppliers seek to maximize their gains and reduce their risk. Mainstream banks therefore find it profitable to deal with firms and other entities that guarantee a lesser risk, lesser cost, and more rewarding outcomes on loans. Mainstream banks find it convenient giving loans to firms that can provide collaterals rather than SHGs. This has created an opportunity for the informal lenders to exploit the situation, sometimes charging as high as 60% to 100% on loans. In between the mainstream banks which provide loans at 8% and the informal lending sector are the Federations. Federations provide loans at 24%, which if strengthened, can be a viable alternative to the mainstream banks.

After the analysis, it was recommended that the AKRSP(I) should consider building a working partnership with the GLPC to contribute to the delivery of their shared values. AKRSP(I), with their level of experience in creating models, should consider moving beyond a grantor-grantee relation to a co-designer of models with the GLPC. Specific aspects of the NRLM that AKRSP(I) can contribute to include:

1) Provide training and skill development workshops for all SHGs members.
2) Collaborate with the Monitoring and Evaluation department of the GLPC to develop a framework for evaluation the progress of the NRLM.
3) Assist with the public education on the NRLM through the strong network that the client has established across villages.
4) Strengthen the Federations to be an alternative source of financial inclusion for the SHGs.
5) Advocate for the inclusion of non-federated SHGs into Federations.
6) Collaborate with the GLPC to identify other potential sources of livelihood in the rural areas beyond farming and diary.

AKRSP(I) is positioned to meet these identified challenges for three main reasons: (1) Has a training facility that is dedicated to training and workshop programmes. (2) AKRSP(I)s current framework of training the ‘trainees trainer’ appears more effective at transferring knowledge and skills to the community. Starting with the SHG leader who serve as the trainer for the SHG members, the trainees trainer concept helps to transfer knowledge and skills to many people. (3) As an NGO, AKRSP(I) is on the constant look out for best practices in governance, leadership, and social inclusion. There is a high tendency that AKRSP(I) will adopt new and changing trends in governance than the bureaucracy.

Again, considering the similarity in the vision, mission, and strategies of AKRSP(I) and GLPC, and the GLPCs expression of readiness to “forge partnerships with other non-government organizations and corporate houses for inclusive growth and the empowerment of the members of the groups served” (Mission Mangalam GLPC, 2018), these identified challenges in the implementation of the NRLM presents a good opportunity for AKRSP(I) to collaborate with the GLPC in pursuit of their shared values like social inclusion, poverty alleviation, women empowerment, rural development, and the creation of strong community-based organizations.

AKRSP(I)’s Solar Irrigation Pump Scheme

Thus far, AKRSP(I)’s solar irrigation program is largely on track to deliver it’s objectives, including increasing agricultural output, promoting self-sufficiency, fostering equity, supporting environmentally sustainable agriculture, and enhancing quality of life. However, given the recent implementation of this project, this report serves as an interim and forward-looking analysis. A fuller indication of impacts will be more apparent after at least one irrigated cropping season.

Assessing current conditions suggest that although environmental challenges exist, there is a unique window of opportunity afforded by political and social support for solar technology, and the declining cost of solar technology. This report makes the following recommendations based on an analysis of AKRSP(I)'s existing program and anticipated factors of success. This includes financial sustainability, partnership, environmental sustainability, legal and policy environment, learning, and information. Market development and social support are also considered.

Program Impact

1) Training: In addition to baseline training offer opportunities for ongoing technical training once installations are in use and for those who would like to specialize in SIP maintenance

2) Planning and Institutional Strength: Support the development of organizational systems within groups by offering special leadership training to peer-selected group leaders.

   - Assist in developing the institutional foundations and mechanisms within groups. This should include provisions for.
   - Clear delineation of participants' responsibilities and the roles of AKRSP(I), government, DGVCL, SIP companies, and other stakeholders. This should be especially clear with regard to financing, the FIT rates and payments, and other key provisions of the agreement with DGVCL (such as length of contract and the implications of this, and relinquishment of right to an electricity connection).
   - A secretary position that represents the whole group, and is supported by the leaders from each subgroup. The person in this position should be the key liaison with government and AKRSP(I), and should receive financial compensation in return.
   - A corpus fund to which participants make monthly contributions. This fund should be managed by the secretary, and should be used to pay this person's salary, save for administrative and maintenance costs, and account for the depreciation of the SIP systems.
   - Bi-weekly meetings amongst subgroup members and monthly meetings between all members of the group

3) Inclusion

   - If LNG Hazira is to select the groups, enable AKRSP(I) workers familiar with candidates to inform the decision and correct misperceptions. However, ideally AKRSP(I) would be responsible for final selection.
   - Expand selection criteria to those who have participated in government groupwell projects if they are functioning well and meet other criteria, and look to incorporate excluded individuals into existing groups.
   - Continue to incorporate women into the program, and support them as leaders of groups and subgroups with additional training.
   - Ensure that women are represented and involved in the planning, implementation, and evaluation of the program moving forward. This applies to AKRSP(I) staff in the national, regional, and field offices as well as to participants.

4) Water Management and Conservation

   - Align resources and training regarding drip irrigation, conservation agriculture, and system of rice intensification (SRI) as able and appropriate.
   - Ensure an adequate FIT in the next project phase. Participants in Dhundi were able to lower the cost of irrigation services through solar and still receive more than the rate offered by MGVCL. While it is not necessary to minimize water markets, appropriate valuation of the resource can be encouraged through a competitive FIT.
   - Install metres on existing pumps so that farmers can monitor their energy use.

Partnership, Financial Sustainability, and Legal and Policy Environment

1) Develop an MOU with GEDA to leverage state and national funding for SIPs.

2) Propose a research project with IWMI and CGIAR Research Program on Climate Change, Agriculture, and Food Security (CCAFS) to leverage their expertise from working in Dhundi, their experience negotiating and facilitating an agreement with MGVCL.

3) Demonstrate the financial benefits to MGVCL of them not being required to provide subsidized electricity and explore the potential for a variable FIT.

4) Partner with financial institutions to develop financing and repayment plans for participants.

5) Facilitate the participation of local panchayats in SIP program as they related to government schemes through capacity building and planning initiatives.

6) Advocate for a lower threshold to participation in government-funded SIP programming with regard to identification and documentation.

7) Advocate for a reduction in grid electricity subsidies. They contribute to the over exploitation of groundwater and may present a barrier to the adoption of solar by those who currently have agricultural grid connections.

Learning and Information

1) Increase and formalize communication mechanisms between AKRSP(I) staff in different offices to coordinate the flow of knowledge and information, and co-develop program goals based on this respective knowledge.

2) Ensure that there is a designated person to handle research and evaluation activities at the national and regional office.

3) Hold a fair and workshop day involving AKRSP(I) staff from the national, regional, and field offices; participants in the first program phase; upcoming and potential participants; and industry and research experts to facilitate knowledge exchange and identify areas for change and action. This can involve informative talks, structured focus group sessions, and time for informal dialogue.

4) Incorporate ongoing evaluation provisions into the donor agreement in with LNG Hazira.

5) Request better information regarding the government of Gujarat's SIP scheme and current progress.

6) Incorporate education on broader energy, groundwater, and agriculture issues into training.

Moving forward, AKRSP(I) can consider these options as ways to enhance its activities as they relate to livelihood development and resource management through SIPs.

Chapter 1: Decentralization and rural governance. Strengthening gram panchayats in rural Gujarat

Introduction

The federal government of India has undertaken many and significant efforts to decentralize governance powers and authority to the sub-state rural bodies called panchayats. The most relevant and far-reaching efforts are the Constitution (Seventy-Third Amendment) Act, passed on 1992 and in force since 1993, and the Provisions of the Panchayats (Extension to Scheduled Areas) Act (PESA), enacted in 1996 to extend the decentralization process mandated in the seventy-third amendment to the scheduled areas of the country, with the aim of ensuring self-governance through gram sabha, a general assembly composed of all adult persons residing in a village or a group of villages. More recently, the Fourteenth Finance Commission (FFC), constituted by the President of India in 2013 to make recommendations for the period 2015-20, recommended to give INR 2 lakh crore[1] to gram panchayats between 2015 and 2020 to foster the development of local governance at the village level. The government adopted the recommendation and emitted guidelines to ensure its adequate implementation, initiating what should have been an ambitious, nation-wide capacity building and planning program.

The seventy-third constitutional amendment and PESA left many important aspects of the decentralization process to the discretion of each individual state. This resulted in important variations across states in the design, scope, and extent of devolution of powers and authority to rural local governments. Some states even enacted or reformed existing state-level laws and policies to hinder the decentralization process, and most of them have done little to improve the socio-economic conditions that are necessary to enhance rural governance and create local demand for more decentralization.

The incomplete description of the national provisions and policies, the variable degree of political willingness showed by the different states to effectively devolve powers and authority to rural governments, particularly to the gram panchayats, and the variability in socio-economic local conditions have resulted in decentralization taking different forms and achieving different degrees of success across states. However, it is commonly acknowledged that in general the results of decentralization have been unsatisfactory along the many criteria that have been used to assess it. Decentralization has not empowered rural governments by meaningfully devolving them with the functions, funds, and functionaries necessary for them to function as units of self-governance; it has not improved local governance nor strengthened planning and administrative capacities in the rural areas, and it has not increased the efficiency of the bureaucratic structures –it some states, it has even created a parallel bureaucratic apparatus that supplements the lack of administrative and financial capacity of the rural bodies and ensures that local governments are used as a vehicle to fulfill the states' goals.

This chapter describes the results of a policy research project conducted with the double purpose of assessing the state of decentralization and local governance in the tribal areas of the state of Gujarat and providing a summative evaluation of AKRSP(I)'s program for strengthening local governance institutions.

Methodology

The state of decentralization and local governance in the scheduled areas of Gujarat is assessed by determining the degree of devolution of powers and authority to gram panchayats. Devolution is

[1] Two trillion rupees, equivalent to approximately 38.8 billion Canadian dollars.

assessed along its three main dimensions: political, functional, and financial, with the emphasis on the aspects of each dimension that AKRSP(I) cares the most about and is trying to impact through its program, which implied extending the scope of this framework by including the topic of capacity building. The assessment is done using qualitative case study methodology. The analysis of findings is supported by the information obtained from a review of the literature on decentralization and local governance in India and from interviews with AKRSP(I) staff as well as scholars and activists.

The summative evaluation of AKRSP(I)'s program for strengthening local governance institutions is an evaluation of the consistency and perceived effectiveness of the program. Ideally, this evaluation should have been done by comparing the functioning of the gram panchayats where AKRSP(I) is intervening with that of the gram panchayats where the organization is not working. However, the researcher was unable to visit any gram panchayat or talk to any elected member or community member from a place where the organization has no presence. This problem was exacerbated by the fact that AKRSP(I) implemented the program in places where they have already been working on other livelihood strengthening projects. This rendered inadequate not only the original intention of assessing the model by comparing gram panchayats with intervention against gram panchayats without it, but also the intention of deriving lessons and identifying good practices, since there is no point of comparison that could be used to ponder whether any apparently favorable outcome could be due exclusively to AKRSP(I)'s program to strengthening local governance institutions. Given these limitation, the only way to evaluate AKRSP(I)'s program is to look at its components and either determine if they are consistent with the stated goals of the program, the barriers expressed in the literature and the state of decentralization and local governance in the gram panchayats as perceived by the researcher or determine if they have been implemented in the field and reaching it goals.

The field work covered eight gram panchayats belonging to the blocks of Sagbara and Dediapada, both in the district of Narmada. A total of 17 semi-structured interviews were conducted. 10 interviews were held with one or more gram panchayat elected members belonging to different eight gram panchayats, three with one or more community leaders that are not panchayat members, one with the development officer of the Sagbara block, one with the Senior Manager of Governance and Institutions at AKRSP(I), and two with scholars who have been promoting local governance and participatory processes for many years and possess a deep understanding of Gujarat's realities. 8 interviews were one-on-one interviews; the other 9 took the form of a focus group.

All interviews except 3 were conducted with the help of an interpreter. In many cases, two or more interpreters were needed, since our interpreters did not speak Gujarati and there were cases where the interviewees did not speak Hindi or Gujarati but only their own dialect. The language gap and the reliance on an interpreter have the possibility of having affected the true meaning of what participants said.

By design, all findings are qualitative.

Policy Context and AKRSP(I)'s Model of Intervention

Too many factors are preventing decentralization and rural governance –i.e. the Panchayati Raj System[2]– from working properly in rural Gujarat. First, an incomplete legal and policy framework, starting with the main constitutional and legal provisions and ending with the description of the planning process necessary to implement the recommendations of the Fourteenth Finance Commission, left many aspects to the discretion of each state. Second, the political unwillingness on the part of the state

[2] The Panchayati Raj System is a three-tier structure of rural local self-government bodies. In this system, the lower tier institution is the village-level body called gram panchayat (or village panchayat). The gram sabha is a legal general assembly consisting of all adults who reside in the area covered by a gram panchayat (an area that could comprise a village or a group of villages).

to let go power and the policy inconsistency and overlapping authority that have resulted from it are hindering the implementation of an already incomplete framework. The best expression of the lack of political will is the small number of functions, funds, and functionaries that have been devolved to the gram panchayats (see the section "Functional devolution" below), while policy inconsistency and overlapping authority are clearly exemplified in the case of water and forest management. Under PESA, these subject matters are the gram panchayats' jurisdiction, but state laws and policies give state departments control over the same resources. Lastly, the lack of awareness and relevant skills at the local level are undermining the ability of rural bodies to make full use of their already limited set of powers and authority.

AKRSP(I)'s work in the field of local governance falls within this context. The overall goal of the organization's efforts is to strengthen the participation of rural citizens in local governance in order to enhance access to the entitlements and basic services intended for them.

AKRSP(I) has put in place a specific program aimed at strengthening local governance institutions. The program's goal is to enable gram sabha and gram panchayat to perform their governance role in local planning, delivery of services and monitoring of public schemes in an effective, transparent and accountable way. The strategy is to bring citizens, panchayats and government administration on one platform, and to establish a smooth communication –two-way flow of information: data, execution actions, results, etc.– among all these three key stakeholders. The program's underlying assumption is that soochna (information) will lead to sahbhagita (participation), which in turn will lead to sushasan (good governance).

The platform is called Nagrik Soochna Kendra (Civic Information Center in Hindi). It is a physical and institutional space where information and knowledge about decentralised governance, public services, and access to government schemes are gathered and shared. As a resource centre, NSK enables the members of the panchayati raj institutions to play and effective role in local planning and implementation of schemes and services, and simultaneously facilitates citizens access to government schemes.

The program has three main components: 1) strengthening of mahila sabha (lady house or women assembly) and gram sabha; 2) panchayat capacity building –knowledge and information support, vision building, planning and budgeting exercises, financial support, and panchayat level information system; and 3) enhancing of supply side interventions –collaboration with the government administration to bridge the information gap between the gram panchayats and the state government as well as develop more collaborative action between different departments.

Our fieldwork allowed us to gather information on the first and second components only. Our findings are presented and analyzed in the next sections.

The program is expected to help AKRSP(I) develop "role model panchayats" to demonstrate the importance and effectiveness of panchayat-led model of development planning and execution.

Findings

Devolution of powers and authority

In a midterm overview of the initiative to revitalize local government in India, focused on the extent to which devolution of powers and resources had been attempted by the states, Chaudhuri (2006) found that Gujarat was among the states that had displayed minimal progress toward devolution.

We found that the state of devolution remains the same in the visited tribal villages.

Political devolution

The degree of political devolution was assessed looking at four aspects of this dimension: regular elections, women's representation, gram sabha, and political autonomy. This type of devolution is the one that has been implemented more extensively –at least on paper–, perhaps because the mandatory provisions of the seventy-third amendment –i.e., those that the state governments needed to take as per the specific terms of the act– where the ones dealing with the structure of representative democracy and political representation (Chaudhuri, 2006, p. 158).

We found out that in all 8 gram panchayats, elections have been held every five years.

We were not able to determine if mandatory representation for women has been observed, but we did encounter that women participation in gram panchayats is weak and/or ineffective, since most women were silent during interviews or appeared to have little knowledge of and involvement in the village's planning and problem-solving. In many times, their place and role has been effectively taken over by their husband.

Gram sabha has formally been working according to PESA, but in fact has been used by the state to advance their own goals, via either the block development officer or the gram panchayat secretary. These are public officials appointed by the state government who have the power to set the agenda of the gram sabha meetings, which allows them to influence the gram panchayat's work. All gram sabhas of the visited gram panchayats had the same issues on their agendas and only a few claimed to have expanded the agenda beyond what the secretary brought into it. While it is reasonable to assume that villages and panchayats belonging to the same region share some common problems, it is hard to think that they do not have specific issues, needs, and preferences that should have been expressed in the agenda.

The same thing happened with the village development plan (VDP). All villages have developed their plan, but all plans include the same topics, as if plans are being used by the state to ensure that the FFC grant is used in a way that is conducive to its goals. This resulted in all villages using the grant for the same purpose. As the electorate of a village panchayat, gram sabha is supposed to be a more direct channel through which citizens could exercise "voice" and participate in local governance. Regular meetings over the course of the year should allow these bodies play a key role in both the planning and subsequent monitoring of development activities. But the current practice has turned these bodies into a legitimacy assembly for the states priorities communicated via the appointed members of the block panchayat.

The fact that the state legislation vests the block secretary with the authority to intervene in the functioning of rural local bodies by setting the agenda of the gram sabha meetings, seriously reduces the political autonomy afforded to gram sabha and to locally elected representatives[3].

Functional devolution

The following table shows the 29 subject matters that could have been transferred to the gram panchayats under the Eleventh Schedule (first column), the subject matters that were formally devolved by the state under the Gujarat Panchayats Act (second column), and the subject matters which according to our interviews and observations during the field research have been de facto devolved (third column). As the table indicates, out of the 29 functions that could have been devolved, only 14 were transferred; and out of these 14, gram panchayats are exercising only a few.

[3] This is further exacerbated by the limited planning and budgeting skills of the panchayat members and by the fact that they are not paid and consequently have little incentives and opportunities to fully involve in their roles. Only the secretary is paid. By the state, not by the gram panchayat. Therefore, he is accountable to the state, not to the village.

TRANSFERABLE SUBJECT MATTERS (Eleventh Schedule)	TRANSFERRED BY LAW (Gujarat Panchayats Act)	EVIDENCE OF ACTUAL DEVOLUTION TO GP
Agriculture, including agricultural extension	Yes	No
Land improvement, implementation of land reforms, land consolidation and soil conservation.	No	No
Minor irrigation, water management and watershed development	Yes	Yes
Animal husbandry, dairying and poultry	No	No
Fisheries	No	No
Social forestry and farm forestry	No	No
Minor forest produce	Non-timber forest produce	No
Small scale industries, including food processing industries	No	No
Khadi, village and cottage industries	No	No
Rural housing	Yes	Constrained
Drinking water	Yes	Constrained
Fuel and fodder	Fire wood and grass	Yes
Roads, culverts, bridges, ferries, waterways and other means of communication	Road and bridge construction	Yes
Rural electrification, including distribution of electricity	No	No
Non-conventional energy sources	No	No
Poverty alleviation programme	Yes	Constrained
Education, including primary and secondary schools	No	No
Technical training and vocational education	No	No
Adult and non-formal education	No	No
Libraries	No	No
Cultural activities	No	No
Markets and fairs	Yes	No
Health and sanitation, including hospitals, primary health centres and dispensaries	Health and sanitation	No
Family welfare	Yes	Constrained
Women and child development	Yes	Constrained
Social welfare, including welfare of the handicapped and mentally retarded	No	No
Welfare of the weaker sections	Yes	Constrained
Public distribution system	No	No
Maintenance of community assets	Yes	Yes

Even more, in many cases, as suggested in the previous section, the exercise of these functions is just a formality, for the state has found or created ways to undermine the panchayats' autonomy. This is what the word "Constrained" in the third column means.

It is evident that gram panchayats are exercising only a small portion of the powers and authority that the Eleventh Schedule of the Constitution and PESA grant to enable them to function as institutions of self-government. Of particular relevance is the subject matter of minor forest produce, which was deprived of timber forest despite the fact that PESA explicitly provides that the state legislatures "shall ensure that the Panchayats at the appropriate level and the Gram Sabha are endowed specifically with the ownership of minor forest produce" (article 4, section (m) clause (ii)), without making any type of exception. On this point, it is important to highlight that even though the constitutional provisions dealing with the devolution of powers and responsibilities are discretionary and have to be adopted by each state in the way they see fit, the subject-matters listed in PESA are not.

When the constitutional amendments were introduced, rural local bodies were playing "the role of implementing agencies at the local level for various schemes sponsored by either central government or state government departments. In this capacity, panchayats helped identify beneficiaries for a number of transfer schemes and oversaw the management and implementation of various local infrastructure schemes funded through various state government departments" (Chaudhuri, 2006, p. 175). In his midterm assessment, Chaudhuri found that this situation had not changed by the mid-2000s, and that progress in genuine functional and financial devolution had been extremely limited in most states, Gujarat among them.

More than a decade later, we found qualitative evidence that this is still the case in rural Gujarat. The visited gram panchayats are being used by the state government to spend federal funds administered by the state. The possible advantages of this scheme are evident. Streamlined, coordinated, and probably efficient ways of delivering federal schemes for which the states are hold responsible. But it clearly undermines the ideal of gram panchayats as bodies of self-government.

According to our research, no functionaries have been devolved to the gram panchayats. This is particularly serious in the current context in which elected members are not paid for the work and their time. Only the secretary of the gram panchayat, who in effect works for the state government and helps perpetuate the status quo, is paid.

Financial devolution

We look into two aspects of financial devolution: the transfer and use of the FFC award and the composition of funds. We did not analyze official records.

The FFC award has not helped to increase political and functional autonomy. Transfers are subject to the elaboration of the VDP, but as has already been mentioned, the VDPs' content has been determined by the state via the taluka development officer and his influence on the gram sabha agenda. All VDPs were said to reflect the decisions adopted in GS, but these were shaped or predetermined by the agenda set by the gram panchayat secretary. Even though we did not look at the plans themselves, we could infer from our interviews that all plans are very similar. This has resulted in gram panchayats allocating the grant to the provision of the same goods and services.

The problem with grants from the central and state governments is that they are usually tied to state- and centrally sponsored development schemes. The FFC however granted some discretionary decision-making that apparently has not been respected by the state. The only expenditures different from the ones based on VDP were possible thanks to the financial support provided by AKRSP(I).

Gram panchayats displayed a high revenue dependency. Even though the sources are not reliable (we did not look at any books, and answers to our questions on the GP's budget and the share of total

income that was self-generated were not responded or did not seem likely to be accurate), two inferences can be made: gram panchayats rely a lot in money coming from the federal and the state governments and there is an evident lack of budgeting understanding and skills.

Capacity building (by Government)

The federal guidelines for the implementation of the FFC grant call for a nation-wide, massive capacity building campaign, especially in the areas of planning and budgeting. However, we found that the training from the state or sponsored by it has not reached the gram panchayats.

AKRSP(I) program for strengthening local governance institutions

AKRSP(I)'s efforts to strengthen local governance institutions is not aiming at changing the legal and policy context of decentralization in rural Gujarat but at improving some of the village-level socio-economic and institutional conditions. The program takes the legal and policy context as a given variable and tries to improve the functioning of gram panchayats along the many local governance variables that AKRSP(I) cares about and can more easily influence, while using gram panchayats as a means to enhance those same variables.

This model makes sense if the legal and policy context is seen as a rigid variable that cannot be easily changed, particularly because according to our research the program is consistent not only with that context but also with the socio-economic and institutional realities of rural Gujarat. What this means is that AKRSP(I) is tackling existing and important problems, but not that it is addressing all the problems or the most relevant ones. Indeed, AKRSP(I)'s program has a design problem as well as limitations and risks. The problem is that by not contributing to overcoming the fundamental barrier to decentralization –namely, insufficient and inadequate devolution of powers and authority to the rural local bodies–, it will not help create the units of self-governance envisioned in the seventy-third constitutional amendment, at least not in the short or medium term. The limitations arise from the fact that AKRSP(I) is not addressing all the variables, which in principle is understandable as no organization has the potential to address all factors of good governance. Finally, the risk is that by using gram panchayats to increase access to state and federal schemes, AKRSP(I) can help lock in the perception that these bodies are first and foremost implementing agencies of the state departments.

We looked at the way the first two components of AKRSP(I) program are playing out and found some qualitative evidence that 1) the components and activities are actually being carried out, and 2) in general, outcomes are positive.

Strengthening of mahila sabha (lady house or women assembly) and gram sabha

Mahila sabha was considered by women elected members as a catalyzer of women empowerment and participation in gram panchayats.

However, there is a considerable difference between the leadership and vision shown by the members of self-help groups and the elected members of the gram panchayats, being higher in the first case. The author has no elements to try to determine what the reason might be, but this is a topic that deserves further consideration.

Panchayat capacity building

Regarding knowledge and information support, interviewees have been benefited by this intervention but did not show detailed knowledge of the functions that gram panchayats have been devolved with, nor awareness of the fact that only 14 functions out of 29 have been formally devolved and that most of those 14 functions are not exercised. Only one elected member (sarpanch) knew about this and was aware of cases of overlapping authority (minor forest). Apparently, the reason behind this was not the

knowledge and information received from AKRSP(I) but the fact that he had been discussing these themes with a lawyer who is volunteering his time to help him.

Another activity of this subcomponent is the strengthening of the two standing committees and the creation of other committees. All gram panchayats have formed other committees apart from the water and social justice ones, but the understanding of roles, responsibilities and powers of different committees and the powers of gram panchayats to form these committees was extremely limited.

With respect to planning and budgeting exercises, all elected members claimed to have received AKRSP(I) training as well as help from the organization to formulate the village development plan. This indicates that even after receiving training, awareness levels and relevant skills remain low. This in turn may indicate that when knowledge is divorced from real autonomy, its impact is limited.

This intervention is also meant to engage the gram panchayats to develop agendas around ward wise planning and call for citizens to participate in this planning. We did not find strong qualitative evidence that is indeed happening, except for the finding described in the next paragraph.

In close relation with the previous intervention stands the financial support by AKRSP(I) (Sushashan Nidhi or good governance fund), which consists of an un-tied fund accessible to gram panchayats that have undertaken participatory planning involving citizens and defined areas of development and governance. We found that the only unique projects –i.e., projects different from the ones undertaken by other panchayats in terms of their VDP– that we heard about had been funded through this intervention.

Policy Options and Recommendations

1) Regarding the capacity building strategy in the analytical framework described in the methodology section, we recommend to AKRSP(I) to reinforce the budgeting and planning skills, as this was perceived as the weakest aspect of the program's capacity building component. Dependence of rural local governments on federal and state funds should be minimized or at least reduced considerably. For that purpose, in the short-term gram panchayats need to take full advantage of their limited fiscal powers and in the medium and long term, try to enlarge them. Capacity building, particularly budgeting skills, would be essential. Increased self-generated resources could be used, partly, to pay salaries to the gram panchayat elected members, at least to the sarpanch and the elected member charged with the task of taking care of the gram panchayat's finances, since this should be a full-time job.

2) No single organization can address all factors of poor rural governance, particularly when top-down decisions are needed to improve the legal and policy framework and increase the degree of autonomy with which gram panchayats operate. In cases like this, partnership and advocacy are key. We suggest that AKRSP(I) partner with other organizations across India to form a coalition that calls for a more detailed description of the national laws, policies and processes underpinning rural decentralization. The states' willingness to decentralize power and authority to the rural governments is not likely to happen spontaneously; therefore, their margin of discretion must be reduced. Achieving this is of paramount importance, as the ability of the states to undermine the panchayats' autonomy makes unsustainable every single effort to build capacity in these rural bodies.

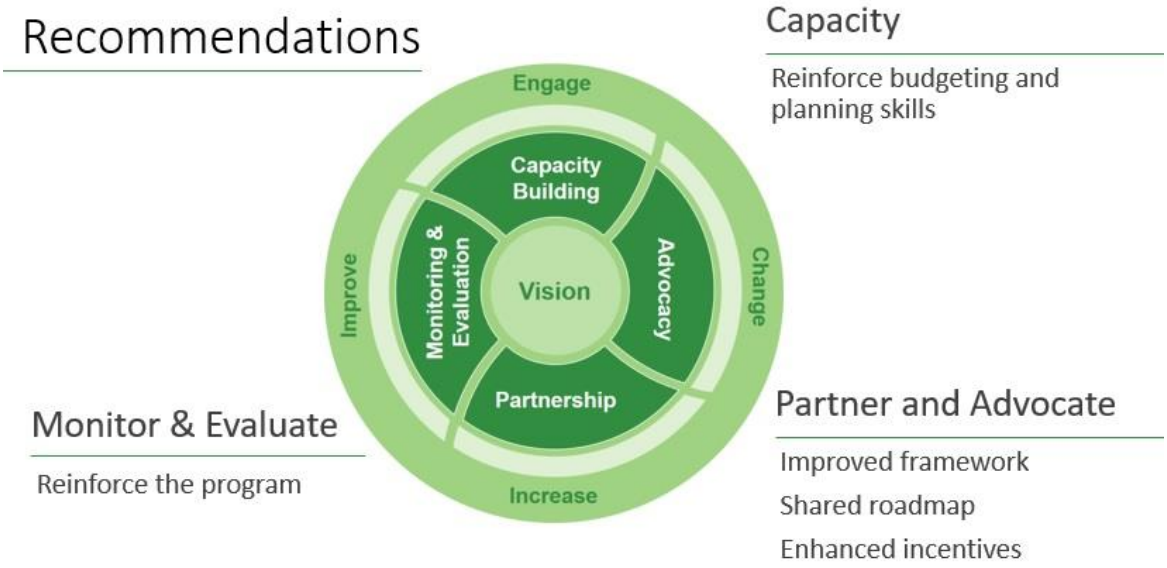
3) At the regional level, AKRSP(I) can partner with other organizations to develop and advocate for a shared road map for an orderly and mandatory transfer of functions, funds and functionaries to gram panchayats. Articulating a detailed road map for functional, financial and administrative devolution can be a powerful mechanism to achieve the spirit of the 73rd Constitutional Amendment, as it would stand as both a benchmark and an assessment tool for the state's actions

(or inactions). In this road map, one of the first steps –both in chronological and relevance terms– should be to increase the fiscal domain of gram panchayats by allowing them to fully exercise their power to impose local taxes and fees and by transferring to them development budget from the state and district panchayats. This implies increasing the capacity of panchayats to enforce tax collection and administer revenue as well as creating the right incentives by paying elected members for their work.

4) In partnership with other state organizations, review the rationale behind the policy to not pay the elected members of the gram panchayats. If no good reason is found, pilot an innovative mechanism to demonstrate the effect of payment on commitment and performance, and afterwards advocate for a change in this policy.

5) The program's potential to develop a role model that could serve as a basis to advocate for policy changes is constrained by the lack of monitoring and evaluation mechanisms. The recommendation is straightforward: reinforce the program with the missing mechanisms, ensuring that the data required to conduct any type of evaluations in the future is being gathered, and conduct an external and independent outcomes-based evaluation once the program has been fully implemented. By doing this, AKRSP(I) would also be securing the information they need to determine whether this program is better –in terms of cost-effectiveness or sustainability– than their other programs aimed at improving local governance.

It is likely that the state of Gujarat has not meaningfully devolved power, authority and responsibilities to rural local bodies as to enable them to function as institutions of self-government because it believes that local bodies and elected members in rural areas lack the capacity and relevant skills to take a permanent, central role in the provision of public services, the creation and maintenance of local public goods, and the planning and implementation of development activities and programs to alleviate poverty and promote distributive equity. If this perception is indeed the reason or one of the reasons why decentralization has not happened to the desired extent, then the key is to break the resistance from state governments by proving that perception wrong or finding a convincing way of addressing that lack of capacity and relevant skills. This is what AKRSP(I) is doing. However, adopting role model and scaling it up on the sole basis of its perceived effectiveness will not be enough to convince the state to adopt it. Thus, the importance of the proposed monitoring tools and external outcomes evaluation.



Long term goal

Modify Schedule 7 of the Constitution to withdraw from the list II (State List) the authority of states to enact legislation dealing with functions of local government, creating a list IV granting municipalities and rural bodies limited, but exclusive, authority on certain subject-matters, and defining a new concurrent list over which the state legislatures and the sub-state governments share jurisdiction. Before the 73rd and 74th amendments, the states were the only subnational units recognized by the constitution. In that context, schedule 7 and the states legislatures having exclusive authority to legislate in matters of local governments made sense, but it is not clear whether it still makes sense nowadays.

Conclusions

Should policy inconsistency and overlapping authority be not addressed, gram panchayats are unlikely to be functional and thrive in Gujarat. In this context, any effort made by NGOs will have a limited impact of the functioning of gram panchayats and their realization as bodies of self-government. Efforts can make them more efficient as implementing agencies but will not be enough to bring about the whole benefits that the constitutional amendment was seeking and will not stop the current and detrimental power dynamics. Those efforts can, however, lay the foundations for a demand-driven decentralization if they succeed in empowering the people. That the gram panchayats are the best vehicle to do this is still unclear. As any bureaucratic body, they offer advantages and disadvantages.

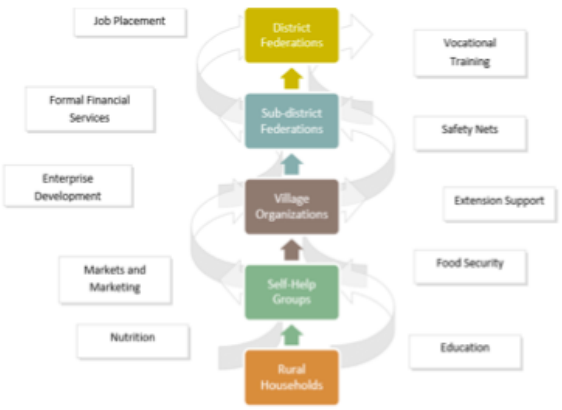
Chapter 2: An Evaluation of the National Rural Livelihood Mission in Narmada District

Introduction

Rural poverty in India is a multidimensional and a complex phenomenon which is reinforced by factors like social class, structures, geography, and tribe. Traditionally, socio-economic policies of the government have not peculated to the rural areas and to people at the bottom of society (Mehta and Shah, CRPC Paper 7). The Narmada district is predominantly made up of people from socially marginalized groups like the Scheduled Castes (SCs), Scheduled Tribes (STs), women, and persons engaged in low earning occupations. These are persons with low education, low or no formal employable skills, mostly poor and lack access to most of the services provided by the government (Ghosh, 2016).

In 2010, the Government of India (GOI) promulgated the National Rural Livelihoods Mission (NRLM), which is also called the Mission Mangalam, as a policy response. Unlike earlier welfare policies like the Swarnjayanti Gram Swarozgar Yojana (SGSY), Sampoorna Grameen Rozgar Yojana (SGRY) and National Rural Employment Guarantee Act (NREGA) which were supply-driven (Gangopadhyay et. al. 2008), the NRLM was envisioned to be a need-based poverty alleviation strategy. Its fundamental purpose is to amalgamate the poor and vulnerable in society into identifiable “functional and effective community groups to enhance their financial inclusion and strengthen their livelihood.” (Reserve Bank of India, 2015)

Figure 1: (Source: The World Bank Rural Livelihood Project:Overview)



The foundation of the NRLM is the Self-Help Group (SHG). SHG is an informal group of women, poor or vulnerable people, and consist of 10-15 persons. 10 of these SHGs from a village comes together to form a village organization. All SHGs in a village come together to form a Village Federation at the block level or the sub-district level. 25-40 village federations form a cluster federation at the district level. These amalgamated bodies, from the Village Organization to the Cluster Federation, are required to register under the appropriate state regulations.

The GOI provides a minimum of 10,000 Rupees and a maximum of 15,000 Rupees[4] per SHG to augment its organizational, institutional, and financial capacity and management abilities. The source of this money is the Revolving Fund[5] and only SHGs that have not benefited from this fund receives it. It is paid just once. After receiving this seed money, SHGs are required to keep records of meetings, savings, and lending to members, and recoveries made.

The Gujarat Livelihood Promotion Company (GLPC) is responsible for the implementation of the NRLM in the state of Gujarat. It is registered under the Companies Act, 1956 (Commissionerate of Rural Development, 2018). The GLPC is structured as follows: the GLPC, District Livelihood Mission (DLM), the Taluka Livelihood Mission (TLM), and the Cluster Coordinator. In line with the objective of the NRLM to promote the productive and entrepreneurial abilities of the poor through an enhanced access to financial services from Banks (MRD, 2008), the GLPC has the following objectives according to the Commissionerate of Rural Development (2018):

1) Empowering the Poor by organizing them into SHGs/Federations/other Collectives.
2) Empower the poor through ensuring access to Financial Services.
3) Augmenting existing livelihoods and enhancing incomes.
4) Explore livelihood opportunities through newer ventures in rural service sector.
5) Developing inclusive value chains."

This section of the research report provides the client, Aga Khan Rural Support Programme India (AKRSP(I)), with an analytical framework for understanding the state of the NRLM in the Narmada district, the challenges affecting the implementation of the policy, and provide recommendations to the client on its subsequent engagement with the policy in the Narmada district.

Methodology

An evaluation of the NRLM was done in two blocks of the Narmada district to assist AKRSP(I) in designing a response to the challenges that the policy faces. A process evaluation is usually carried out on policies that haven't gone their full cycle to identify early warning signs and challenges for policy redress (Evaluation toolbox, 2010). Qualitative case study research method was used to assess the defining themes of the NRLM and the challenges that it faces. Stakeholders with varied degree of engagement with the policy were interviewed to identify specific challenges and successes of the NRLM policy and how it could be improved.

Page 9 of 'National Rural Livelihood Mission: Programme Implementation Plan (2008)' provides 4 main ethos for assessing the NRLM. These are:

1) Organization of the poor into functional groups;
2) Skills training and development;
3) Access of the poor to finance; and
4) Improved livelihood and livelihood empowerment.

[4] The 10000 and 15000 rupees are equivalent to about 200 and 300 Canadian dollars respectively.

[5] Revolving Fund is a fund created by the GOI to support SHGs. Monies used from the Fund's account in the year are repaid by the GOI at the start of a budget year.

A qualitative matrix was developed to assess these 4 themes based on available data at the TLM at Sagbara block and the responses of the research participants.

Theme	Matrix
Organization of the vulnerable into functional grouping	1) The number of functional SHGs that are registered and recognized by the TLM 2) The ease with which people can form or join such groupings.
Skills training and development	1) The number of trainings programmes conducted in the year. 2) The gaps that the beneficiaries have identified in their regular operations as members of SHGs, Village Organization or Federation.
Financial inclusion	1) The barriers to financial 2) The interest rates on loans from Federations, banks, and informal lenders
Improvement in the livelihood	1) The institutional practices and socio-economic factors that militate against the goals of the NRLM

The analysis is supported by the information obtained from the official website of the GLPC, secondary sources, and from interviews with AKRSP(I) staff, TLM officers, Indian scholars, and activists.

Key stakeholders were identified with the help of officers of AKRSP(I) in Netrang. They were drawn from bureaucrats, AKRSP(I) staff members, SHGs, VOs and Federations, and individual beneficiaries of the NRLM. Key stakeholders were contacted via phone calls. They were sampled from two blocks within the Narmada District; Sagbara and Dediapada blocks. A total of 18 stakeholder engagements were conducted out of which 10 were focus group interviews and 8 were one-on-one interviews. In all, 44 people were engaged. Non-beneficiaries (activist and a scholar) were 2, beneficiaries and local leaders were 36 (3 SHGs, 3 Elected Women Representatives (ERPs), 1 Nagarik Mitra, 2 officers of the TLM, 4 panchayats and 1 AKRSP(I)-Federation), AKRSP(I) staff were 4, and 2 were bureaucrats from TLM.

Two main types of interviews were conducted; focused groups and one-on-one interviews. These two types of interviewing were most appropriate for the research for two reasons:

1) It provided a broader appreciation of how groups (Federations, VO, and SHGs) perceived the policy as against the experience of individuals in the community. It was also in line with the NRLM framework which encourages the formation of SHGs as the basic level of bringing vulnerable members of the community together.

2) Considering the limited number of days for gathering data, focused group discussion was a conduit for aggregating the views of the more than one person within the shortest possible time. In some situations, one-on-one interviews were conducted with individuals who appeared to have seemingly critical opinions on some of the questions.

Ideally, the interviews should have been balanced between AKRSP(I)-SHGs and GLPC-SHGs. However, only one member from a GLPC-SHG was interviewed. The opinion of this participant may not expressly reflect the true opinion or the opinions of all GLPC-SHGs.

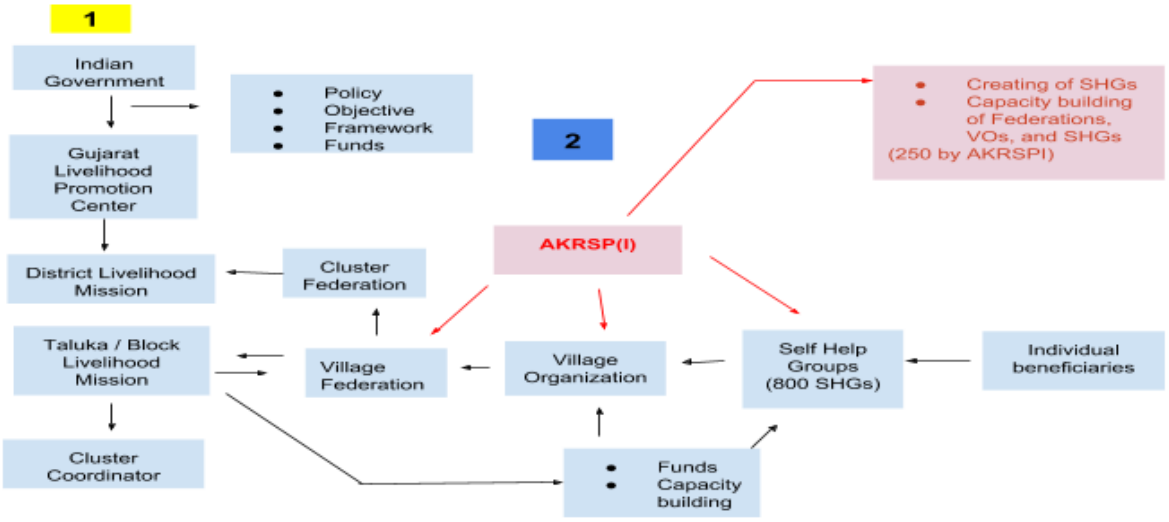
The data was collected through notes-taking and the recording of interview sections. A semi-structured interview guide was developed to provide a format for the interviewing process. However, the

researcher asked unstructured follow-up questions where and when necessary. These semi-structured questions revolved around the main themes espoused in the "National Rural Livelihood Mission: Programme Implementation Plan." *(See Appendix A for the semi - structured questions).* The researcher relied on an interpreter and in some cases interpreters to translate the participants' responses. All the participants responded to the research questions in either Gujarati, Hindi, or a native dialect. The language gap had the possibility of affecting the true meaning of what the participants said. However, the interpreter(s) fluency in Gujarati or Hindi or the native dialect and English guaranteed a reliable degree of assurance in the interpretations they provided.

Findings

Figure 2 reflects the operational framework of the Mission Mangalam as observed in the Narmada district. Implementation of the NRLM is done by professional bureaucrats. Throughout the national, state, district, and sub-district level, the Mission Mangalam has a parallel set of decentralized bureaucrats who are charged with managing and supporting the Mission in achieving its mandate. In Gujarat, the 4-tier structure of the GLPC ensures that at every level of the SHG framework, there is a set of bureaucrats to see to the needs of SHGs.

Figure 2: Operational framework of the NRLM as observed in the Narmada District in Gujarat.



Organization of the poor into functional groups

SHGs in Narmada district are made up of women. Membership is opened to every woman within a community with no laid down barriers to entry. The TLM issues licenses to the SHGs, Village Organizations, and Federations. There are about 800 SHGs in the Sagbara block in the Narmada District out of which 250 SHGs were established with the active involvement of AKRSP(I). AKRSP(I) affiliated SHGs benefit from organizational coaching and leadership from AKRSP(I). They also get logistical and managerial support for the enhancement of their organizational abilities. AKRSP(I) also assist these SHGs to amalgamate into Village Organizations and Federations. AKRSP(I)s operation are however limited to only AKRSP(I) affiliated SHGs. The remaining 550 SHGs have no operational relationship with AKRSP(I). The GLPC through its Cluster Coordinator also works with individuals within the communities to identify other vulnerable people who are willing and able to come together to form an SHG.

Shri Navjivan Adivashi Mahila Vikas Manch – Sagbara (New Life Women Development Platform at Sagbara) was the only federation that was interviewed. This sub-district federation has about 2300

members from 351 SHGs, spread across 93 villages and under 31 different local government offices (Panchayats). It is well structured and has a democratic mechanism for selecting its leaders. The Federation works with structured committees and positions like President, Secretary, Paralegal, Marketing of Farmers Produce Organization (FPO), Elected Women Representatives and Women Groups for Women and Land Ownership Committee. To support the organizational abilities of the Federation, AKRSP(I) has provided a tablet for the Federation to facilitate communication with its decentralized structures and members. A cluster manager of AKRSP(I) sits in the meetings of this Federation to assist them on technical issues.

That said, contrary to point 2 of Annex 1 of the 'Master Circular' of the Reserve Bank of India, the Sarpanches and leaders of the Panchayats (except for one individual) had no idea about the operations of the GLPC in their jurisdictions. This trend is worrying especially when these leaders are supposed to be part of the process of identifying the poor and vulnerable in their communities.

> "The households identified as poor through the P.I.P process will be accepted as NRLM target group and will be eligible for all the benefits under the programme. The list finalized after PIP process will be vetted by the Gram Sabha and approved by the Gram Panchayat." pg 10, paragraph 2

Again, some communities didn't have any knowledge of the NRLM and the operations of the GLPC in their communities, and hence, had no SHG. At Kolivada, the research participant intimated that "we only have user groups, we don't have Mission Mangalam. We will be happy to have it. At least it will help our people with resources."

Skills training and development

Central to the GLPCs mandate is the provision of training and employable skills that can support the poor and vulnerable to improve their livelihoods. An amount of 10,000 to 15,000 Rupees is provided to each SHG by the GOI from the 'Revolving Fund' through the GLPC. This seed money is to cater for the organizational, logistical, and training expenses of SHGs. The bureaucrats explained that GLPC also provides trainings, first to its Cluster Coordinator and later the SHG on book-keeping and monitoring and evaluation. However, some members of the SHGs that were interviewed disclosed that the training from GLPC is inadequate and others were waiting to be trained. Participants identified fund management, planning, and information dissemination as some of their knowledge gaps.

The participants from the AKRSP(I)-SHGs intimated that "TLM training programmes are not fairly distributed between AKRSP(I)-SHGs and GLPC-SHGs." Considering the about 800 SHGs which averages about 100 SHGs a year has added to the financial and logistical constraints of the GLPC. Some participants (AKRSPI-SHGs) indicated that they haven't had any training from GLPC within the year whereas the GLPC-SHG member who was interviewed indicated that they (her SHG) had a training on the making of incense. At the TLM office, an officer explained that the GLPC Cluster Coordinators are trained to train the SHGs.

AKRSP(I) is equally selective in the provision of training and skill development for SHGs. Participants from AKRSP(I)-SHGs also disclosed that AKRSP(I) provides some training programmes for them. In the last 3 years, some of AKRSP(I)s trainings included leadership, governance, exposure, and training in the production of organic pesticide and manure. AKRSP(I) has a framework for training trainers or leaders of SHGs and Cluster Managers who in turn serve as trainees' trainer. AKRSP(I) through this framework, decentralizes the training processes to involve the local people as a way of knowledge transfer. Again, as an NGO, AKRSP(I) has a training facility which facilitates their training programs and are flexible to imbibing new practices on leadership, good governance, and other needed skills that are rarely found in a very strict bureaucratic structure like the GLPC.

Financial assistance

The only direct source of financing from the GOI to SHGs comes from the Revolving Fund. From this fund, the GLPC provides an amount of 10,000 to 15,000 Rupees to the SHGs for their organizational and logistical purposes. There are two secondary funds that SHGs can access through the assistance of the GLPC:

1) Access to finance from banks: The GLPC serves as a facilitator or a bridge between the banks and Federations. Registering SHGs and Federations provide the poor with a certain degree of credibility, identifiability, and guarantee that members of these groups are traceable. The NRLM as a policy make provision for financial engagements between banks and SHGs. Point 1 of the 'Master Circular'[6] issued by the Reserve Bank of India[7] provides in detail the rate at which banks should provide loans to SHGs and the nature of the financial relationship that should exist between them (Attached as Appendix 3). Because of this policy, mainstream banks provide loans to SHGs at a current interest rate of 8 percent.
2) Access to financial resources from other government agencies: The GOI has multiple poverty alleviation schemes spread across the 24 central ministries of the government and other parastatals. For example, an SHG in a tribal area also qualifies for support under the Tribal Sub-Plan[8]. The GLPC therefore tries to reach out to some of these agencies that can also assist SHGs that qualifies to benefit from their schemes.

Notwithstanding the regulatory provisions made by the Reserve Bank of India, funding, and financial inclusion especially from the mainstream banks remain a challenge. Comparatively, mainstream banks face a higher monitoring and operational cost if they provide loans to SHGs instead of companies; not only are they expected to provide the loans at a ceiling of 8%, banks are also required to undertake the same evaluation for all loans whether it is given to SHGs or companies. Economically, the higher the loan, the lesser the unit cost of undertaking any evaluation and vice versa. In addition to that, the risk of non-payment of loans is also higher with SHGs. This is simply because loans to SHGs do not come with collaterals as security for non-payment. *Ceteris Paribus*[9] mainstream banks find it more secured and less costly to deal with companies and richer entities than SHGs.

Once there is demand for financial inclusion, economic forces have found ways of meeting the demand gap. An informal microfinance system has sprung up to meet the loan needs of these SHGs. 4 research participants posited that these informal microfinance institutions charge a minimum average rate of 3% per month on all loans. The cumulative minimum interest rate of 36% is high and burdening according to the participants. It was disclosed that some informal lenders charge as high as 60% to 100% per year.

Shri Narjivan Adivashi Mahila Vikas Manch – Sagbara has developed a framework in response to the higher interest rates. It provides services ranging from financial support to farm inputs, on credit to its members. All members of this federation make regular contribution into a pool as savings. The cumulative savings of a member remains an asset of the member. Members of the Federation can borrow from the Federation through their respective SHGs at a monthly interest rate of 2%; 1% for the management of the Federation and the remaining 1% as interest on the loan. Notwithstanding the interest on the principal, members are only entitled to their saving. The interest is committed to creating an asset or financial buffer for the Federation.

---

[6] Master Circular is a communique that was issued by the Reserve Bank of India providing directive on how mainstream banks should engage SHGs to enhance financial inclusion.

[7] Reserve Bank of India is the central bank in India that makes and supervisors all banking regulations.

[8] Tribal Sub-Plan is an affirmative budgeting strategy that was adopted by the GOI to provide dedicated funding to ST and SC communities for developmental purposes.

[9] Ceteris paribus means all other conditions held constant.

In addition to the monthly contribution from members, the Federation also leverages its number to get loans from the banks and microfinance institutions. Comparatively, mainstream banks have lesser challenges dealing with a Federation than an SHGs. The organized structure and leadership of the Federation minimizes the financial risk that banks try to avoid when dealing with SHGs. That does not, however, suggest that there is no risk at all. It is less costly for the mainstream banks though collaterals are not provided. The total membership of the Federation also enhances the negotiation power of the Federation. And that helps especially when dealing with microfinance institutions.

Repayment of loan is done in two ways. A member can repay her loan by cash or through farm produce. Loan repayment are also made flexible and are determined based on a member's assessed repayment strength. The Federation, at their meetings, spend hours on phone to reach out to members who are defaulting. The Leadership of the Federation disclosed that such members eventually pay, only that they take longer time and peer pressure than usual. The entire Federation risk been blacklisted from receiving subsequent loans if a member defaults.

Livelihood empowerment

The three factors explained above combine to achieve an improved and enhanced livelihood for the poor and vulnerable under the NRLM. Though the NRLM policy was promulgated in 2010, all SHGs were not formed at the same time. The process of forming SHGs is a process unabated. This means that not all SHGs are 8 years old. Considering the sample size and the fact that the policy is within its first cycle, it will be difficult to make conclusive statements on whether NRLM is succeeding or failing. That said, the current framework of the NRLM faces three main challenges that may affect its success or failure in the long term:

1) The GLPC is overly concentrated on the disbursement of the revolving fund. A participant said "all they (GLPC) do is give the money but they do not follow up to ensure that they were used for the purpose for which it was given. They only come back for reports." Providing finance for administrative and organizational duties does not automatically translate into improved livelihood. It must be accompanied by administrative, technical support, and employable skills training and development.
2) Notwithstanding the seed capital from the revolving fund, subsequent access to financial services threatens the long-term viability and objective of the GPLC. According to some participants, they either borrow to repay existing debts or forfeit their produce to defray same. Mostly, these loan-to-pay-debt loans are contracted from the informal lenders which come at 'throat cutting' interest rates. This pushes most women into a debt trap.
3) The GLPC is mandated to "explore livelihood opportunities through newer ventures in rural service sector (objective number 4)." It is instructive to note that there are 2 predominant livelihood activities in the Narmada district; farming and diary. In time of harvest, some participants explained that the overconcentration of the beneficiaries in these two sectors have led to market glut or distress sale in previous times. This is also compounded by the poor food storage or processing systems in the Narmada district. Farmers are either left to sell their produce cheaply or allow them to rot on their farms.

Though there is a monitoring and evaluation (M&E) department under the GPLC, no evaluation report from the agency was discovered or provided, when asked. Questions on how M&E is carried out by the TLM were barely answered. To ascertain the M&E process of the GLPC at the TLM in the Narmada district, the researcher requested for any document detailing how the GLPC evaluates the NRLM. No such document was produced, creating the impression that no clear evaluation mechanism for assessing the NRLM exists. This impression is further heightened by the fact that the action plan of the GLPC for 2018 as posted on the official website of the GLPC does not make mention of monitoring and evaluation. However, independent bodies like the Institute of Rural Management Anand (2017) have done an evaluation of the policy.

AKRSP(I) IN GLPC

AKRSP(I) and the GLPC share similar operational philosophies though they are distinct entities. A critical study of their vision, mission, and operational strategies of AKRSP(I) and the GLPC shows that both entities espouse important social values like social inclusion, poverty alleviation, empowerment of vulnerable groups, creation of strong and sustainable community-based organizations, and rural development.

Table 2: Table 2 compares the vision, mission, and the underlying strategies of AKRSP(I) and GLPC for achieving their stated mandates. This is based on secondary data sources.

	AKRSP(I)	GLPC
Vision	"AKRSP (India) can contribute in India to the creation of an enabling environment in which rural people can identify their needs and priorities and with professional support, organize themselves to improve the quality of their lives." (AKRSP(I) 2016 Annual Report)	"Create a socio-economically developed Gujarat through inclusive growth strategies for empowering the underprivileged members of vulnerable communities/groups, resulting in them leading a dignified life." (CRD 2018)
Mission	"AKRSP (India) exists to enable the empowerment of rural communities and groups, particularly the underprivileged and women, to take control over their lives and manage their environment, to create a better and more equitable society." (AKRSP(I) 2016 Annual Report)	"We strive to serve the underprivileged women as well as members of vulnerable communities/groups in the state by organizing and capacitating their Groups and creating sustainable livelihoods. We ensure convergence of prevalent development programmes and schemes as well as forge partnerships with other non-government organizations and corporate houses for inclusive growth and the empowerment of the members of the groups served. In order to provide quality member-services, we strive to remain financially sound and secure. We will work towards establishing ourselves as a unique organization with deep abiding human values and maintaining the same." (CRD 2018)
Strategy	1) "Provide direct professional support to rural communities to help them identify their own needs and priorities. 2) Organize rural communities into self-reliant community-based organizations (CBOs). 3) Empower rural communities, particularly underprivileged and women, through collectivization and promotion of individual micro enterprises." (AKRSP(I) 2016 Annual Report)	1) "Improving the delivery of social and economic support services to the poor. 2) Mobilizing all rural, poor households into effective self-help groups (SHGs) and their federations. 3) Building capacities and skills of the poor for gainful and sustainable livelihoods; and 4) Enhancing access of the rural poor to credit and other financial, technical, and marketing services."

From the summary comparison between AKRSP(I) and GLPC, it can be inferred that the 2 entities share some broad values in terms of their vision, mission, and their strategies for achieving them. The vision statement of AKRSP(I) captures three out of the four cardinal concepts underpinning the NRLM policy namely: (1) Organization of the poor into functional groups. (2) Skills training and development. (3) Livelihood empowerment. Though captured in different wordings, both entities aspire to improve livelihoods of women and underprivileged. In their mission statements, both institutions make specific reference to empowering women and the vulnerable or underprivileged. This disposition is further highlighted by their visions. AKRSP(I) hope to create "an enabling environment in which rural people can identify their needs and priorities and with professional support, organize themselves to improve the quality of their lives" whereas the GLPCs goal is to facilitate "inclusive growth strategies for empowering the underprivileged members of vulnerable communities/groups, resulting in them leading a dignified life."

Both entities employ similar strategies in pursuit of their end. Except for strategy 4 of NRML, the remaining 3 strategies of NRLM are the similar to the strategies of AKRSP(I). Strategy 1 to 3 of AKRSP(I) and NRLM are similar. Strategy 1 of both entities borders on the provision of social and economic services that can assist the poor and vulnerable. Strategy 2 seeks to create community-based organizations as a way of making the community own the development agenda. Strategy 3 hopes to promote economic livelihood of the vulnerable in society. Though AKRSP(I) may not directly be involved in either providing financial assistance to SHGs or facilitating their access to loans from banks like the GLPC, its operations may have an indirect effect on access of the vulnerable to loans after they are able to amalgamate them into identifiable community-based groupings.

By the above comparison, the NRLM policy is in line with the vision and mission of AKRSP(I). AKRSP(I) also have years of working experience in 3 out of the 4 operational strategies of the GLPC.

Recommendations

The challenges as identified present a good opportunity for AKRSP(I) to collaborate with the GLPC to pursue and achieve their shared objectives. It however relevant to note that such a collaboration or partnership may have financial, administrative, and organizational implications for both institutions. The following recommendations are made for the consideration of AKRSP(I):

1) (A) Identify and bring non-federated SHGs into VOs and Federations. From the TLM, it was discovered that on 42 village organizations are registered in the Sagbara block, with each having about 10-15 members. Assuming all SHGs in Sagbara have 15 members, it means that about 170 SHGs are currently not members of any village organization nor federations. Such SHGs are worse off compared to the federated SHGs. Federations amplify the voices and strength of the poor and provide them with a platform for bargaining and accessing loans. Banks may feel unsafe to deal with such SHGs. They will therefore be left to the mercy of the informal lending sector. AKRSP(I) should consider working with the TLM and the Cluster Coordinators to identify and bring new and non-village organization and federated SHGs into village organizations and possible, into a Federation.

   (B) Since federations provide loans at 24% which is between the 8% from mainstream banks and the 60% to 100% from the informal lending sector, federation can serve as a viable alternative to the mainstream banks. Consideration should be given to bringing all SHGs under a federation. AKRSP(I) should consider advocating for non-federated SHGs that are awaiting the threshold of becoming a member of a village organization. Such non-federated SHGs loses out on the economies of scale that comes with the numbers of the Federations. They also do not get loans from federations. Advocating for their inclusion of SHGs into federations will help SHGs to get loans from federations.

2) AKRSP(I) should consider scaling up their training programs to cover non-AKRSP(I) SHGs. AKRSP(I) should utilize their training facilities and training frameworks to provide training and skills development for SHGs and federations. With years of practice and experience, AKRSP(I) is better positioned to deal with issues of capacity building than the GLPC. The focus of AKSRP(I) should be on enhancing the operational abilities of federations. It carefully done, federations can become a major instrument for dealing with poverty among rural and tribal people.

   Attempts should be made to extend the NRLM concept into villages that are currently not benefitting from it. As stated in the findings, some villages were oblivious of the existence of such a policy. Inherently, that may mean that either the education on the policy hasn't peculated to all communities or that the GLPC hasn't extended the policy to those villages. AKRSP(I), through its very strong rural network across many tribal villages, can contribute to the publicity of the policy.

3) With reference to the 4th mandate of the GLPC, "explore livelihood opportunities through newer ventures in rural service sector", AKRSP(I) should collaborate with the GLPC to research into other forms of sustainable livelihood opportunities in the rural areas beyond farming and diary. Previously, attempts have been made to train SHGs in stitching and the making of incense. That said, there is an opportunity for the two entities to research into other livelihood opportunities in the rural areas. Examples of unexplored economic areas like processing and value addition of produce from rural areas.

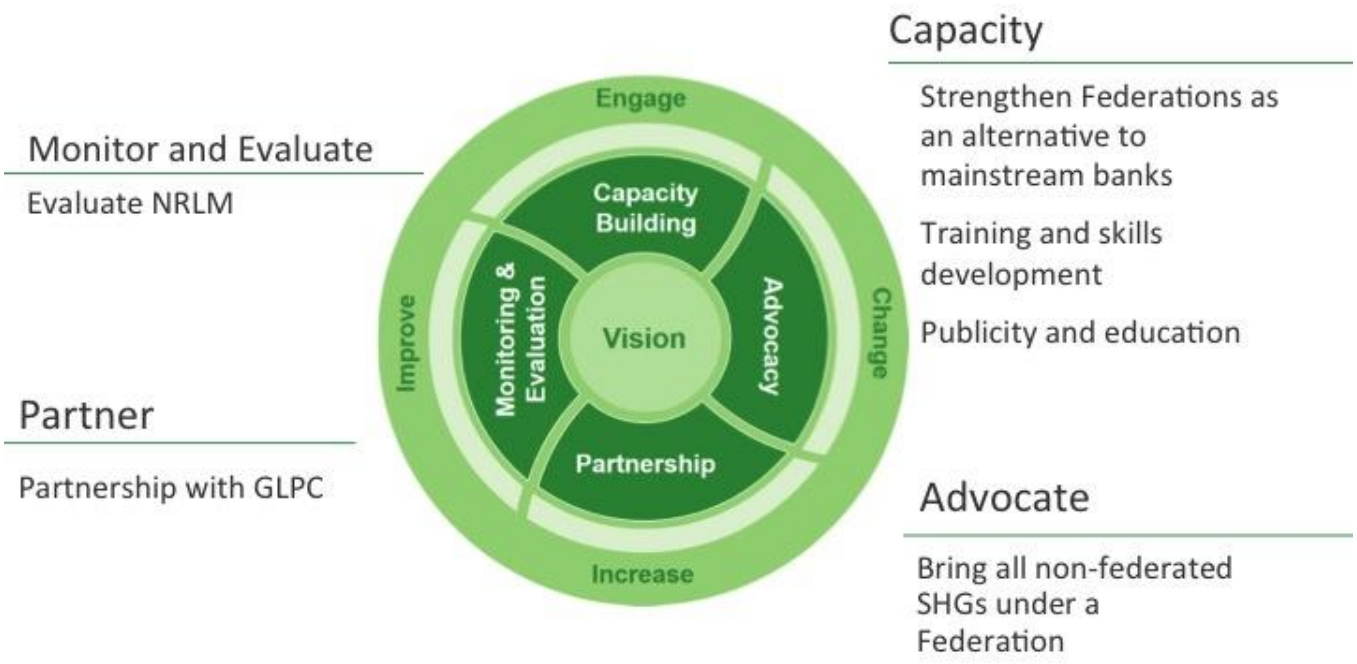
4) Finally, what gets evaluated gets done. AKRSP(I) should develop a framework for evaluating its contribution to the NRLM overtime. AKRSP(I) should also work closely with the monitoring and evaluation department of the GLPC to evaluate the progress of the policy overtime. This will serve 2 main purposes:
   - Probity, transparency, and accountability: It will ensure that resources that are disbursed do not only reach its targets but are also used for their intended purposes. This will promote the efficient and judicious use of the limited fiscal resources at the disposal of GLPC.
   - Recommendations from the M&E process can be reintegrated into the action plan of the subsequent year. By this, mistakes that are identified by a former evaluation report will be corrected by a latter action plan. Such a progressive process will enhance effective and efficient delivery of the mandate of the GLPC.

Conclusion

The report was unable to make conclusive findings on the success or failure of the Mission Mangalam. This was because the policy is just 8 years old and within its first cycle. However, the research identified some challenges with the NRLM in the Narmada district. The NRLM in its current operational framework is limited by factors like finance, limited skills development for the poor and vulnerable, and limited economic opportunities in rural Narmada. That notwithstanding, the policy has a very good potential to affect lives and transforms rural livelihoods if the GLPC will outsource or involve NGOs in areas that it either lacks the capacity or is overwhelmed and play more of a supervisory duty. Such areas include training and skills development and research into other sources of livelihood in the rural areas in Gujarat.

AKRSP(I) should explore its options around the 4 major pillars of capacity building, advocacy, partnership and monitoring and evaluation. The finding of the research are largely issues of capacity building and financial inclusion. If a critical attention is given to federations and SHGs through capacity building, the problem of financial inclusion can be mitigated to some reasonable extent. AKRSP(I) should also utilize its strength such as training facilities, strong network across villages and training frameworks to design models that can support federations.

To effectively do this within the legal framework of NRLM and the GLPC, AKRSP(I) should take advantage of the readiness of the GLPC to build collaborations with NGOs. The GLPC in its mission, states its readiness to "forge partnerships with other non-government organizations and corporate houses for inclusive growth and the empowerment of the members of the groups served." With the similarity and convergence of minds on the vision, mission, and operational strategies of AKRSP(I) and GLPC, and the institutional readiness of GLPC to work with non-governmental organizations, AKRSP(I) should consider collaborating and assisting the GLPC to achieve their shared values.



Chapter 3: Analysis of AKSRP(I)'s Solar Irrigation Pump Scheme in Surat District

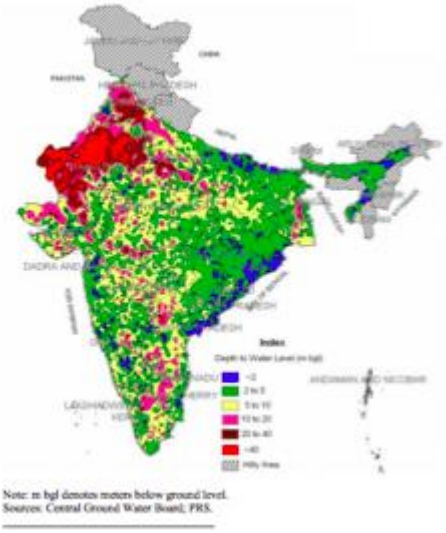
Introduction

Perverse electricity subsidies and agricultural intensification have led to the depletion of groundwater resources in ten Indian states, including Gujarat. In the long term, water shortages may threaten the livelihoods that have been built upon these policies and practices. At the same time many farmers continue to rely on rain-fed agriculture or expensive, air-polluting diesel pump irrigation systems. Lack of access to dependable, affordable energy and irrigation systems hinders agricultural profitability and leaves farmers vulnerable to climate and economic shocks.

Although groundwater levels are more critical in other states, groundwater development in Gujarat is estimated at 67 % as of 2011 (PRS Legislative Research India). In many south-eastern districts such as Surat (the location of research) development is lower than in central and northern regions (Shag et. al, 2008). In the south-east many farmers do not yet have access to an agricultural grid connection (PRS Legislative Research, 2017). Joint national and state level schemes such as the Deen Dayal Upadhyaya Gram Jyoti Yojana and Pradhan Mantri Sahaj Bijli Har Ghar Yojana (or Saubhagya),

however, continue to advance the project of rural electrification and last mile connectivity, which could allow farmers to pursue further groundwater development in these regions.

With respect to small-scale agriculture, solar photovoltaic irrigation pump systems are a proposed alternative to rain-fed, grid, and diesel powered systems. Solar power systems have the potential to serve as an energy resource for those not able to avail themselves of conventional electricity, and may be more sustainable in comparison to grid and diesel. However, groundwater scarcity in the region remains problematic and further groundwater development via any energy system must be undertaken cautiously. The challenge is to adopt irrigation practices in a way that promotes long-term sustainability. This is in the interest of the farmers and communities that AKRSP(I) works with.



Since 2016 AKRSP(I) has implemented 20 SIP schemes in the districts of Dangs and Surat. The rationale for, and hypothesized benefits of solar irrigation in these regions are as follows.

1) There is low penetration of agricultural electricity connections. Transitioning to solar from rain-fed or diesel powered irrigation will increase economic benefits through enabling irrigation and reducing fuel costs, respectively.

2) Low incremental costs of operating solar irrigation systems will provide an economic buffer against poor cropping seasons.

3) Solar systems will promote responsible groundwater use via their limited pumping depth capacity while meeting the irrigation needs of small shareholders.

The purpose of this report is to provide an interim assessment of AKRSP(I)'s SIP program and analyse the viability of the program in relation to water-agriculture-energy nexus issues. This analysis will conclude with recommendations to AKRSP(I) on how the organization can promote sustainable agricultural livelihood development by taking action in the four strategic areas outlined in this report's analytical framework.

Methodology

This research employs qualitative case study methodology to evaluate AKRSP(I)'s solar irrigation schemes by comparing a sample of five AKRSP(I) beneficiary sites, one future beneficiary site, and two government solar irrigation beneficiaries.

These inferences are supported by information collected through site visits to observe technical and operational aspects of the project; interviews with AKRSP(I) staff, one AKRSP(I) non-beneficiary group, International Water Management Institute (IWMI) staff, the Secretary of the Dhundi Solar Cooperative, and the Gujarat Energy Development Agency (GEDA); and from a review of literature.

This approach is designed to incorporate the perspectives of major stakeholder groups, including beneficiaries, non-beneficiaries in case study communities, government, and AKRSP(I). Other relevant stakeholders that were not directly consulted were industry actors in solar energy, distributed energy, and electricity utilities.

In order to compare the experience of AKRSP(I)'s beneficiaries to those participating in the Government of Gujarat's Agriculture Solar Pump scheme an effort was made to include a sample of this population. However, only two participants could be reached. Thus, these will serve as case studies from which to draw tentative comparative hypotheses. See Appendix D for a full summary of study participants.

These solar irrigation systems were installed in spring 2017. This means that farmers may have only been partially or unable to plan with this in mind during the 2017 kharif season. Impacts of solar adoption on households will likely evolve and be more apparent after 1-2 years. However, some initial observations can be made on the program processes and the experience of participants thus far. Additionally, these observations can contribute to a broader analysis of solar irrigation in relation to the social, economic, political, and environmental, and technological issues at hand.

Analytical Framework

In addition to the overall analytical framework that guided this research, specific variables, objectives, and indicators were use to evaluate the progress of the SIP program. This is the Program Evaluation Framework. Secondly, a Strategic Factors and Formative Analysis Framework was used to assess broader factors that may impact the success of AKRSP(I)'s future work with SIPs.

Program Evaluation Framework

Of the 12 schemes in Surat District five were chosen for analysis. The schemes in these locations were assessed in relation to the program's objectives and other significant criteria as determined through the literature and participant interviews.

Variable	Objective	Indicator
Productivity	Increase quality of output	Shift from lower to higher value crops
	Increase quantity of output	Increase acres under irrigation
		Shift from single to double cropping
		Reduce input costs
	Increase ratio of outputs to inputs	Increase yields
Capacity	Increase resilience to economic and climate shocks	Lower, predictable cost of agricultural inputs
		Solar system produces sufficient electricity
		Crop diversification
	Enable independent operation of solar pump system	Technical knowledge
	Increase community-driven planning and organization	Future-oriented planning
		Presence of formal operation system
Equity	Enable access by marginalized groups	Female participation
		Participation of low-income households
Environmental Sustainability	Optimize groundwater use	Adopt water conservation practices
		Presence of financial incentives that promote rationalized groundwater use (adequate valuation of the resource)
	Reduce fossil fuel emissions associated with pumping water	Shift from diesel or grid to solar systems
Quality of Life	Increase time available for other activities	Self-reported increase in time and money dedicated toward social purposes, education, health, and other economic activities
	Increase money available for other purposes	
	Reduce drudgery associated with agriculture	Self-reported increase in ease and convenience of irrigation

Strategic Factors and Formative Analysis Framework

In order to guide AKRSP(I)'s plans to develop and scale-up this program, this interim assessment, in conjunction with lessons learned from the extensive body of literature pertaining to this topic, was used to develop factors of success. These factors were used as a framework to analyse political, economic,

social, and environmental challenges for effective scaling, as well as opportunities to enhance the outcome of AKRSP(I) efforts.

Factors of Success	Description	Example in Practice
Impact	Achieve program objectives	Enable agricultural livelihood development among smallholders through the expansion of irrigation while ensuring sufficient groundwater recharge
Financial Sustainability	Funding sources are diversified, resilient to political factors, and the financial rationale is compelling to each stakeholder	A strong business case for the government, utilities, and farmers is made so that each party has an economic rationale for participating. The program is not dependent on donor funding or government subsidies
Learning	Research, evaluation, and feedback mechanisms are imbedded in, and shape AKRSP(I)'s activities	Crucial indicators are regularly collected as part of a cohesive analytical framework in order to inform ongoing activities and new initiatives AKRSP(I) conducts literature reviews and consults with experts and community members in order to design programs
Partnership	AKRSP(I) builds relationships with government, NGOs, private players, and community leaders in order to access and employ resources optimally	AKRSP(I) leverages the comparative advantage of government in financial resources, private players in low cost solutions, and community leaders in social capital in designing and implementing activities
Environmental Sustainability	Demands placed on the environment can be met without reducing its capacity to allow all people to live well, now and in the future (Financial Times Lexicon, 2018)	Groundwater and soil quality are preserved so that people can continue to successfully farm
Enabling Legal and Policy Environment	Law, regulations, and policy directives create opportunities for success and innovation, are not overly burdensome, and are implemented in alignment with principles of good governance	Subsidies enable uptake of beneficial technologies while discouraging perverse or inefficient electricity use Government schemes are accessible

Developed Markets	Multiple solar technology companies engage in efficient and high quality provision of goods and related services at competitive prices	Farmers can choose between solar system providers and can easily access repair parts and professionals
Accessible Information	Context-specific and general information regarding challenges and opportunities in the groundwater-agriculture-solar energy nexus exists and is accessible	Farmers access and utilize information about government schemes, key issues, current events, and future predictions in their planning
Social Support	Adopters, their communities, and other impacted communities view the adoption of solar pump irrigation systems favourably	People are interested in adopting solar pump irrigation and are not against adoption by other people in their community or nearby communities

Case Studies

While notable differences among the five schemes exist, there are also some similarities. All beneficiaries

- Contributed a total of Rs 15,000 to participate in the program toward SIP capital costs of Rs 115,000/hp (or Rs 575,000 for a 5 hp pump)
- Previously participated in programs with AKRSP(I), specifically the group well and irrigation program which meant they had collective access to a group well or bore well and pipes
- Had approximately one acre of landholding per household
- Had some members who engaged in animal husbandry
- Were located in Mandvi taluka (except Zhakarda in Bardoli taluka)
- Received some technical and organizational training from AKRSP(I)
- Had access to a help line and warranty from the SIP manufacturer
- Had stationary instead of tracking solar installations

	No. Households	Area Under Irrigation (acre)	Capacity of Pump (hp)	Capacity of Panels (kWp)	Solar installation cost per acre to beneficiary (Rs)	Sex
Badtal	7	6	5	5	2500	male
Bhatkai	6	8	5	5	1875	female
Dadhvada	4	4	5	5	3740	male
Satvav	5	5	5	5	3000	female

Zhakarda	5	5	10	10	3000	mixed
Jamkui	~22	~22	na	na	2500	male

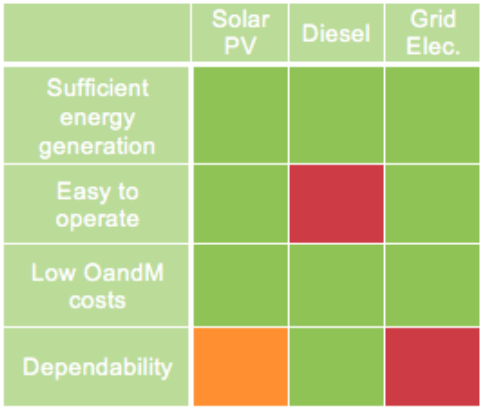
Badtal, Mandvi, Surat
Number of households: 7
Area under irrigation: 6 acres

These households used a 5 hp diesel pump to irrigate their land. They were initially sceptical when AKRSP(I) approached them with the solar energy project and were uncertain whether the system would generate enough electricity to pump sufficient water. However, given their longstanding relationship with AKRSP(I) and exposure visits to existing solar irrigation systems in Dangs and to Dhundi, they were convinced of the project's potential benefits.

Crops and Irrigation
As a result of solar irrigation they have decreased the cropping ratio of fodder and increased that of cereals, ginger, okra, creepers, tomatoes, and other vegetables. The majority of this produce is consumed. They continue to use flood irrigation, but are interested in adopting drip irrigation.

Comparing Alternatives
Diesel, grid electricity, and solar pv systems are each able to generate and deliver sufficient energy. However, different experiences regarding ease of operation, operation and management costs, and the dependability of the system show that solar PV is viewed as a superior alternative. Grid and solar electricity are both easy to use, enabling the participation of women in irrigation, and pose low continuing costs compared to diesel. One acre under diesel irrigation receiving 15 waters/year was estimated to cost INR 7,500. Solar in particular provides a buffer against a poor season because of the negligible cost/unit. However during the monsoon and cloudy periods the solar system does not produce enough electricity and so must be supplemented with diesel. The ability to irrigate when desired as a distinct benefit of diesel. Although farmers received 3-5 hours/day or night of grid-electricity, the exact timing was uncertain and long power outages due to storms would sometimes leave them without an energy source for 2-3 weeks at a time.

Figure 1: Self-reported Experience of Different Energy Systems



(Green = positive, orange = sufficient, red = poor)

Lifestyle Changes
In commenting on changes to their everyday life farmers mentioned that utilizing solar energy, compared to grid electricity, allows them to get a better sleep because electricity is available during the day instead of at unpredictable times during the night. Easier operation of the system and no need to go buy fuel also frees up more time for animal husbandry, and money to devote toward better agricultural inputs and social purposes.

Organization, Planning, and Extended Impacts
This group decided to manage their resource by allocating each farmer one day's use per week on a regular rotation. An advantage of the group system format is that it promotes fair use of the shared water resource. Given the period of time in 2016 when these farmers received 24h/day of electricity they shared that over-abstraction is a real risk under conditions of unlimited energy. However, they

mentioned that excess energy capacity would not result in selling water to neighbours. Rather the combined conditions of high electricity subsidies and the fact that many neighbours are family members means that irrigation services would have to be provided for free. This is a disincentive to these farmers.

In addition to deciding on a system of water allocation, the group intends to start a collective fund where each member will contribute INR 200-500/month for ongoing maintenance. Any issues with the AC pump are easy to address as AC pumpsets are very common. Issues associated with solar technology would be more difficult, and they want to ensure the lifespan of the system after the warranty expires. Currently, they are aware of the installer's helpline, however have had no major issues yet.

Their neighbours are also interested in adopting solar irrigation technology. However, they told me that there is no financial support from the government for this type of investment. The participants of AKRSP(I)'s project said that their financial contributions were in part made through coordinating with the Gram Vikas Mandal and the self-help group (SHG) women in the household belong to.

Bhatkai, Mandvi, Surat

Number of households: 8
Area under irrigation: 5.75 acres

This all-female group of beneficiaries had a positive attitude toward the idea of a solar installation when first approached by AKRSP(I), and collectively contributed the INR 15,000 required. They do not have an agricultural electricity connection and were using a diesel pumpset before. All but one of the women farm alongside their husbands. The other woman's husband is a diamond cutter.

Comparing Alternatives & Lifestyle Changes

Collective operation and maintenance costs were estimated at INR 45-55,000/year. They appreciate that the solar system is easy to operate and frees up time for them to spend with family.

Crops and Irrigation & Organization, Planning, and Extended Impacts

They plan to shift toward higher productivity cash crops like vegetables, however did not report any other plans to do with agriculture or solar technology. Their neighbours are also interested in solar irrigation, especially as this project was highly subsidized.

Due to translation difficulties and necessary interpolation from AKRSP(I) staff I was unable to gather further details on the experience of these women. However, it appears that the solar system offers similar advantages over diesel and grid electricity as reported by other groups, and that there is a positive appraisal of the system. I was not able to properly assess the existence or attitudes towards excess electricity generation capacity and what alternative uses they would find desirable. While AKRSP(I) staff related that the solar irrigation systems are designed to accommodate the water needs of farmers, given that the system is not always running when the sun shines, it can be assumed that excess energy could be produced.

Dadhvada, Mandvi, Surat

Number of households: 4
Area under irrigation: 4.4 acres

Before owning the solar system they used a diesel pumpset and do not have an agricultural electricity connection. They each contributed INR 3,500 from their savings for the project. They were persuaded of the benefits of solar irrigation through exposure visits to Dhundi.

Crops and Irrigation

They currently plant paddy, wheat, and peas. Some is sold at market, however a large portion of paddy is fed to their animals. They have no plans to change their cropping patterns, but have received some training in advanced agricultural techniques like drip irrigation and SRI from visits to model farms. They also report that their water consumption has not changed since installing the solar system.

Comparing Alternatives & Lifestyle Changes
To them, the advantages of solar are that it saves time and provides a buffer against having a poor crop and no money to invest in diesel fuel. The cost of diesel was a major downside of this energy source. They estimate collectively spending INR 15,000 on diesel, plus maintenance costs because the pumpset breaks down often. They have not experienced any technical difficulties with the solar panels and clean them regularly.

Organization, Planning, and Extended Impacts
In order to allocate water they decided on a group rate at which to sell water to each other. These payments go toward a corpus fund that will be used for ongoing maintenance. High electricity subsidies and the fact that their neighbours are family members mean that it is not feasible to sell water. Rather, they would have to give it for free.

They have excess generation capacity and are interested in pursuing a model similar to that in Dhundi. They said that their neighbours would also be interested in joining them. However, they are uncertain of the processes and technicalities of making this a reality. AKRSP(I) staff related how they would likely look to AKRSP(I) to facilitate this type of development by acting as a mediator of donor or government schemes. They have also discussed selling water to their neighbours, but have yet to meet and decide a suitable rate.

Satvav, Surat, Mandvi
Number of households: 5
Area under irrigation: 5 acres

This is an all female group of beneficiaries. Each farmer contributed 3,000 to the project. Two members accessed these funds through a SHG loan. The others had savings from participating in the diary cooperative. Dairy is the main occupation in the village.

Crops and Irrigation
After switching to solar pumping they have begun to plant more vegetables like chillies. However, they experience water shortages. When this happens they reduce the amount of land under cultivation. They typically can only farm in kharif and plant jaur and paddy. This is similar to others in the village. Some have diesel pumps and draw water from canals when it is available. Others do not have pumps and rely on rain or purchase water for INR 40 per water from another group well, which is quite far off.

This focus group occurred during a SHG meeting with 4 different SHGs present. Thus, there was minimal time to speak specifically with AKRSP(I) solar beneficiaries.

Comparing Alternatives & Lifestyle Changes
They save time not having to go purchase fuel. With this time they can spend it in household or community activities, or in economic activities such as rearing goats.

Organization, Planning, and Extended Impacts
They have not had any major problems with the solar system and clean the panels regularly to encourage optimal efficiency. They allocate the water between members sequentially.

Zhakarda, Bardoli, Surat
Number of households: 5
Area under irrigation: 11 acres

This group had not heard of solar pv before AKRSP(I) approached them with the project, but so far it has been a positive experience. Before, they practiced a mix of rain fed and diesel powered irrigation. One household owned the borewell and a 10 hp pump that is now used in the project. This household was

Note that there is some uncertainty about the irrigation arrangements prior to the solar project

also unique in that they had an agricultural electricity connection that delivered 8 hours of electricity at night. It appears they elected to use diesel power in conjunction with this.

Each farmer contributed 3,000 from their savings to participate. All of them took interest free loans from family members to make this investment. None of them accessed any government schemes, including SGH schemes. Although their primary occupation is agriculture, secondary activities include rickshaw driving, working in local shops, and animal husbandry. Previously, they had completed the LNG Hazira sanitation program with AKRSP(I), but not an irrigation program as with the other solar scheme sites.

Crops and Irrigation
When asked about changes in agricultural practices they mentioned that no major changes have been made because of the SIP yet, because it was installed only ten months prior. However, this is the first year they have planted sugarcane instead of vegetables. Since it is the first year they expect the yield to be exceptionally good. Also, vegetables are not suited to this region as the soil is waterlogged. They estimate savings as INR 30,000 per person per 10 months.

Comparing Alternatives
They all have household electricity connections. However, only one has an agricultural connection. He receives 8 hours per day, but it is sometimes at night, which is inconvenient. Being able to consistently irrigate during the day is one of the benefits of solar for this farmer.

Organization, Planning, and Extended Impacts
Currently, there are no specific roles within the group, including that of group leader. They each use the water sequentially. They have excess electricity generation capacity, and are discussing selling both water and energy but have not begun to do so. With their savings and excess energy they would like to invest in a reverse osmosis (RO) plan to purify and sell bottled water. With regard to selling irrigation services, other nearby farmers do not need to buy water from them because they are higher caste, more wealthy, or have access to a canal.

They have not had any major problems with the solar system and clean the panels every 15 days. In the case of a technical problem they are aware of the warranty and helpline. They do not have many agricultural or economic alternatives so they make sure to take good care of the system so that it lasts a long time. In the future they plan to go to the same vendor if they need assistance.

Their neighbours are also interested in adopting solar power and have been asking them about it. However, their landholdings are quite scattered, which poses a challenge to a centralized irrigation system.

Jamkui, Mandvi, Surat
Number of households: 40 (4 groups x 10 members) represented by 11 members
Area under irrigation: ~ 1 acre per member

Most of the village relies on rain fed agriculture. 21% have borewells or access to group or individual wells, which currently use diesel power to operate pumps. There are 4 groupwells that will service each user group in this cooperative based model. One of the wells was built up. The other was an open pit and would have to have a barrier built around it.

They have participated in AKRSP(I)'s sanitation program and recently people in the village received 47 cows from AKRSP(I) through availing Tribal Sub-Plan (TSP) funds. A government SHG is also active, while an AKRSP(I) SGH that was established is no longer active. The cost of participating in this scheme will be INR 25,000 per group, or INR 2,500 per person. Those who do not have another local source of income have gone to the city for work to raise this money. Some may get credit from the milk cooperative or take loans from each other. They will not take loan from a bank as the interest is too

high. SGHs are not involved. They went on an exposure trip to Dhundi and have no major concerns about the project.

Crops and Irrigation
They expect solar irrigation will increase the scope for agriculture, including the quantity and quality of agricultural inputs they can afford. They may plant vegetables or adopt drip irrigation. They are interested in planting guavas if they can implement drip irrigation.

Organization, Planning, and Extended Impacts
They are interested in developing skills associated with solar and advanced irrigation techniques. They have also developed preferences given the current information they have on solar technology. They want the panels installed high off the ground so they can plant underneath. They have not seen AKRSP(I)'s other installations, but also had knowledge of the importance of having a pivoting panel.

They intend to charge INR 40 per water for members and INR 50 per water for non members per hour, plus operation cost. However, they are more interested in selling to the government because sometimes neighbours do not pay the required fees, which can spoil their relationship.

Lifestyle Changes
Revenue from crops may be used to support animal husbandry activities. With additional income from selling energy to the government they want to invest in secondary education.

Pinpur, Umarpada, Surat
Government Beneficiary 1
Land ownership area: 2 acres

Before owning the solar pump system and 5 hp pump he used a 1 hp electric pump. This was the maximum hp that could be powered by the electricity connection in Pinpur.

He is an AKRSP paraworker and so received information from AKRSP(I) about the government scheme for solar irrigation being implemented in this block. He went to an exposure fair put on by the now defunct Gujarat Electricity Board (GEB) where he was able to fill out an application form at a cost of INR 1,000. His four brothers acted as guarantors and he had to submit 12 documents including an aadhaar card, ration card, signed map from the Panchayat secretary confirming land ownership, household number assigned in 1962, etc. After the government verified his site he paid INR 4,000 and they granted approval and installed the system, including a 5 hp pump and 200 ft of piping.

He can water his 2 acres from the well and is now able to draw more water, but regardless his well usually becomes dry in March. His well is 35 feet deep, and he estimates he would have to dig another 180 feet to access more water. Water recharges in the monsoon are sufficient. He does not plant during rabi. He has had the installation for 1 year, but has only run it for 3 months (when not relying on rain). He also practices horticulture (and participated in AKRSP(I)'s horticulture program). He does not practice sprinkler or drip irrigation.

No challenges or technical difficulties, except it doesn't work when it's cloudy, which is inconvenient. There is a 5 year warranty and he is not aware of any maintenance or care that should be done.

He reports that his neighbours are interested in solar irrigation, two of which have a well. One of his brothers also has a solar system. He did not seem interested in selling water or electricity to neighbours.

Pinpur, Umarpada, Surat
Government Beneficiary 2

Land ownership area: 3 acres

Before using solar, they used a 1 hp electric pump to draw water from a 200 foot tube well. They plan wheat, maise, paddy, and ground nuts. During summer they currently irrigate less than their total three acres, but next season they hope to bring all three under irrigation because of the solar system. They practice flood irrigation and seemed unfamiliar with drip irrigation, but when AKRSP(I) horticulture staff spoke about it they seemed interested.

They learned about solar irrigation from a neighbour, who directed them to the GEB office to fill out the appropriate application form. The head of the household had to submit 11 /documents. The total fee was 5,500 and came a 5 hp pump, pipe, an inverter, a torch with a LED bulb and battery. This household's solar system was installed one week prior to this research interview. Since then they have used it three times for approximately 3.5 hours per day. They are not aware of any care or maintenance, but report that they have a one year warranty.

Findings: Case Study Analysis

The observations from these six focus groups and two interviews can be summarized in tabular form in order to identify trends, outliers, and major differences between AKRSP(I) and government beneficiaries. Each table indicates whether the indicator was observed, is anticipated or something that has been seriously contemplated by beneficiaries, not present, existed prior to introducing the solar irrigation system, or cannot be assessed due to a lack of information.

Legend	Present	Anticipated	Not Present	Pre-Existing	Insufficient Evidence

Productivity

Objective Dimension	Indicator	Badtal	Bhatkai	Dadhvada	Satvav	Zhakarda	Jamkui	Pinpur 1	Pinpur 2
Quality	Shift from lower to higher value crops								
Quantity	Increase area under irrigation								
	Practice double cropping								
Ratio	Reduce input costs								
	Increase yields								

Improvements in agricultural output generally appear in shifting to higher value crops and improving the ratio of inputs to outputs through reducing fuel costs. The upfront capital cost per acre of AKRSP(I)'s solar scheme (weighted average of INR 2677.14 for this sample) is approximately 32% of the amount farmers report spending on diesel fuel and maintenance per acre every year (weighted average of INR 8266.16). This means that although costs are concentrated rather than spread out, this project provides for marginal continuing fuel costs at a relatively low price. The two government beneficiaries paid INR 2500 and 1833.33 per acre.

However, a major caveat to the productive economic logic of SIPs in this case is the highly subsidized rate of the capital investment. AKRSP(I)'s program is subsidized at 97% and the cost paid by the government benficiaries suggests that the Government's SIP scheme is subsidized at a similarly high rate. One report found that 50% of farmers would invest in an SIP system if the subsidy was halved, however none would participate if there was no subsidy (Dekker, 2015). However, studies also

demonstrate the comparative economic advantage of off-grid SIPs over diesel powered pumps (SELF, 2008; Purohit, 2007; Raghavan, 2010). While outside the scope of this study, an anlysis can be conducted to determine whether this holds for the farmers AKRSP(I) is working with. The social benefits of SIPs to marginal farmers may warrant subsidization regardless, however financial sustainability remains a concern. This will be discussed further in a later section.

5 hp SIP capital cost	575 000 Rs
Farmer's contribution	15 000 Rs
Subsidy component	97 %

Yield data was not collected, but increased yields can be anticipated where shifts from rain-fed crops to irrigation occur, given that the type of crop remains the same. Although this isn't the case in Zhakarda where they recently elected to plant sugar cane, this is one key difference between AKRSP(I) and government beneficiary groups. While neither government beneficiaries intend to switch to higher value crops (one already practiced horticulture and the other had a mix of wheat, maise, paddy, and ground nuts), they will increase acres under irrigation. These divergent trends are likely associated with the pre-existing energy resources in the different communities. The farmers in Pinpur relied on low cost, yet low power electricity to power low hp electrified pumps with insufficient pumping capacity. They were unable to extend irrigation to the totality of their lands. With the increased capacity of solar systems they can power a 5 hp pump, removing pumping capacity as the limiting factor. AKRSP(I) beneficiaries were largely already using diesel powered 5 hp pumps to irrigate all of their lands.

Whether farmers practice double cropping does not seem to be a function of the solar installation or not as farmers either already planted in both kharif and rabi, or are limited to planting after the monsoon by water shortages in their well. Participants in Jamkui anticipate similar changes to their cropping practices.

Capacity

Objective Dimension	Indicator	Badtal	Bhatkai	Dadhvada	Satvav	Zhakarda	Jamkui	Pinpur 1	Pinpur 2
Increase resilience to economic and climate shocks	lower, more invariable cost of agricultural inputs								
	produces sufficient electricity								
	reliable electricity								
	crop diversification								
Enable independent operation of solar pump system	technical knowledge								
Increase community-driven planning and organization	proactive planning								
	formal operation system								

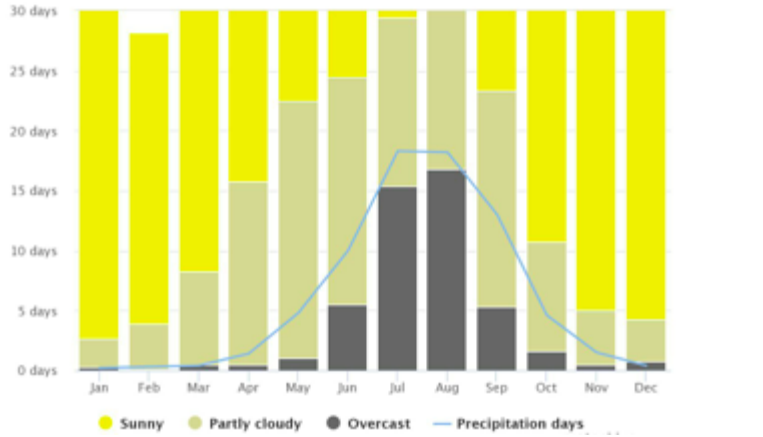
Across all cases capacity realized through self-sufficiency will be enhanced by partially insulating farmers' agricultural practices from climate and fuel price shocks. Solar as a sufficient energy source with negligible incremental costs will increase the likelihood that farmers can get back on their feet after a bad season and continue to irrigate their crops regardless of fuel prices. Two out of five groups also

indicated that they plan to diversify their crops, which can provide an economic buffer against isolated crop failure or a poor market.

It should be noted that most farmers indicated that the reliability of solar decreases during the monsoon and that they may be compelled to supplement their energy supply with diesel or grid electricity. Weather data indicates that partially cloudy (20-80% cloud cover) and overcast (over 80% cloud cover) days number between 23.5-30.3 during June, July, August, and September. Additionally, precipitation, although substantial at average of 104.25 mm per month, is concentrated on 59.5 out of 122 monsoon season days.

However, compared to the outages and inconvenience of grid-electricity, solar remains a desirable alternative for the majority of the year and the only alternative to diesel where agricultural grid connections are not available.

Figure 2: Overcast and Precipitation Days in Surat, Gujarat (Meteoblue, 2018)



AKRSP(I) beneficiaries consistently reported fair systems of water allocation and group organization, which will enable ongoing function of the group. However, since none of the groups had experience major technical issues at the time of research it is unclear how groups' current organizational systems would handle this type of challenge.

Although some groups demonstrated technical knowledge regarding their system such as pumping capacity, or enhancing the capacity factor of solar systems through pivoting and cleaning the panels, this was not observed consistently among groups. While a basic level of operational knowledge may be sufficient to reap most of the benefits of the system, enhanced technical knowledge can facilitate troubleshooting, optimal use, and planning. It could also contribute toward a marketable skill as solar technology becomes more prevalent.

Different groups appear to be engaged in different levels of strategic planning for the future use of their solar technology, including how it can shape their agricultural practices and alternative energy uses. Common ideas like selling irrigation services have been tabled. Participants have generated interest in using their resource in creative ways like purifying and selling water and selling electricity back to the central grid. The potential impacts of these ideas on groundwater use and recharge will be discussed in another section. However, with regard to planning it is evident that participants could benefit from improved knowledge of government schemes and the agriculture and energy sector. For example, the group that was interested in selling excess electricity back to the grid was not aware of the relevant regulatory environment, the government agencies involved, or the logistical and capacity-related constraints of their system. Alternatively, adequate information has the potential to build capacity for generating and carrying out innovative and feasible plans. Further, it was evident that some groups rely heavily on AKRSP(I) to plan, and do not pursue further development of the infrastructure provided through AKRSP(I)'s programs.

Finally, despite room for improvement AKRSP(I) participants exhibited greater community organization, planning, and technical knowledge than those participating in the government solar panel scheme. However, a small sample size limits generalizability of this observation, and the government scheme does not require community organization in order to access the scheme.

Equity

Objective Dimension	Indicator	Badtal	Bhatkai	Dadhvada	Satvav	Zhakarda	Jamkui	Pinpur 1	Pinpur 2
Enable access by marginalized groups	Female participation								
	Low-income household participation								

AKRSP(I) has been somewhat successful in including low-income households and women in this project. The program donor, LNG Hazira chose the final 12 participating groups from 16 groups initially submitted by AKRSP(I). AKRSP(I)'s recommended groups that were moderate to fully functional and aligned with LNG Hazira's criteria:

- Group includes 5-7 members
- Total land ownership is 7-8 acres
- Own an existing group wel
- All members of the group are use the group well
- Practice rain-fed agriculture and farm non-cash crops
- The existing well is a project supported by AKRSP(I) (not the government)
- High level of participation of women among groups
- The women should be members of a SHG

While these criteria are designed to include marginalized groups the actual selection may have disqualified those who were least well off. Some groups had their "best" representative speak with the donor, giving the impression that they were better off than they were. Additional rationales for exclusion included the low participation of women in group discussions, perceptions that some group members were too well off, evidence of cash crops during a site visit, and interpreting ownership of vehicles or motorcycles as signals of wealth, whereas these are typically purchased with loans.

However, overall the program is designed in such a way that it is accessible to the population that AKRSP(I) works with in this region. A major benefit of AKRSP(I)'s group-based approach is that it creates a lower-entry point for participation and enables the collective use of community resources. The cost of participating in this program was Rs 15 000 per group. Depending on the number of members, individuals paid between Rs 2000-3750 to participate. While few households were able to support this cost from their savings many were able to access financial capital through SHGs or inter-community loans. Notably, no beneficiaries reported accessing loans through microfinance institutions. LNG Hazira provided Rs 115 000 per hp per scheme. In comparison, the government beneficiaries each paid a total Rs 5 000 for their own comparable solar system with piping. This suggests that this scheme was almost completely subsidized by the state and national government, which drew from the MNRE's credit-linked capital subsidy scheme through the National Bank for Agriculture and Rural Development (NABARD) (Shim, 2017) and GEDA at Rs 95 000 per hp for DC pumps and Rs 85 000 per hp for AC pumps (GEDA, 2018). While the two farmers in this study accessed the government scheme individually, making it more expensive, it is conceivable that groups could also access this scheme if they were sufficiently organized.

The ease of operating the solar system compared to diesel pumps enables the increased participation of women in irrigating farmland. Although AKRSP(I) has been able to establish some female and one mixed member group, the ability to gain insight into the specific experiences of women was limited in this study. This is apparent in the information gaps that exist in the case study accounts of Bhatkai and Satvav. Without proper information it will not be possible for AKRSP(I) to assess its goal of female empowerment or design initiatives that further this objective.

Environmental Sustainability

Objective Dimension	Indicator	Badtal	Bhatkai	Dadhvada	Satvav	Zhakarda	Jamkui	Pinpur 1	Pinpur 2
Optimize groundwater use	Adopt water conservation practices								
	Presence of financial incentives that promote rationalized groundwater use				*			*	
Reduce fossil fuel emissions associated with pumping water	Shift from diesel or grid to solar systems								

* Indicates beneficiaries that reported their well runs dry before the monsoon. This is a nonfinancial incentive for conservation.

Sustainable agriculture is ``capable of maintaining its productivity and usefulness to society over the long run… it must be environmentally-sound, resource-conserving, economically viable, socially supportive, and commercially competitive (Ikerd, 1993).

Participants were not able to report if the solar system resulted in increased water abstraction, as assessing only a single cropping season can conflate the effects of variable climate with that of the solar pump system.

None of the program participants had implemented water conservation irrigation practices such as drip irrigation. There are mixed intentions among beneficiaries to adopt such practices, however it was generally recognized as a beneficial practice in the light of personal water scarcity. Of note, however, is that government beneficiaries were not familiar with drip irrigation. Lack of familiarity with precision agriculture techniques and the necessary capital are likely barriers to adoption.

The cultivation of less water intensive crops also promotes sustainable water management. This study does not examine the specific shifts to more or less water intensive crops. However, examining these evolving ratios and cases where farmers plant new varieties such as water intensive sugar cane in Zakharda over the long run could reveal how fuel costs impact crop selection.

A related impact of some changing cropping patterns is that vegetables are generally more sensitive to the amount of water they receive in comparison to fodder. This will serve as a water-moderating mechanism. However, since animal husbandry constitutes a large source of income for many beneficiaries meaning that there may be a continuing motivation to grow fodder rather than more water-sensitive crops.

Additionally, the existence of financial incentives to rationalize water use may promote responsible water management. While the group in Dhadvada set up their own fee schedule to pump water and those in Jamkui anticipate selling electricity back to the grid, others not severely limited in groundwater resources did not have a financial mechanism to encourage appropriate valuation of groundwater. There was some interest in facilitating water markets, which would impose an opportunity cost on over extraction while increasing the overall stress on the aquifer. There is debate about the social and environmental impacts of water markets. While the distribution of irrigation services could help improve the livelihoods of a broader number of people in the village, there is a risk of critically depleting

groundwater resources as has happened in other areas across the country. While SIPs have more limited pumping capacity than submersible electric pumps, SIPs may still pose a stressor to shallow groundwater sources that small farmers depend on. This is especially true because the marginal cost of solar electricity is negligible. Participants in Badtal also flagged low cost power as a potential driver of increased abstraction based on their previous experience of highly subsidized grid electricity.

This risk does not seem large for this suite of projects. Participants reported that their neighbours were either wealthier and had their own water source or were family members who would expect the irrigation service for free (which, given general water scarcity, was not desirable).

However, groundwater may be extracted for reasons outside of agricultural use. Selling purified water was one suggestion of how to capitalize on the low cost of abstracting water. This suggests that people desire to put accessible electricity to use. If water is available and there are not more beneficial alternatives (or direct costs) to abstracting water for sale or use, water abstraction may increase in situations not already severely limited by water shortages.

Quality of Life

Objective Dimension	Indicator	Badtal	Bhatkai	Dadhvada	Satvav	Zhakarda	Jamkui	Pinpur 1	Pinpur 2
Increase available time	Self-reported increase in time and money dedicated toward social purposes, education, health, and other economic activities								
Increase available money									
Reduce drudgery	Self-reported increase in ease and convenience of irrigation								

Overall, participants reported that using the solar system, when compared to diesel-powered irrigation, conserves time and money in not having to travel and purchase fuel. They related that they wanted to dedicate this time and money toward social purposes like weddings, education, health, improved agricultural inputs, and other economic activities like animal husbandry. Further, not relying on grid-electricity for those in Badtal meant that they could get a better nights rest and spend more time with family. Finally, the ease of operating the solar system was consistently cited as a benefit, reducing drudgery associated with agricultural practices.

Another factor to consider that was not mentioned by participants or covered in group interviews was the potential health benefits of solar systems. By switching from diesel to solar farmers and their households will no longer inhale diesel fumes or risk contaminating their wells with oil or fuel.

Findings and Recommendations: Strategic Factors and Environmental Outlook Analysis

Planning for AKRSP(I)'s future work in the groundwater-agriculture-energy nexus requires the consideration of its current program as well as a number of related contextual factors. The following

table indicates one way that AKRSP(I) can conceptualize these factors. Each factor is identified as an enabler, opportunity for development, or challenge. Enablers are existing conditions that can help facilitate the successful expansion of AKRSP(I)'s SIP program. Opportunities for development are factors that are not yet present or fully developed. However, they are areas where AKRSP(I) can play a role or another such window of opportunity exists. Finally, factors classified as challenges are difficult, complex issues that often present as intractable. However, targeted approaches may still be able to address important components of these factors.

Legend	Enabler	Opportunity for Development	Challenge

Factors of Success	Description
Impact	Achieve program objectives
Financial Sustainability	Funding sources are diversified, resilient to political factors, and the financial rationale is compelling to each stakeholder
Learning	Research, evaluation, and feedback mechanisms are embedded in, and shape AKRSP(I)'s activities
Partnership	AKRSP(I) builds relationships with government, NGOs, private players, and community leaders in order to access and employ resources optimally
Environmental Sustainability	Demands placed on the environment can be met without reducing its capacity to allow all people to live well, now and in the future
Enabling Legal and Policy Environment	Law, regulations, and policy directives create opportunities for success and innovation, are not overly burdensome, and are implemented in alignment with principles of good governance
Developed Markets*	Multiple solar technology companies engage in efficient and high quality provision of goods and related services at competitive prices
Accessible Information	Context-specific and general information regarding challenges and opportunities in the groundwater-agriculture-energy nexus exists and is accessible
Social Support	Adopters, their communities, and other impacted communities view the adoption of solar pump irrigation systems favourably

*This is an important factor, but was outside the scope of this study

Impact	Achieve program objectives and uphold AKRSP(I) values and mission

The first section of this report indicates that AKRSP(I)'s solar irrigation program has been largely successful in achieving it's objectives. Moving forward, main improvements can be made in the areas of technical training, equipping participants with information and skills required for planning, ensuring the inclusion of marginalized groups, and promoting drip irrigation and other water conservation practices,

and in helping participants find beneficial uses for their excess electricity. This last suggestion is largely met through the solar cooperative model that AKRSP(I) intends to adopt. The other areas are program components that AKRSP(I) can consider strengthening as the SIP program evolves.

AKRSP(I)'s proposal to scale up it's solar program includes shifting from its current model to the one that was piloted by the International Water Management Institute (IWMI) in nearby Dhundi. In this model groups of farmers form cooperatives to sell back excess electricity to the state's grid at a Feed in Tariff (FiT) rate. Jamkui will be among AKRSP(I)'s first sites for the implementation of this model, wherein four groups will each own a groupwell and solar irrigation system and sell excess electricity back to the grid through a central evacuation point.

Recommendations for the next phase of SIP schemes:

1) Training: In addition to baseline training offer opportunities for ongoing technical training once installations are in use and for those who would like to specialize in SIP maintenance

2) Planning and Institutional Strength: Support the development of organizational systems within groups by offering special leadership training to peer-selected group leaders.

- Assist in developing the institutional foundations and mechanisms within groups. This should include provisions for.
- Clear delineation of participants' responsibilities and the roles of AKRSP(I), government, DGVCL, SIP companies, and other stakeholders. This should be especially clear with regard to financing, the FIT rates and payments, and other key provisions of the agreement with DGVCL (such as length of contract and the implications of this, and relinquishment of right to an electricity connection).
- A secretary position that represents the whole group, and is supported by the leaders from each subgroup. The person in this position should be the key liaison with government and AKRSP(I), and should receive financial compensation in return.
- A corpus fund to which participants make monthly contributions. This fund should be managed by the secretary, and should be used to pay this person's salary, save for administrative and maintenance costs, and account for the depreciation of the SIP systems.
- Bi-weekly meetings amongst subgroup members and monthly meetings between all members of the group

3) Inclusion

- If LNG Hazira is to select the groups, enable AKRSP(I) workers familiar with candidates to inform the decision and correct misperceptions. However, ideally AKRSP(I) would be responsible for final selection.
- Expand selection criteria to those who have participated in government groupwell projects if they are functioning well and meet other criteria, and look to incorporate excluded individuals into existing groups.
- Continue to incorporate women into the program, and support them as leaders of groups and subgroups with additional training.
- Ensure that women are represented and involved in the planning, implementation, and evaluation of the program moving forward. This applies to AKRSP(I) staff in the national, regional, and field offices as well as to participants.

4) Water Management and Conservation

- Align resources and training regarding drip irrigation, conservation agriculture, and system of rice intensification (SRI) as able and appropriate.

- Ensure an adequate FIT in the next project phase. Participants in Dhundi were able to lower the cost of irrigation services through solar and still receive more than the rate offered by MGVCL. While it is not necessary to minimize water markets, appropriate valuation of the resource can be encouraged through a competitive FIT.
- Install metres on existing pumps so that farmers can monitor their energy use.

Financial Sustainability	Funding sources are diversified, resilient to political factors, and is sufficient to enable beneficiary buy-in

The current sole source of funding for this program, donor funds through LNG Hazira's mandated corporate social responsibility (CSR), are time-bound and project-based. This inhibits project flexibility and learning mechanisms. Secondly, although current funds have proven sufficient to install a number of SIPs at a rate that beneficiaries can afford, they will likely be insufficient to scale up this program. While AKRSP(I) has a longstanding relationship with LNG Hazira it can also not be assumed that AKRSP(I) can rely on funding for this program in the future, for example, if CSR legislation were to be changed.

However, AKRSP(I)'s overall sources of funding are quite diversified, suggesting that this is also a possibility for this program. Secondly, the Government of Gujarat's scheme for SIPs may be another source of funding AKRSP(I) beneficiaries can avail either directly or through a government partnership with AKRSP(I).

Recommendations for financing will be made in the sections on Partnership and Enabling Legal and Policy Environment.

Learning	Evaluation and feedback mechanisms are imbedded in, and shape AKRSP(I)'s activities

The current program design facilitates a one-year evaluation, but it is unclear how these results will be applied to future projects. AKRSP(I) has a wealth of knowledgeable regional staff who are familiar with the context and community members AKRSP(I) works with and can help shape and implement future directions. Continuing to develop this capacity and engage all levels of staff and community members in designing research may present an innovative way to ensure AKRSP(I) continues to achieve its objective of empowering rural people.

1) Increase and formalize communication mechanisms between AKRSP(I) staff in different offices to coordinate the flow of knowledge and information, and co-develop program goals based on this respective knowledge.

2) Ensure that there is a designated person to handle research and evaluation activities at the national and regional office.

3) Hold a fair and workshop day involving AKRSP(I) staff from the national, regional, and field offices; participants in the first program phase; upcoming and potential participants; and industry and research experts to facilitate knowledge exchange and identify areas for change and action. This can involve informative talks, structured focus group sessions, and time for informal dialogue.

4) Incorporate ongoing evaluation provisions into the donor agreement in with LNG Hazira.

Partnership	AKRSP(I) builds relationships in order to access and employ resources optimally, including with private sector and government

AKRSP(I) has connections with IWMI and has worked with the Government of Gujarat on Participatory Irrigation Management systems (PIMs). Solar irrigation presents an opportunity to build on these relationships. IWMI and its foremost researcher Dr. Tushaar Shah are key supporters of the Dhundi model, which leveraged a 20-year power purchasing agreement (PPA) with the regional DISCOM, GUVNL. Although the feed-in-tariff (FIT) GUVNL agreed to was less than that suggested by IWMI, securing this arrangement is a substantial accomplishment. As AKRSP(I) moves forward in building its relationship with GEDA and regional DISCOM, DGVCL, IWMI may prove to be a valuable source of both compelling economic analysis and social capital.

1) Develop an MOU with GEDA to leverage state and national funding for SIPs.

2) Propose a research project with IWMI and CGIAR Research Program on Climate Change, Agriculture, and Food Security (CCAFS) to leverage their expertise from working in Dhundi, their experience negotiating and facilitating an agreement with MGVCL.

3) Demonstrate the financial benefits to MGVCL of them not being required to provide subsidized electricity and explore the potential for a variable FIT.

4) Partner with financial institutions to develop financing and repayment plans for participants.

5) Facilitate the participation of local panchayats in SIP program as they related to government schemes through capacity building and planning initiatives.

Environmental Sustainability	Demands placed on the environment can be met without reducing its capacity to allow all people to live well, now and in the future

Groundwater recharge and maintaining soil quality are major challenges that counterbalance the need to enhance livelihoods through irrigation. While selling to the grid, adopting drip irrigation, and adopting other water conservation practices can minimize unneeded abstraction, it is uncertain whether this will be sufficient in the long run. Further this does not address the challenges of those already facing substantial water shortages.

1) Expand community water-recharge and management activities in project areas and in communities with the most severe cases of water scarcity.

Enabling Legal and Policy Environment	Law, regulations, and policy directives create opportunities for success and innovation, are not overly burdensome, and are implemented in alignment with principles of good governance

While India's bureaucracy exhibits substantial levels of inefficiency, corruption, and lack of capacity, the national and state-level governments have also lent support for renewable energy development. National and state policies promote the adoption of solar energy as a complementary or sole source of power. This includes the 2010 Jawaharlal Nehru National Solar Mission (JNNSM) to achieve 100 GW of solar generation capacity by 2022 and the 2015 Gujarat Solar Power Policy, which includes provisions for MW-scale, rooftop, and SIP projects. These provisions include schemes to coordinate subsidies with the national Ministry of Power (MOP) and Ministry of New and Renewable Energy (MoNRE).

Policies directly related to agriculture and water management such as the 2010 National Mission for Sustainable Agriculture Government, the 2016 Model Bill to Regulate and Control the Development and Management of Groundwater, the 2011 National Water Mission, the 2010 National Mission Micro Irrigation, and the 2010 National Mission for Enhanced Energy Efficiency also contribute toward the pursuit of renewable and efficient forms of energy production and allocation.

AKSRP(I) can capitalize on this policy window by engaging government and DISCOMS in reference to these commitments, and by positioning itself as an organization that has experience in natural resource management and capacity building. If the lack of technical knowledge and planning by the two government beneficiaries can be elaborated on, capacity building may be a large gap in the government's program. This proposition was affirmed by regional AKRSP(I) staff.

1) Advocate for a lower threshold to participation in government-funded SIP programming with regard to identification and documentation.

2) Ensure that local panchayats are equipped to support local farmers in accessing this scheme.

3) Advocate for a reduction in grid electricity subsidies. They contribute to the over exploitation of groundwater and may present a barrier to the adoption of solar by those who currently have agricultural grid connections.

Developed Markets	Multiple solar technology companies engage in efficient and high quality provision of goods and related services at competitive prices

The solar technology market is not fully developed, but it is growing as user applications become more pervasive and the cost per unit decreases and nears grid parity. Declining costs and an anticipated need for future skills in the solar energy sector suggest that this is an area AKRSP(I) should continue to expand in.

Accessible Information	Context-specific and general information regarding challenges and opportunities in the groundwater-agriculture-solar energy nexus is accessible

Currently, this type of information is not easily accessible, especially to farmers. In line with many of AKRSP(I)'s capacity building efforts, it could integrate this type of information into its future solar irrigation training. In areas where this information is not clear to AKRSP(I) staff, it should be a priority to be knowledgeable about potential related policies. Developing NGO, private sector, and government relations are one way to pursue this information. For example, a thorough understanding of the Government of Gujarat's solar pump irrigation scheme can, and should inform AKRSP(I)'s future directions. Regular information sharing can accomplish this.

1) Request better information regarding the government of Gujarat's SIP scheme and current progress.

2) Incorporate education on broader energy, groundwater, and agriculture issues into training.

3) See recommendations under Learning section.

Social Support	Adopters, their communities, and other impacted communities view the adoption of solar pump irrigation systems favourably

So far AKRSP(I)'s solar irrigation systems have been met with support by program beneficiaries. Non-beneficiaries are also reported as being interested in adopting this type of technology. This level of social interest and acceptance means that community members can be drivers of scaling, shapers of the model, and builders of relationships beyond AKRSP(I).

Conclusion

In order to enhance their impact going forward AKRSP(I) can take specific steps in the four areas outlined in this project's analytical framework. The major recommendations in these strategic areas are as follows.

AKRSP(I) can build capacity among farmers to engage in planning for sustainable development by bolstering their leadership training, helping groups develop their institutional systems, and promoting skills and knowledge associated with solar technology, water management practices, and relevant government schemes.

In relation to partnership, AKRSP(I) can align its SIP program with water management programs to promote sustainable groundwater use. It can also increase the scalability of its program by moving beyond donor funding to leverage the government's existing scheme for SIPs. This could feed into an improved financial model wherein the government and banking institutions like the National Bank for Agriculture and Rural Development provide specialized loan and repayment options for farmer to access schemes like this.

Finally, as AKRSPI contemplates shifting to a grid connected SIP model wherein groups of farmers form cooperatives to sell back excess solar electricity to the state, it should partner with the IWMI, who has experience piloting this model and negotiating the necessary power purchasing agreement.

In pursuing this next phase AKRSP(I) will need to advocate for a competitive FiT. If the tariff is not high enough farmers will seek out another productive use for their excess electricity, which may involve over-use of groundwater.

Finally, through regular monitoring and evaluation of specific variables AKRSP(I) can improve its model and demonstrate the necessary rationale for key stakeholders. Specific recommendations include assessing the ongoing technical performance of the SIP installation, and conducting an economic viability analysis comparing off-grid and on-grid SIPs as well as the specific benefits to DISCOMs.

References

Chapter 1

AKRSP(I). (2017). *Annual Report 2016*.

Balaboina, S. (2013). "Panchayati Raj and Dalits in India: A Post 73rd Amendment Scenario". Commonwealth Journal of Local Governance. Issue 13/14: November 2013

Chaudhuri, S. (2006). "What Difference Does a Constitutional Amendment Make? The 1994 Panchayati Raj Act and the Attempt to Revitalize Rural Local Government in India." In Pranab Bardhan and Pilip Mookherjee, *Decentralization and Local Governance in Developing Countries: A Comparative Perspective*. Pages 153–201. MIT: Cambridge, Massachusetts

Ghosh, R. "Decentralization and Rural Governments in India". Arthapedia [accessed October 22, 2017] http://arthapedia.in/index.php?title=Decentralization_and_Rural_Governments_in_India

Government of India, Ministry of Panchayati Raj. (2016). *Manual for Preparation of Gram Panchayat Development Plan.*

Johnson, C. (2003). *Decentralisation in India: Poverty, Politics and Panchayati Raj*. Working Paper 199. Overseas Development Institute. London.

Menon, S. V. (2007). "Grass root democracy and empowerment of people: Evaluation of Panchayati Raj in India". MPRA Paper No. 3839, posted 07. November 2007. Online at http://mpra.ub.uni-muenchen.de/3839/

Ministry of Panchayati Raj, "Decentralized Planning". http://www.panchayat.gov.in/gram-panchayat-development-plan

Murthy, S. L. and M. J. Mahin. (2015). "Constitutional Impediments to Decentralization in the World's Largest Federal Country". Duke Journal of Comparative & International Law. Vol. 26:79, pp. 79-139.

Singh, H. (1994). "Constitutional Base for Panchayati Raj in India: The 73rd Amendment Act". Asian Survey, Vol. 34, No. 9 (Sep.), pp. 818-827

World Bank. (2000). *Overview of Rural Decentralization in India. Volume I.*

World Bank. (2000). *Overview of Rural Decentralization in India. Volume II: Approaches to Rural Decentralization in Seven States.*

World Bank. (2000). *Overview of Rural Decentralization in India. Volume III: Background Papers.*

World Bank. (2004). *India. Fiscal Decentralization to Rural Governments. Volume I – Main Report.*

Chapter 2

Aasha Kapur Mehta and Amita Shas. Chronic Poverty in India: Overview Study. CRPC Working Paper 7. ISBN 1-904049-06-0.

Aga Khan Rural Support Programme India (2016). Annual Report 2016

Bhattachejee Anol (2012). Social Science Research: Principles, Methods, and Practices. Textbook collection. Book 3.

Commissionerate of Rural Development (2018). Mission Mangalam. The Government of India. http://ruraldev.gujarat.gov.in/glpc.htm

Gangopadhyay D., Mukhopadhyay A.K. & Singh P. (2008). Rural Development: A strategy for poverty alleviation in India. India, Science and Technology

Institute of Rural Development Anand (2017). Independent Assessment od design, strategies, and impacts of Day-NRLM.

Sudeshna Ghosh (2016). Rural Poverty in India: An Overview Study. Journal of Research in Humanity and Science, Volume 4, pg 01-12. ISSN 2321-9467.

Reserve Bank of India (2015). Master Circular - National Rural Livelihood Mission. RBI/2015-16/142

Evaluation toolbox (2010). Community Sustainability Engagement. Types of Evaluation. http://evaluationtoolbox.net.au/index.php?option=com_content&id=15

Ministry of Rural Development (2008). National Rural Livelihood Mission: Project Implementation Plan.

Mission Mangalam Gujarat Livelihood Promotion Company (2018). Introduction. http://www.glpc.co.in/showpage.aspx?contentid=3

Mission Mangalam Gujarat Livelihood Promotion Company (2018). Action plan. http://www.glpc.co.in/showpage.aspx?contentid=6

Neepa Saha (2005). Poverty Alleviation Programmes in India. Independent Commission on Development and Health in India. New Delhi.

Sowmya Ramesh and Warisha Yunus (2015). Social Inclusion and Social Development interventions in National Rural Livelihoods Mission.

World Bank. India's National Rural Livelihood Mission: An Overview.

Chapter 3

Bassi, N. (2018). Solarizing groundwater irrigation in India: a growing debate, International Journal of Water Resources Development, 34(1), p 132-145, doi: 10.1080/07900627.2017.1329137

Bird, J., Roy, S., Shah, T., Aggarwal, P., Smakhtin, V., Amarnath, G., et al. (2016). Adapting to Climate Variability and Change in India. In A. K. Biswas & C. Tortajada (Eds.), Water security, climate change and sustainable development: Water Resources Development and Management (pp. 41–63). Singapore: Springer Singapore. doi:10.1007/978-981-287-976-9_4

Dekker, T. (2015). Solarizing Indian agriculture by deploying solar irrigation pumps, KTH Royal Institute of Technology and IWMI, www.diva-portal.se/smash/get/diva2:844049/FULLTEXT01.pdf

Dubash, N. K. (2007). The electricity-groundwater conundrum: Case for a political solution to a political problem. Economics and Politics Weekly 42(52), p 45–55

Financial Times Lexicon, http://lexicon.ft.com/Term?term=environmental-sustainability

GEDA. (December, 2017), personal correspondence

Hyeon-Sook Shim. (2017). Solar-Powered Irrigation Pumps in
India - Capital Subsidy Policies and the Water-Energy Efficiency Nexus, Global Green Growth Institute

Ikerd, J., 1993. Two related but distinctly different concepts: organic farming and sustainable agriculture. Small Farm Today 10(1)

Monari, L. (2002). Power subsidies: A reality check on subsidizing power for irrigation in India. The World Bank Group Private and Infrastructure Network, 244, Washington, DC

Paranjothi, T. & Mishra, H. K. (na), Dhundi solar pump irrigators' cooperative: A preliminary study, International Co-operative Alliance Asia and Pacific, www.ica-ap.coop/icanews/dhundi-solar-pump-irrigators-cooperative [Accessed: 20-10-2017]

Planning Commission. (2007). Report of the Expert Group on Groundwater Management and Ownership. Government of India, Yojana Bhawan, New Delhi

PRS Legislative Research. (2017). Electrification in India: 'Saubhagya' scheme, www.legallyindia.com/views/entry/electrification-in-india-saubhagya-scheme

PRS India, Overview of ground water in India,
www.prsindia.org/administrator/uploads/general/1455682937~~Overview%20of%20Groun

Purohit, P. 'Financial Evaluation of Renewable Energy Technologies for Irrigation Water Pumping in India', Energy, Vol. 35, No. 6, 2007, pp. 3134–44.

Raghavan, S., Bharadwaj, A., Thatte, A., Harish, S., Iychettira, K., Perumal, R., Nayak, G. (2010). Harnessing Solar Energy: Options for India, Center for Study of Science, Technology, and Policy

Solar and Electric Light Fund (SELF), A Cost and Reliability Comparison between Solar and Diesel Powered Pumps Solar Electric Light Fund, 2008, http://www.self.org/SELF_White_Paper_-_Solar_vs_Diesel.pdf

Shah, T., Bhatt, S., Shah, R. K. & Talati, J. (2008), Groundwater governance through electricity supply management: Assessing an innovative intervention in Gujarat, western India, Agricultural Water Management, 95, p 1233-1242

Shah, T., Giordano, M. & Mukherji, A. (2012). Political economy of the energy-groundwater nexus in India: Exploring issues and assessing policy options. Hydrogeology Journal, 20, p 995-1006

Shah, T., Gulati, A., Pullabhotla, H., Shreedhar G., & Jain, R. C. (2009). The secret of Gujarat's agrarian miracle after 2000. Economics and Politics Weekly, 44(52), p 45–55

Shah, T. & Verma, S. (2008a). Co-management of electricity and groundwater: An assessment of Gujarat's Jyotigram scheme. Economic and Political Weekly 43, p 59–66

Singh, S, Pillai, H.P. (2010) Electricity policy reforms and its impact on groundwater use in Gujarat. MTS Report, Institute of Rural Management, Anand, India

Appendices

Appendix A

NRLM Interview Questions

A set of semi-structured questions were ask during the interview. These questions were based on the four cardinal themes that were posited by the implementation plan of the National Rural Livelihood Mission. Below are the semi-structured questions were asked.

- **Organizing vulnerable people into functional groupings**

1. What is your name?
2. What is the name of the SHG/VO/Federation or Panchayat or office?
3. What is your role / position?
4. How many members do you have?
5. How are members selected?
6. Are you affiliated to a VO or Federation?

- **Capacity building / Skills development**

1. What do you know about NRLM?
2. Is your SHG/VO/Federation registered with the GLPC?
3. What benefits do you derive from the GLPC?
4. What do SHG members get?
5. How many training programs have you had as an SHG?
6. Who provides the training?
7. Are there specific training needs that the SHG needs?

- **Financing of SHGs / VO / Federations**

1. How is the SHG financed?
2. How are SHG members financed?
3. How easy is it to get loans?
4. What is the average interest rate on your loans?
5. How is the interest rate affecting your livelihoods?

- **Livelihood enhancement**

1. How has your membership of the SHG impacted your livelihood?
2. What are some of the challenges to livelihood enhancement of SHGs / VO / Federations?
3. What can be done to improve it?

Appendix B

NRLM List of Interviewed Persons

The field interview started on Friday, December 8, 2017 and ended on Thursday, December 14, 2017. The sample area was the Narmada District in Gujarat. Four types of stakeholders were engaged. They included members of Federations and SHGs, Staff of GLPC, Panchayats (Sarpanchs and other executive members) and Staff of AKRSP(I). Below is a list of the persons who were interviewed within the stipulated duration:

SHG/VO/Federation/Panchayats/Bureaucrats	Village	Focus groups	Interviews	Total
AKRSPI Staff	Netrang		**4**	**4**
Shri Narjivan Adivashi Mahila vikas Mach	Sagbara	1		1
Sajanvor	Sagbara	1		1
Nagarik Mitra (Gramin Sushashan Pariyojna)	Sagbara	1		1
Programme Managers	Sagbara	1	1	2
Panchpipari	Nani Devrupan	1		1
Nitesh Vasava	Sajanvar	1		1
Paat	Paat		2	2
Pati	Datvada		1	1

Parodi (Panchayat & SHG head)	Parodi	1		1
Kheripada Panchayat	Kheripada	1		1
Kolivada Panchayat	Khokrauma	2		2
				18

Appendix C

Reserve Bank of India Master Circular

The master circular from the Reserve Bank of India provides regulations and other necessary details for the enhancement of the relationship between the banks and the SHGs. Below is Annex III of the master circular.

Annex III

Interest subvention scheme for Women SHGs

I. Interest subvention scheme on Credit to Women SHG for all Commercial Banks (only Public Sector Banks, Private Sector Banks and Regional Rural Banks) and Co-operative banks in 150 districts

i. All women SHGs will be eligible for interest subvention on credit upto Rs. 3 lakhs at 7% per annum. SHG availing capital subsidy under SGSY in their existing credit outstanding will not be eligible for benefit under this scheme.

ii. The Commercial Banks and Cooperative Banks will lend to all the women SHGs at the rate of 7% in the 150 districts. Annex IV provides the names of the 150 districts.

iii. All Commercial Banks (excluding RRBs) will be subvented to the extent of difference between the Weighted Average Interest Charged (WAIC as specified by Department of Financial Services, Ministry of Finance.) and 7% subject to the maximum limit of 5.5%. This subvention will be available to all the Banks on the condition that they make SHG credit available at 7% p.a. in the 150 districts.

iv. RRBs and Cooperative Banks will be subvented to the extent of difference between the maximum lending rates (as specified by NABARD) and 7% subject to the maximum limit of 5.5%. This subvention will be available to all RRBs and Cooperative Banks on the condition that they make SHG credit available at 7% p.a. in the 150 districts. RRBs and Cooperative Banks will also get concessional refinance from NABARD. Detailed guidelines for RRBs and Cooperative Banks will be issued by NABARD.

v. Further, the SHGs will be provided with an additional 3% subvention on the prompt repayment of loans. For the purpose of Interest Subvention of additional 3% on prompt repayment, an SHG account will be considered prompt payee if it satisfies the following criterion.

Appendix D

Solar Irrigation Pump Study Participant Summary

Category	Subcategory	No. of Groups	No. of People
Beneficiaries	AKRSP(I) solar beneficiaries	5	24
Beneficiaries	AKRSP(I) future solar beneficiaries	1	11
Beneficiaries	Dhundi solar cooperative	1	1
Beneficiaries	Government solar beneficiaries	-	2
Non Beneficiaries	AKRSP(I) non solar beneficiaries	1	10
Government Official	Serpanch	3	3
Government Official	GEDA	-	2
NGO Staff	IWMI	-	1
AKRSP(I) Staff	-	-	4