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# An Evidence Based Study On Measuring the Impact of Stakeholder Engagement to Drive Social Change- A Case of Adani Foundation

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**KEYWORDS**

*stakeholder engagement, drip irrigation, Callon's framework, sustainable practice*

**ABSTRACT**

As a part of CSR activity, Adani Foundation launched the Drip irrigation project in Mundra (Phase I&II). This study maps the stakeholder engagement process emphasized by Adani Foundation to bring holistic development of small and marginal farmers and adopt Drip technology as a sustainable practice in Mundra. Adani Foundation developed a broad coalition of key stakeholders such as farmer communities, government representatives, development agents, NGO staff and progressive farmers to initiate developmental agenda through various activities like seminars, exposure visits, consultations and media interactions. The study adopts Callon's framework to identify and monitor activities at the grassroot level and provide effective solution. Field study was conducted in 38 villages (phase I&II) of Kutch district where the Adani Foundation carried out the CSR activity. In-depth interviews with the beneficiaries and key stakeholders were conducted and analyzed to draw perspectives. The findings of the study highlight the impact achieved in terms of increase in knowledge and awareness of drip irrigation among farmers, improved fertility of soil, visible prosperity of small and marginal farmers, and promoting alternative livelihood activities.

## 1. INTRODUCTION

### *1.1 Background*

Water availability across the globe has changed drastically over the last four to five decades. It is seen that almost two-third of blue water withdrawals are for irrigation as irrigated agriculture represents a fifth of total cultivated land globally (Bhamoriya & Mathew, 2014). The depleting groundwater tables constantly create a global call to minimize the quantum of water used in irrigation and promote sustainable water use (Narayanamoorthy, 2003). Evidence from secondary studies suggests that the persistent depletion and degradation of groundwater scarcity can be found in adopting a micro-irrigation system such as drip irrigation method (Vaddula & Singh, 2023). This is because other ways to increase water supply for irrigated lands, such as completion of storage dams, interlinking rivers, desalination of seawater, and artificial recharge of groundwater and rainwater harvesting, are costly and long-term processes (Sipes, 2015). Drip irrigation is one of the most efficient irrigation methods, and it is also recognized as a potential technology to improve farmers' income and alleviate poverty (Postel, Polak, Gonzales, & Keller, 2009). Evidence shows that the water use efficiency increases upto 100% in a properly designed and managed drip irrigation system (Sivanappan, 1994).

Adani Foundation (AF) is pioneering sustainable development across the country through many interventions in health, education, livelihood, and infrastructure development. One of the critical organizational priorities of AF is to promote and ensure sustainable livelihood opportunities for all, especially concerning agriculture. For decades, AF has been working with the farmers in Mundra Taluka in Kutch District of Gujarat to encourage and prioritize

sustainable methods in agriculture through micro-irrigation systems (MIS) like the drip irrigation (DI) method. Mundra block provides a good prospect for agricultural produce than other parts of the Kutch district. However, farmers in the region face perennial problems of insufficient and erratic rainfall, depleting water tables, water logging, secondary salinization, and steep escalation of input costs on agricultural activities and others.

This case study documents Adani Foundation's evidence-based practices to engage stakeholders in promoting micro-irrigation systems like drip irrigation in the Mundra and their impact on the overall wellbeing of the farming population. The case highlights the Foundation's efforts to promote Drip as an alternate solution to the challenges of low water tables, low quality of water in the region, and insufficient rainfall, which adversely impact the farmers' agricultural

productivity and income. AF has been extensively supporting farmers in the area by providing subsidies for adopting drip irrigation practices. It has also created a holistic framework of educating, nurturing, and strengthening sustainable agriculture practices among the farmers through its various interventions, along with providing agricultural extension services and making investments in water resources regeneration to improve the agriculture landscape of the region.

### *1.2 Bridging the Gap*

Gujarat has been one of the high performing states in the country to adopt MIS, such as the Drip method of irrigation (Viswanathan, Pathak, & Bahinipati, 2016). The state promotes Drip in water-scarce, water-stressed and critical groundwater blocks and districts. In Mundra, many farmers had small or fragmented land holdings, low economic capacities, and low technical know-how. Consequently, installing Drip and benefitting from government subsidies was challenging. The smallholder drip irrigation project by AF in Mundra is an innovative solution to two of the most pressing problems farmers face in the region. First, smallholders in the small villages and communities in Mundra are poor and highly vulnerable; technological advances have not reached them properly in irrigation or are too expensive. Secondly, this area suffers from a considerable water resources scarcity and issues of poor water quality. Thus, there is an urgent need to promote sustainable agriculture that optimizes water use and efficiently secures resources.

***The drip irrigation project initiated by AF presented a twofold solution to the farmers' livelihood***

sustainability, poverty alleviation, and inclusive development. Firstly, there is broad scientific evidence supporting drip irrigation, claiming efficient use and optimum water usage. Evidence also promotes increased productivity and higher yields of crops that enable farmers to generate high income (Bansal & Zala, 2022) . Small, low-cost drip irrigation systems that fit small farm sizes can be procured using the subsidy and support provided by AF, which will allow farmers to grow more varieties of crops in small lands and earn more from the crops produced. To bring sustainable solutions to the persistent challenges faced by the small and marginal farmers in Mundra, Adani Foundation has consistently promoted sustainable technology such as drip irrigation in the region for the last decade. The members of AF have been an integral part of the journey of the farmers in Mundra, from witnessing their struggles with technology and resources to their success in adopting sustainable micro-irrigation techniques like drip irrigation, use of organic manure, pesticide, soil health, multi-cropping, etc. AF strategically introduced modern techniques to enhance people's livelihood in the Mundra district through drip irrigation interventions. They have also played a key role in implementing other projects in water conservation, such as infrastructure development, dam check, pond deepening, etc. Adani Foundation also supported farmers through various activities, such as drain-water harvesting, tree plantation training, and capacity-building programs on different agricultural techniques that reduce water usage. AF adopted a multipronged approach (Table 1) to understand people's needs, attitudes, and practices concerning adopting drip technology for irrigation as a sustainable and efficient method.

**Table 1**

| | |
|---|---|
| Key activities undertaken by Adani Foundation to assess and understand the need, issues and practices of small farmers in adopting drip irrigation technique. | Mobilization and awareness creation among farmers and stakeholders |
| | Informal meetings with farmers and families |
| | Focused group discussions |
| | Exposure visits to progressive farmers' farms and KVK when drip irrigation was in use |
| | Consultative meetings with KVK and Kisan Sangh |
| | Meetings with GGRC representatives and DI agencies |
| | VDC meetings and Gram Sabhas |
| | Seminars/Workshops |
| | Demonstrations and capacity-building exercise |
| | In person support and handholding |

### *1.3 Intervention by Adani Foundation*

Apart from assessing the need, attitudes, and challenges of people adopting sustainable technologies for agriculture, AF also engaged the farmers as key stakeholders to promote drip irrigation. Its vision to allow farmers' holistic development led them to emphasize engaging key actors in the block to encourage local drip irrigation interventions. It also partnered with crucial institutes and organizations like Krishi Vigyan Kendra (KVK), Kisan Sangh, GGRC, and others to seal viable options for promoting drip irrigation in the region. One key goal of AF was to address the challenges the small farmers face in acquiring subsidies for drip irrigation. For this, AF emphasized the "Deep Stakeholder Engagement" process, which engaged key actors for mobilizing, educating, handholding, promoting, and facilitating support to farmers for adopting the drip irrigation methods.

Adani Foundation launched the drip irrigation project in July 2010 as a pilot base in the Mundra block. The entire project is divided into two phases. The duration of the first phase was from July 2010 to March 2012. The second phase of the project was introduced in 2018 and was completed in 2020. In phase I, AF provided 25% of additional subsidy and spent INR 2,19,17,807 for 606 farmers. Similarly, in Phase II, AF provided 15% of additional support on the drip irrigation system and spent around INR 1,07,54,457 for 338 farmers.

**Table 2**

| | |
|---|---|
| The terms for availing subsidy and support from AF | Farmers who had applied for the subsidy in the month of July 2010 when the scheme was launched will only be provided with the Adani Foundation subsidy. |
| | Adani Foundation will provide subsidy for up to only 3 hector of agricultural land area (to be used under drip irrigation). |
| | AF will provide a subsidy of INR 27,000/- per hectare for drip irrigation, i.e., roughly INR 81,000/- per farmer or say per family. |

## 2. RESEARCH DESIGN

### *2.1 Research Objective*

The objective of the study is to assess the outcomes and impact of efforts made by the Adani Foundation to engage with stakeholders and strengthening their roles in Mundra. This includes evaluating the process of stakeholder engagement for mobilization, creating awareness and education related to the drip irrigation system, and financial assistance in terms of additional subsidies and its process.

### *2.2 Research Design (Secondary Review + Field Study)*

The case study involved a thorough investigation of literature to develop a detailed understanding of drip irrigation in India and its relevance in the context of Gujarat. A secondary search encompassed a literature search on coverage of DI in the district and state, past research work on the potential of DI, sustainable agriculture, and water resource management. The data search on physical and financial performance indicators relating to various DI schemes was collected from GGRC and State Government departments. Secondary data regarding program assessment and financial reports were obtained from AF. Other published data sources included research reports, local journals, state, and district-level statistics, etc. A field study was conducted in the Mundra district of Kutch, covering 38 villages where AF is carrying out its interventions for CSR activities. The study sample involved 25 villages from Phase I and 13 villages from Phase II of the project. 10% of the total beneficiaries of the project were selected for the study. Out of 944 beneficiaries, 102 farmers were selected for survey and interviews (including in-depth interviews). The respondents were selected based on the criteria mentioned below:

Gender (ownership of the land)

Type of farmers (based on the size of landholding + adopted DRIP with the support of AF subsidy)

Beneficiary from AF who availed subsidy during phase I or II.

### *2.3 Data Collection Tools and Processes*

Interview schedules were prepared in consultation with AF senior officers. The tools were pretested for the efficiency and comfort level of the respondents. More emphasis was given to the quantitative and qualitative impact created by the inputs

provided by AF through an effective stakeholder engagement process to implement and spread the reach of drip irrigation in Mundra. Separate interview schedules for farmers, key stakeholders, and implementers were prepared.

**Table 3 – Phase Wise Data Collection Process**

| Villages covered | Total Data collection | | | | | | |
|---|---|---|---|---|---|---|---|
| | Project period | Farmers | In-depth interviews | Key stakeholders | Implementers (AF team) | Total | Total beneficiaries of the project in both phase |
| 25 | Phase I (2011–12) | 27 | 5 | 13 | 6 | - | |
| 13 | Phase II (2018–21) | 65 | 5 | | | - | |
| 38 | Total | 92 | 10 | 13 | 6 | 121 | 944 |

The study was designed and administered with 121 respondents using the simple random sampling technique (Table 3). The selection of the farmers has been made randomly from each selected village targeted by AF. In addition, the purposive sampling technique was used to conduct in- depth interviews with the beneficiaries and key stakeholders. Virtual interviews were conducted with the AF team, senior management and officials who were involved during phase I and II. In- depth interviews with the farmers and key stakeholders were conducted over telephone by getting a prior appointment with the help of AF team. Call recordings of 25-30 minutes of each interview and summary notes were used for data analysis.

### *2.4 Data Analysis*

Data collected from interviews, surveys were analyzed using both qualitative and quantitative methodologies. In addition, field observation and summary notes from the personal interviews with farmers, in-depth telephonic interviews with key stakeholders – Kisan Sangh, VDC/GP, KVK, GGRC, local NGO/CSO, suppliers/dealers progressive farmers – were analyzed to draw perspectives. The study also covered institutional stakeholders at different levels at AF to understand the implementation and operational issues and the challenges of rolling out the project in two phases.

| | |
|---|---|
| Target audiences | **Key stakeholders**<br>Farmers, Communities, Gram Panchayat, and Village Development Communities<br>**Lateral stakeholders** (e.g., those who are closely working with Adani Foundation)<br>GGRC (Gujarat Green Revolution Company), Kisan Sangh, Krishi Vigyan Kendra (KVK), Supplier company/dealer<br>**Others**<br>Progressive farmers, Supplier company/dealer, CSO/ NGOs |
| Why?<br>Why is AF engaging with key stakeholders? | To understand the feasibility, scope, and challenges to promote a drip irrigation system.<br>Encourage and promote drip irrigation for ensuring sustainable farming practices.<br>To understand farmer's preferences, concerns, and challenges in availing Govt. subsidies for drip irrigation schemes.<br>To understand how, where, and who delivers their irrigation needs and how external support can facilitate and ensure agricultural and livelihood needs. |
| What are AF's objectives?<br>What does AF want the Stakeholders to do? | To introduce/educate farmers on adopting a cost-effective micro-irrigation system (MIS) to enhance their agricultural productivity through drip irrigation practices.<br>To avail subsidies/benefits related to drip irrigation schemes.<br>Advise on their access needs to agricultural services to inform specifications for future provision.<br>Advice on how they can address salinity issues in the soil through MIS.<br>Give anecdotal evidence of their current experiences. |
| What are the key messages delivered to the key stakeholders in the project course? | Drip irrigation practices can provide sustainable solutions to agricultural needs and ensure yield and productivity through a low-cost, practical, and accessible technique.<br>Drip irrigation can transform soil quality, address salinity issues, and play a key role in water conservation. |
| Key timeline | Phase 1 (dates): July 2010 to March 2012<br>Phase 2 (dates): August 2018 to March 2021<br>April 2012 to March/July 2018: Project stopped<br>Stakeholder engagement process and awareness generation activities initiated in the Year 2009–10. |
| KPI's<br>(How is impact measured?) | Improved individual income/household income, agricultural productivity<br>Reduction in expenditure (labor cost)<br>Reduction in water usage<br>Reduction in electricity usage<br>Improved land health/fertility<br>Improved quality of life (time spent with family, support education of children, improved self and family health, withdrawal of children and women from agricultural labor, participation in social life, etc.)<br>Reduction in declining level of groundwater availability<br>Increase in number of farmers adopting Drip (new as well as progressive) with and without the support of AF subsidy |
| Assessing KPI's | Number of meetings/participations through community and stakeholder engagement process (meetings, discussions, community meetings, and others)<br>Number of people presented at meetings/focus group sessions held<br>Anecdotal evidence from discussions and interviews on drip irrigation adopted by farmers<br>Number of people completing the survey<br>Analyzing and quantifying tangible and intangible indicators |

## 3. STAKEHOLDER ENGAGEMENT

Engaging key actors and collectively solving an issue is a fundamental operational approach of AF (Table 4). AF members have extensively worked with the farmers to understand their needs, issues, and concerns in the last decade. In doing so, AF realized the importance of involving the core actors in the village to maximize impact and holistically derive solutions to the challenges faced by the farmers in the region. AF emphasized dialogue with stakeholders like KVK (Krishi Vigyan Kendra), the agriculture extension center for promoting sustainable agriculture, farmer leaders, Gujarat Green Revolution Corp. Ltd (GGRC) and other key actors and organizations in the region for initiating the drip irrigation project in Mundra.

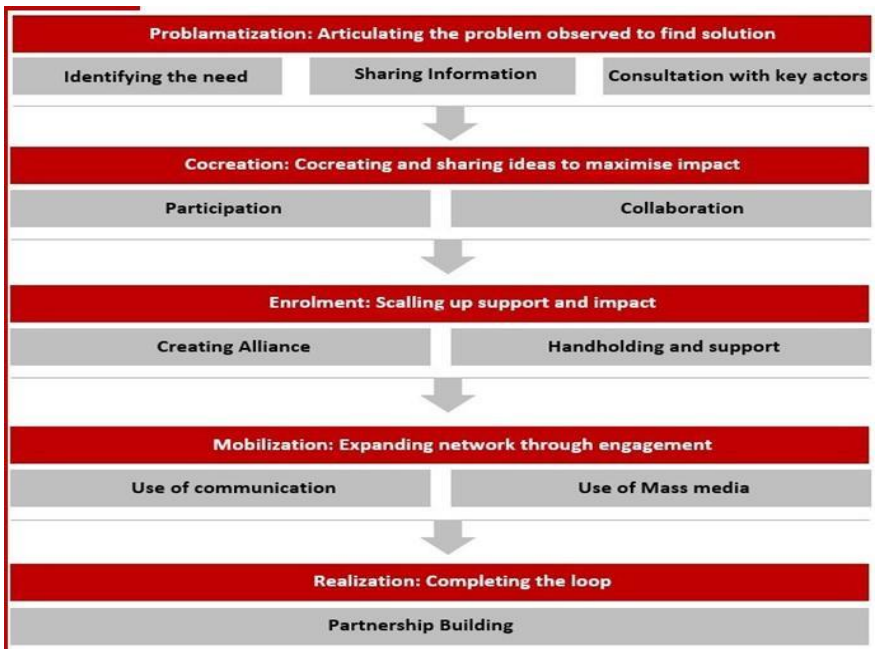
**Table 4: List of Key Stakeholders engaged by AF in the Drip Irrigation Project**

| Sr. No. | Stakeholders engaged in phase I & II | Details |
|---|---|---|
| 1 | Farmers | 606 farmers in phase I; 338 farmers in phase II |
| 2 | Kisan Sangh | Farmer Association, Mundra |
| 3 | Gram Panchayat & Village Development Committee | 46 villages covered in phase I; 44 villages in phase II |
| 4 | GGRC & Local Administration | GGRC is the SPC for providing subsidies for MIS Other blocks, district & state-level officials who are in charge of water conservation, agriculture, irrigation and others |
| 5 | Krishi Vigyan Kendra | Agriculture extension centre, Mundra |
| 6 | Supplier/Dealers | Agencies responsible for supplying and installing Drip |
| 7 | CSO/NGO | Local organizations such as Agrocel in the region working towards awareness programs on MIS |
| 8 | Progressive Farmers | All individuals who are exploring opportunities in agriculture as their source of livelihood |

### *3.1 The Stakeholder Engagement Framework*

In this study, we try to adapt the engagement of Adani Foundation with the stakeholders in the process of translating technology into five key steps (Figure 1): Problematization, Co-creation, Enrolment, Mobilization, and Realization (This is adapted from the framework given by Callon in 1986, regarded crucial for any technology translation and engagement at the grassroots).

**Figure 1: Adapting Callon's Theory of Translation**



### *3.1.1 Problematization*

Adani Foundation has worked with farmers in Mundra for decades to improve agricultural practices, use organic seeds and fertilizers, optimize resources, and promote scientific and traditional knowledge, capacity building, and infrastructure development. The observation and experiences in the field have enabled AF members to identify the various challenges and articulate them to a broader network of actors to develop solution-driven sustainable programs to support farmers. Therefore, Adani Foundation emphasized these critical steps in this phase:

Identifying the need: Identifying and deliberating on the issues that are recognized as crucial for the project. Identifying key actors who could mitigate and address the problems. Recognizing the condition of the target audiences (the farmers and the progressive farmers), assessing the need, and initiating dialogue with critical stakeholders.

Sharing Information: Adani Foundation shared the broad objectives of supporting drip irrigation and introduced the project concept with the stakeholders already working in agriculture to align common goals and objectives of the project.

Consultation with important actors: Adani Foundation initiated dialogue with all key and potential members to holistically develop project terms and goals for initiating the drip irrigation project at Mundra. Series of meetings, group discussions with the local authorities like GP, block administration (concerned department/s, Kisan Sangh, KVK, and local village leaders) were conducted to gather more baseline information, experiences of similar ongoing interventions, and their views for defining the project strategy.

### *3.1.2 Co-Creation*

The AF's success with the project can be linked to the convergence of interest of five major actors in the area: Mundra Kisan Sangh (a farmers' group working for the development of farmers in the region), Krishi Vigyan Kendra (an expert agricultural research-based center, working for agriculture innovation and scientific research in the area), GGRC (a key organization promoting drip irrigation in Gujarat by a subsidy assistance program), Village Development Committees, and Gram Panchayats. These actors were engaged to co-create the project roadmap for providing Adani Foundation additional subsidies to the farmers. This involved a series of actions and strategies through which AF identified the "problem to be solved" and aimed to create a shared vision for the program, identifying and tracing other actors' potential roles. The key steps involved were:

Participation: AF members encouraged inputs from the farmers, village leaders, and key actors in the village, such as the Village Development Committee members, Panchayat members, and others for planning, monitoring, and support for the drip irrigation projects. The AF team made continuous efforts to have an inclusive approach serving the best interest of all farmers. The Foundation emphasized trust-building and participation as its crucial role in promoting drip irrigation in the area. AF organized training programs, awareness drives, and FGDs with farmers' groups to coordinate common goals with the identified key stakeholders.

Collaboration: In this entire project, AF engaged various stakeholders to form a stable network of alliances. Organizations like Kisan Sangh played an integral role in implementing and maximizing the reach of the project. A committee was constituted, including the Foundation's Chief Executive Officer, Project Officer, a representative from Corporate Affairs, and two farmers' association members. Foundation also worked with all other stakeholders (elaborated in Table 4) in different project stages for decision making, awareness building, technical support, media, communication, and grievance redressal.

### *3.1.3. Enrolment*

It was scaling up the activities for the project that required identifying other individuals and agencies that would support agriculture through drip irrigation. Co-creation with Kisan Sangh and KVK members highlighted the need to initiate dialogue with GGRC regarding subsidy-based assistance for promoting Drip. GGRC would eventually fund the installation of Drip through subsidy-based support and build capacities of the farmers on MIS through training and workshops in the area. Other local NGOs such as Vivekanand Research and Training Institute (VRTI) and Agrocel worked with the farmers in the region to develop awareness and provide technical support. These became a catalyst for the Foundation in its attempts to promote Drip. More organizations enrolled for promoting Drip and working with the farmers allowed more opportunities for AF to make drip irrigation a success.

Creating Alliance: The steering committee was formed for the project with GGRC and state government representatives to support the farmers with subsidy-based assistance. The AF team and GGRC laid down the terms of the subsidy assistance program and criteria for identifying beneficiaries. The farmers paid 25% of the cost, whereas the remaining came from GGRC and the Foundation. The payment from the Foundation went once the system was in functioning condition. This significantly reduced the economic burden on the small and marginal farmers, which was a primary obstacle to installing a drip system. The alliance with GGRC allowed AF to reach maximum farmers in the region and holistically carve their growth.

Handholding & Support: Enrolling farmers for the program required extensive handholding and awareness creation from the AF team members. The AF created a support network with Kisan Sangh, KVK, and NGOs to handhold, educate and apprise farmers on drip technology. It also created many support initiatives on rain water harvesting, tree plantation training, and capacity building programs on various agricultural techniques that reduce water usage. AF also supported water conservation

through various activities like construction and repair of check dams, pond deepening, wells, bore wells, rooftop water harvesting, and underground drainage with sewage treatment plants in the intervention villages. To date, AF has the below mentioned structure to support water conservation:

| | |
|---|---|
| 22 Check Dams | New construction as well as repairing of the existing |
| 54 Ponds | Ponds deepened to increase the collection of water |
| 75 Borewells | Construction of borewells with recharging facility |
| 31 Wells | Construction of wells with recharging facility |
| 54 Roof water harvesting | Construction at the household level |

### *3.1.4 Mobilization*

This was one of the most crucial steps for the AF in the entire stakeholder engagement process. It involved creating a vast extension of individual and organizational networks around promoting sustainable agriculture and innovation (Table 5). With all its efforts, AF and its stakeholders have taken center stage in promoting Drip, with smallholder drip irrigation moving into the field. AF has given enormous efforts to mobilize the stakeholders that led to a net increase in the use of drip irrigation. Earlier, only a section of people could use and install the drip system, but with AF's intervention, the program has reached the taluka's interiors and the weaker ones.

**Table 5: Activities through which AF engaged and mobilized its stakeholders**

| | |
|---|---|
| Farmers | Meeting farmers at the doorstep<br>Meeting with farmer's family Organizing seminars and workshops<br>Focus group meetings with progressive farmers<br>Exposure visits |
| Kisan Sangh | Information and review<br>Monitoring<br>Consultation<br>Site visits<br>Seminar workshops<br>Media/recognition |
| KVK | Meetings<br>Seminars<br>Exposure to farmers<br>Opinion building activities |
| Gram Panchayat and VDC | Meetings<br>Peer pressure support |
| GGRC | Consultation meetings (keeping them informed about the project stages)<br>Organizing seminars for information dissemination<br>Telephonic conversation |
| CSO/NGO | Meeting<br>Seminar workshops |
| Suppliers | In-person communication<br>Organizing Krishi Mela |
| Progressive farmer | Meetings<br>Seminars<br>Exposure to farmers<br>Media interactions |

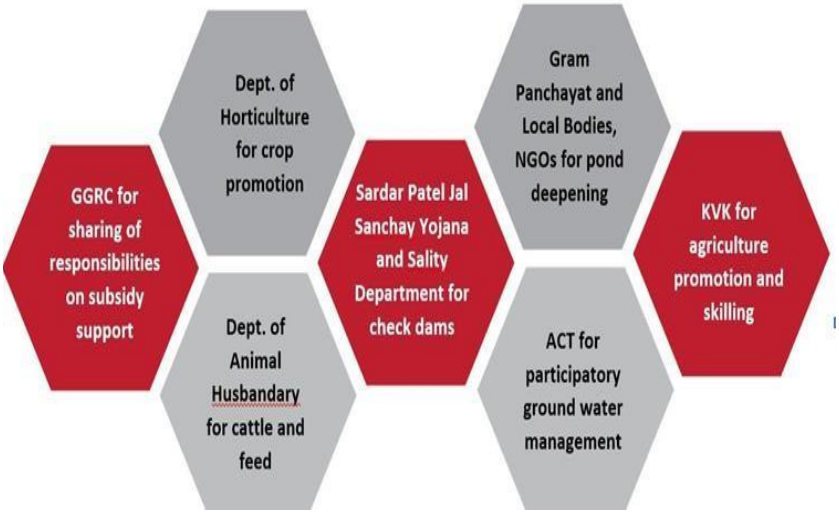
Use of communication: AF emphasized a participatory approach to mobilize target beneficiaries and stakeholder engagement. More emphasis is given to strengthening interpersonal relationships through more interpersonal communication like group meetings, focus group discussions, and in-person communication with families and beneficiaries. This approach has enabled the Foundation to get a deeper view of the target audience's knowledge, attitude, and practice. It also emphasized a bottom-up approach, which allowed the stakeholders to voice their opinions, concerns, and feedback to AF members.

Use of media: The AF also made intensive use of mass media to promote and endorse drip irrigation in the area. The Foundation engaged journalists, researchers, and mass media channels to share information via emails, press notes, interviews, etc. In addition, they optimized the mass media channels to recognize, appreciate, and run "be the change" programs that acknowledged the efforts made by the farmers in adopting sustainable agriculture and technology and the contribution of its stakeholders. As a result, the Foundation could leverage media to reach more people in need and create a buzz around innovative practices like drip irrigation in the region.

### *3.1.5 Realization*

This phase allowed the AF team to put together all its effort to clarify the project's result. AF made continuous efforts and follow-ups and created grassroots support mechanisms to deliver a successful impact. This phase allowed the Foundation and key actors to draw from the success and challenges of the drip program and design more effective programs in the region to sustain the progress made in Drip. The Foundation emphasized building lateral partnerships with organizations to strive for early and successive deliveries of their goals (Figure 2). It has stressed building partnerships with organizations promoting Drip and has developed a multifaceted partnership model with other livelihood promoting agencies to create a holistic project cycle.

**Figure 2: Key Partnerships of Adani Foundation for Livelihood Enhancement**




## 4. FINDINGS AND IMPLICATIONS

### *4.1 Impact Achieved*

Over the last decade, the Foundation has worked in different capacities with people, communities, and stakeholders, building key touch points and platforms for farmers to raise their concerns, issues, and opinions. In addition, it has extensively promoted sustainable agriculture practices like a drip in the communities of small and marginal farmers. The impact of the Adani Foundation's efforts can be seen in many areas improving the quality of life of its people and ensuring sustainable and safe agriculture in Mundra.

**Table 6: Highlights of the impact and key milestones achieved**

| Key Goals Indicators Envisioned (Impact Intended) | Impact Achieved | Key Project Milestones |
|---|---|---|
| Saving water/increase water conservation activities in Mundra block | Saving approx. 50% to 70% water usage in agricultural activities | Reduction in overuse of water in agriculture that leads to less groundwater usage |
| Reduction in salinity ingress in groundwater and soil to improve water and soil quality | An average of 86% of the farmers in both phases reported improved soil health.<br>The experts claimed a decline in the level of seawater ingression reducing salinity in the area | Increase in production and fertility of the land |
| To reach out and mobilize maximum small and marginal farmers to propagate DI in Mundra block | An average of 83% of the total beneficiaries covered with DI were small and marginal farmers | Maximum small and marginal farmers have adopted Drip in the selected villages |
| Increase in adoption of DI in AF's peripheral area in Mundra block | DI coverage:<br>Phase I – 100% of the GGRC coverage<br>Phase II – 42% of the GGRC coverage<br>Between Phase I and II, 1544 farmers have adopted DI | AF contributed 30% of the total coverage in DI by GGRC in the Mundra block |
| The prosperity of small and marginal farmers | 36% of the respondents reported 25% to 40% in various crops in both phases.<br>An average of 83% of farmers from both phases have claimed to lower expenditure on labor, electricity, and fertilizer cost by 60% to 70% | Farmers have expanded Drip in their field and shifted towards horticulture |

### *4.1.1Drip Irrigation Coverage*

On an average 83% of the total beneficiaries covered with drip irrigation were small and marginal farmers.

Progressive farmers (earlier supported by AF) expanded drip in the remaining land of total landholding through their investment without the support of AF. 42% of the drip irrigation project beneficiaries reported growing drip to their non-drip landholding on their investment.

Increased adoption of drip among small and marginal farmers because of the additional subsidy provided by AF. 78% farmers in phase I, 68% farmers in phase II, and the key stakeholders pointed out that GGRC offers support on the drip. However, the additional subsidy provided by AF allowed small and marginal farmers to take the subsidy and incur the installation expenditure. Earlier many small and marginal farmers hesitated to procure drip because of the high installation cost.

### *4.1.2 Water Conservation related impact*

The amount of water used to irrigate 1 acre of land can now be irrigated 5 acres of land. 72% of the total respondents agreed that water usage in agriculture had been reduced to 70% in the area.

An average of 86% of the farmers from both phases has reported improvement in soil health. In addition, the expert claimed a decline in seawater ingression level that has reduced salinity in the area.

All the respondents claim improved water and land quality with drip irrigation, and water is only given to the crop's root zone, which reduces evaporation losses. It also helps in the aeration of the soil and maintaining proper moisture levels, resulting in better fertility. Moreover, 50% to 70% of the farmers believed that the water quality is improved due to a decrease in seawater ingress.

Decline in groundwater level because of the over usage/wastage of water in agricultural activities is reduced drastically. 72% of the farmers agreed that they generally use the stored water in their farms in a limited manner, resulting in declining groundwater usage.

Decreasing salinity in coastal agricultural land because of the declining seawater ingression.

### *4.1.3 Agricultural Economy Related Impact*

The majority of the respondents agreed to an increase in the growth and quality of the crops/plants. There is an improvement in size, color, smell, and taste (crops/fruits/vegetables), resulting in better market price.

Farmers found that before installing Drip, they used to source water from bore well or tube well for eight hours a day. Now it has been reduced to three to four hours a day. Thus, before installing the Drip, electricity usage was eight hours a day (Govt. supply was eight hours a day only). After installation of the Drip, the usage has dropped to around 4-5 hours a day.

Farmers reported using water-soluble fertilizers having 80–90% efficiency while other fertilizers had 30–35% to improve the health of the land. Before Drip, two bags of fertilizer (100 kg in one bag) was required in one acre, and now with Drip, not even one bag is utilized – one bag of fertilizer costs around INR 3000.

81% of the farmers in Phase I and 91% in Phase II reduced their fertilizer and pesticide costs. Farmers also mentioned that fertigation helped them yield better. It was advantageous to apply Drip along with fertigation only.

#### *4.1.4 Well-Being*

There is a considerable saving in labor costs due to the reduced cost of weeding and irrigating water. Most farmers claimed that they had to spend a significant amount on agriculture laborers earlier, which is now considerably reduced due to the implementation of Drip on their lands.

With the adoption of drip irrigation and higher yields, a shift to horticulture is witnessed that increased income. Generally, the higher yields appeared to be the biggest reason for increased revenues. Farmers shared that the higher production due to drip irrigation helped them to improve their gross income. All the respondents from phase I reported an average of 29% increase in yield. Respondents in Phase II reported a 26% rise in profit. More than half of the farmers agreed on adopting horticulture as the main crop/product and the primary source of income.

Earlier, the farmers had to spend most of their time on the farm doing various labor work like irrigating water through water pumps (at night also), monitoring, removing the weed, fertigation, etc. Drip has reduced the burden of laborious jobs, and now farmers can productively utilize the time. All the respondents from Phase I and II reported an average of 45% and 55% reduction of work hours in the field.

### *4.2 Challenges Faced by Adani Foundation*

The Adani Foundation's efforts show how a strong engagement with the key actors at the ground can make extensive technology available to the weaker section of the society and serve as a means to the meet the sustainable development goals. However, identifying and engaging stakeholders from different areas, bringing them to a common opinion, and convincing each was highly challenging. Few of the challenges faced by Adani Foundation during the course of the project are listed below:

Resistance in sharing information and participating: At the beginning of the engagement process, the stakeholders hesitated to share knowledge, ideas, and opinions until the goals were clear. Farmers also had a misunderstanding regarding the project that discouraged them from joining/participating in the meetings.

Finding the right people: Identifying and inviting stakeholders to participate in the planning, implementation and review process was a huge task, and figuring out who to engage with was equally difficult.

Decision Making: Decision making was one of the crucial components in project implementation. A limitation was observed as stakeholders were hesitant to offer opinions and suggestions because of their risks. Balancing multiple inputs was challenging to determine whether a particular stakeholder was an outlier or had a personal or political agenda. It was a delicate balance to make stakeholders feel that their insights were valued, while at the same time being mindful that not all ideas would be incorporated.

Competing priorities: Stakeholders had their roles and responsibilities in their respective organizations. It was challenging to prioritize their tasks and interests while contributing to the project.

Resource Constraints: A lack of appropriate training and resources could limit the benefits of stakeholder's engagement. Stakeholders required additional brainstorming and support to make a meaningful contribution to the process.

### *4.3 Implications*

The benefits of Drip irrigation technology are visible only when the adoption of the technology happens at a large scale. Hence it is necessary for the government to not only frame policies but to also ensure large scale adoption of the same. For this the government can classify geographical clusters based on the hydrology and soil quality.

The farmers are hesitant to adopt Drip because of the costly after sales service. Private entrepreneurs/startups can explore this opportunity of providing affordable solutions to the technology.

Currently Drip is giving results only with certain specific crops. More research and funding is required to ensure that the technology can accommodate as many crops as possible.

The procedure to avail subsidy is considered to be quite lengthy, confusing and non-transparent. A need for faster, clearer and more convenient set of steps is required so that maximum advantage can be taken.

## 5. CONCLUSION

The study of drip irrigation by the Adani Foundation is an evidence-based example of how engaging and participating with people at the grassroots can create models of sustainable adoption of technology. The success of the technology appears unrelated to whether and how end-users appreciate it initially, but how it has translated to bring change in the overall wellbeing of people and the development sector. The study allowed a perspective on how technology can enable social change in agriculture and why engaging with stakeholders becomes crucial for translating technology at the grassroots. There is a need to understand small farmers' perspectives as technology users and as promoters and advocates of technology to

enable conducive environments for technology adoption, such as Drip. Also, there is a need to understand how different actors can facilitate and contribute to the success of the technology.

The role of multiple stakeholders at different project stages has been crucial to the project's success. It has played an integral part in introducing DI to the remotest part of Mundra, increasing awareness about the Drip, and building trust in the communities to adopt drip practices, mobilizing, etc. The current study can serve as an important example for other CSR organizations and policymakers to enable agriculture technology to minimize resources address environmental and social issues and optimize benefits.

## REFERENCES

[1] Bansal, R. K., & Zala, Y. C. (2022). Impact of Drip Irrigation Technology on Input use and Productivity in Banana: Evidence from Gujarat . Current Journal of Applied Science and Technology, 42-51.

[2] Bhamoriya, V., & Mathew, S. (2014). An Analysis of Resource Conservation Technology: A Case of Micro-Irrigation System (Drip Irrigation). Ahmedabad: Centre for Management in Agriculture Indian Institute of Management, Ahmedabad.

[3] Narayanamoorthy, A. (2003). Averting water crisis by drip method of irrigation: A study of two water-intensive crops. Indian Journal of Agricultural Economics, 427-437.

[4] Postel, S., Polak, P., Gonzales, F., & Keller, J. (2009). Drip Irrigation for Small Farmers. Water International, 3-13.

[5] Sipes, J. (2015). Sustainable Solutions for Water Resources. John Wiley & Sons, Inc.

[6] Sivanappan, R. K. (1994). Prospects of micro-irrigation in India. Irrigation and Drainage Systems, 49-58.

[7] Vaddula, Y., & Singh, K. (2023). Progression of drip irrigation and fertigation in cotton across the globe and its future perspectives for sustainable agriculture: an overview. Applied Water Science, 13(177). doi:https://doi.org/10.1007/s13201-023-01986-3

[8] Viswanathan, P. K., Pathak, J., & Bahinipati, C. (2016). State of Development and Adoption of Micro Irrigation Systems in Gujarat. In P. K. Viswanathan, M. Dinesh Kumar, & A. Narayanamoorthy, Micro Irrigation Systems in India (pp. 71-89). Singapore: Springer

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