

A photograph showing two people from behind, wearing straw hats and long-sleeved shirts, standing in a field and looking towards a cornfield. In the background, there are trees, a small building, and mountains under a clear blue sky.

Community-Driven Recommendations for Agricultural Technology Adoption in Underserved Farming Communities

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Executive Summary

Our case study examined the political, cultural, economic, and social environments that enable or constrain the adoption of agricultural technologies such as biodigesters, and how difficult it can be to achieve successful adoption across different communities. The research focused primarily on San Juan de Abajo, Mexico, where we found that the main barrier to farmers adopting different technological tools was the lack of social networks and institutional support.

In San Juan de Abajo, there is low trust and few communication channels among farmers. This situation is worsened by an unbalanced market characterized by the presence of unfair intermediaries called “coyotes” by farmers. On the other hand, there are very few individuals in positions of power within the Ejidos (the central agricultural organizational structures of the community) where leaders are not elected by the entire agricultural community, resulting in low community participation in decision-making. This environment of weak communication and limited decision-making power threatens the adoption of agricultural technologies, even when technologies are subsidized.

Lasting innovations in agricultural communities endure through strong social structures with deep roots. In these communities, solutions go beyond technical considerations and focus on the systems that make them accessible to everyone, as shown in Las Palmas, a neighbouring community.



Knowing this, the proposed approach is a scalable framework for making climate-conscious and sustainable agricultural technologies viable, in contexts where formal institutions are weak and skepticism is high, ultimately supporting more equitable, resilient, and locally grounded development outcomes.

Our main finding, as seen in Las Palmas, is that successful technology adoption in a farmer community requires a socially cohesive network that generates trust and transparent communication for all farmers. This network should prevent exclusion and allow everyone to access information and government initiatives that, due to limited data infrastructure, often fail to reach those who need them most. When there is coherence between what farmers know and what the government offers, it is possible to create durable social systems that allow technology to flourish in agricultural communities.

For this reason, the recommendations presented in this solutions brief are based on building a sense of community and strengthening coordination, communication, information, and trust. Our recommendation is to focus on four improvement actions:

1. Establish a municipal farmer registry to improve recognition, inclusion, and access to local programs and decision-making processes;
2. Create a community-led WhatsApp group to enable low-cost, accessible, and trusted information sharing and coordination;
3. Develop a farmer-led capacity-building group and innovation hub to support peer learning, on-farm demonstrations, experimentation, and inclusive governance;
4. Support community-led markets for sustainable inputs (e.g., bio) to create visible demand, encourage repeated collaboration, and generate short-term economic incentives.

These are solutions that go beyond a specific location and can be applied to diverse agricultural communities where weak community cohesion and institutional support is identified. They are solutions that must be built with and by the community in phases to allow for perceived benefits and ownership among farmers and others connected to the agricultural system.



Mapping of Policy Stakeholders

The stakeholder landscape is shaped less by “technology policy” alone and more by the political economy of rural livelihoods. Farmers are more likely to adopt new practices when they lower risk, bring clear economic benefits, and are supported by institutions they trust. In San Juan de Abajo and similar communities, these conditions are weak because community cohesion is low and many farmers are skeptical of formal institutions.

At the centre is the municipal government responsible for local programming but constrained by limited producer data and rigid planning cycles—constraints that directly affect any recommendation involving registries, targeted support, or procurement. Alongside them sits the leadership of the Ejido (Mexico’s agricultural governance system) primarily led by the largest producers in the region.

Intermediary implementers (such as ITESO University in our case of San Juan de Abajo) act as trust agents bridging donor requirements, municipal processes, and farmers’ constraints, making them central to shifts towards more sustainable agricultural practices. Upstream, funders and funder-intermediaries such as Fondo Noroeste y Occidente or Northwest and West Fund (FONNOR), the Mexican Fund for the Conservation of Nature (FMCN), the Global Environment Facility (GEF), Green Climate Fund (GCF), and World Bank, have a vested interest in sustained outcomes of projects that disseminate sustainable agricultural technology.

Market actors, especially intermediaries (“coyotes”) and buyers, shape incentives because dependence on exploitative channels affects both profitability and willingness to cooperate from the farmers end. Although market intermediaries and buyers are not formal policymakers, policy design must account for their influence because their practices shape farmer incentives and can either support or undermine efforts to build community cohesion and fairer market relationships.

Finally, the farmers are the main beneficiaries of the proposed solution, and the group who can actually carry out some of the proposed recommendations.





Solution: Community Cohesion

Our core solution is creating mechanisms to strengthen community cohesion and foster trust between farmers and local institutions. As evidenced by our case study, community trust frequently enables the long-term adoption of sustainable technologies like biodigesters, as farmers become willing to share successful practices with each other and become less cautious or risk averse. This solution overlaps closely with what we heard across interviews: trust among farmers and in formal institutions (municipality/Ejido) is extremely low. Many farmers report weak governance, disorganization, and exclusion that limits the potential for creating collective action. The comparison community (Las Palmas) reinforces the same pattern, exhibiting stronger community cohesion and a resulting higher rate sustainable technology adoption among farmers.

While our recommended solution and the four subsequent concrete recommendations can help address this challenge, there are still some key gaps. First, cohesion-building is slower than typical donor timelines. There is a potential misalignment between funder expectations and the longer trust-building needed for durable buy-in. Second, any collective structure must be designed to avoid reproducing existing power imbalances (e.g., larger farmers dominating), which means building inclusive governance from the start. Finally, there is a big risk that such community cohesion solutions and recommendations be regarded as top-down approaches that farmers might find not attractive. Recommendations discussed in the next section must be co-designed and co-implemented with farmers and other stakeholders to secure buy-in.

Recommendations

To foster greater community cohesion within San Juan de Abajo, we recommend the creation of a farmer registry, a WhatsApp group for communication, a community-led agricultural innovation hub, and market infrastructure for sustainable agriculture products like bio.

Establish a farmer registry for the municipality

A persistent challenge mentioned by municipal leaders in San Juan de Abajo is the lack of up-to-date data on farmers, their activities, and their needs. This makes it difficult for the government to design effective programs that address farmers' needs and track progress. We recommend that the municipal government establish a farmer registry to mitigate these challenges and provide a foundation to enable our other recommendations.

The farmer registry aligns with existing municipal mandates of providing support to the agricultural community and creating programs that serve the municipality's constituents. It also reduces barriers to access capital for the agricultural population down the line, as donor organizations such as FONNOR require credible baseline data and documentation in order for the community to be eligible to apply for funding that can support climate resilience or other development efforts. This registry would be a non-political administrative tool, likely to have buy-in from community members. In order to apply to FONNOR's funding call to support the biodigester project, ITESO compiled some basic documentation for San Juan de Abajo including a preliminary farmer database which can be used as a foundation for the larger proposed registry. Municipal representatives can carry out a survey to fill in data gaps and update information from existing documentation, aiming to capture farmer data such as home address, farm address, farm size, crop type, production volume, livestock, irrigation type, etc.

The registry can begin as a simple digital spreadsheet-based system (e.g., Excel) without advanced IT infrastructure, making the cost to implement it very low.

The municipality-led registry is intended to cultivate transparency and more effective programming for the agricultural community. Farmers can opt-in at first, reducing fear and allowing trust to build gradually. It will also provide the municipality clear visibility into small producers, land renters, women and older farmers who are often excluded from formal programs tied to land ownership or Ejido participation.

WhatsApp group for farmers

The next recommendation is the creation of a WhatsApp group for easy communication among farmers in San Juan de Abajo. This is based on successful communication via WhatsApp within the farming community in Las Palmas, noted by several farmers who spoke highly of the trust within their community. The WhatsApp group will be created by the Farmer Leader, an informal designation in the community, who is trusted by many farmers and members of the Municipal Government.

This recommendation fits informal communication norms that already exist and will require no new formal infrastructure from the municipality or Ejido. The WhatsApp group will be simple to set up and managed by the Farmer Leader and would not be tied up in any bureaucracy with the municipality or Ejido due to its community-led nature. It is intended to increase awareness about successful farming practices, knowledge sharing opportunities, and activities related to the innovation hub (see recommendation below). Additionally, there is no expected cost.

The group will leverage word-of-mouth communication, the most trusted information source in San Juan de Abajo and similar communities, and includes marginalized individuals like small producers and women who may ordinarily not be part of other communications. Ultimately, the WhatsApp group is intended to strengthen the social fabric of the community.

Capacity Building & Innovation Hub

The next recommendation that could improve community unity, trust, and the capacity of different farmers is the creation of a farmer-led capacity building and innovation hub. With the support of an NGO or external stakeholder, like ITESO, at the initial stage, this hub could help farmers spend more time together, share ideas, and discuss the challenges they face in order to collectively identify solutions. The idea is that this hub would be led by the farmers themselves, recognizing that Ejidos have limitations and are not currently fulfilling this role, which could instead be addressed through a structure such as this hub.

The purpose of the hub would be to create a centralized structure where farmers can share experiences such as success stories from applying biol or operating biodigesters. In addition, it would provide access to different types of training, whether from government representatives, NGOs, or specific individuals willing to support farmers, thereby strengthening agricultural practices, technical knowledge, and financial literacy. This hub would also serve as a space to promote existing government support programs. In many cases, farmers do not access government programs because they are unaware of their existence or do not know how to apply for them, which makes having such a space particularly valuable.





This hub also presents an opportunity to promote innovation and to establish experimental or pilot plots to test different innovative approaches and observe how they develop. One of the clearest ways to encourage broader participation in the biodigester initiative is for farmers to see that others are already using the technology. By creating demonstration plots (such as the one shown above), the entire community can observe results firsthand and become more confident in adopting new technologies or practices. This process could be supported by agronomists working with farmers and would not be limited to a single technology, but rather extend to future innovations introduced in the region. The hub would also function as a space to share best practices.

A farmer-led capacity building and innovation hub could become a structure that benefits the entire community by focusing on the dissemination of practical and accessible information through multiple channels, making it easier to reach different types of farmers. At the same time, it could evolve into a social and communal space where farmers connect with one another, share meals, and celebrate important moments together.

Community-Led Markets

In addition to fostering community cohesion, making the outputs of sustainable agricultural technology programs economically attractive will enable wider adoption.

It is recommended to establish community-led biol markets (or cooperative exchange systems) that create visible demand and repeated, low-stakes collaboration. Operationally, this can begin on a small and simple scale, starting with a small farmer committee (including a respected local trust agent), basic quality and handling guidelines, transparent recordkeeping, and regular exchange or sales days linked to local communication channels such as the proposed WhatsApp group. Financially, the critical lever is demand-side incentives (e.g., time-bound biol vouchers/discounts or municipal requirements for soil restoration) that temporarily rebalance relative prices.

This is important because subsidized or familiar synthetic fertilizers can crowd out organic alternatives such as biol unless incentives reduce adoption risk and make the switch worthwhile in the near term. This way, farmers are incentivized themselves, without any other external coordination, to participate in this free and fair community-led market by which the community cohesion is improved and that finally leads to increased demand for biodigester and other agricultural technologies.



Prioritization and Technical Assistance for Implementation

The first step is to bring farmers together to identify trusted community leaders. These leaders would represent shared priorities and help coordinate future initiatives that benefit the broader farming community. This group of leaders would be the foundation for the creation of any other initiative. They would be people whom everyone trusts, since support from NGOs is limited due to funding cycles and there is evidence of government distrust in the community. It is therefore necessary to create structures that can last over time, even when there are no funds coming from NGOs. These informal community leaders would become the bridge between farmers and technical experts, agronomists, governmental organizations, and also among the farmers themselves.

To be able to implement the proposed recommendations, phased development is also required. Ideally, this would start with actions that can have a strong impact but require less effort to achieve, such as the WhatsApp group. When certain communication channels or initiatives are already in place, it is easier to see results, and from there more complex structures can be created as communication and trust grow among all actors in the agricultural value chain. In addition, this helps generate transparency and honesty through text-based communication.

The next step is to engage NGOs who can advise farmers on how to organize themselves or create structures that can bring them collective benefits. This initial support is crucial to understanding what role each person would play in an initiative such as an innovation hub. It also helps empower farmers so they can define how decisions will be made going forward, who will be responsible advocating on behalf of the group, what each person's role will be, and how to transform these ideas into tangible solutions that benefit everyone.

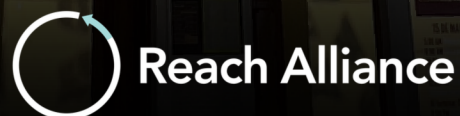
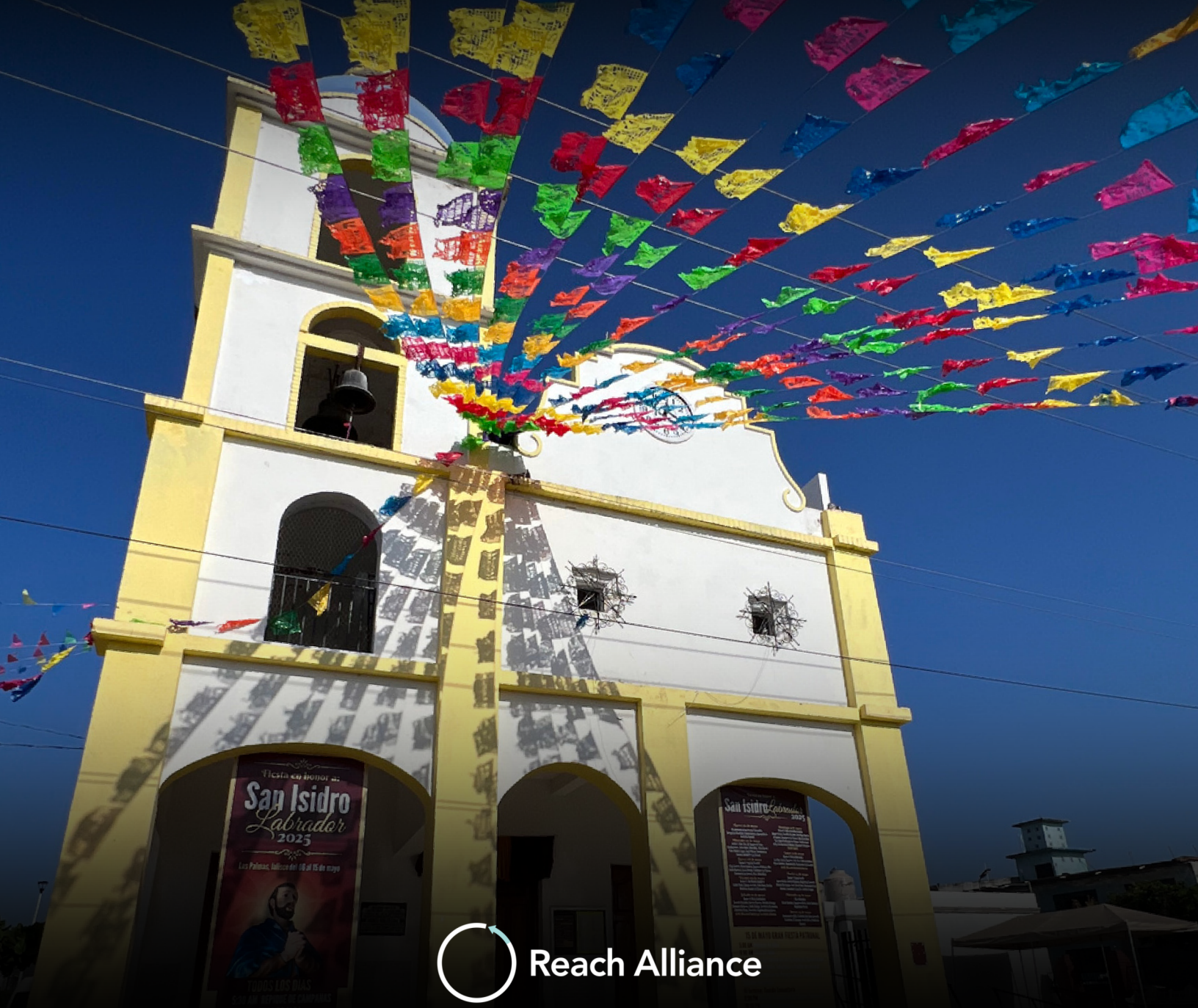
These recommendations are intended to create cohesion, a sense of community, and unity that allows everyone to trust the different systems being created. As this develops, it then becomes possible to shift toward more technical aspects, where farmers can access technical talks from different actors. These can cover agricultural, financial, political, and technological knowledge, or even discussions about the possibility of creating different markets or identifying which crops to focus on based on emerging demand in different regions. In general, we consider it essential that these interventions be carried out in phases, as improvements become visible and as the community adopts the suggestions and considers them effective.

Conclusion

The transition to more sustainable agricultural practices can be supported through technology adoption, yet success is dependent on trust within the community and a willingness to take risks. Our recommendations centre around fostering community cohesion, communication, knowledge sharing, and economic opportunities to realize the benefits of agricultural technologies.

Implementing these initiatives in phases and through engagement with trusted farmer elders, NGOs, the Municipal Government, and other key partners is critical. It is hoped that communities like San Juan de Abajo can develop a more trusting social fabric, a foundation to their journey towards sustainability and climate resilience.





This work builds on the 2024-25 Reach research report, [“Exploring the Adoption of Biodigesters in San Juan De Abajo, Mexico,”](#) by Rebeca Alarcon Delgado, Ashna Jain, Melisa Marin Jaramillo, Milad Naeimi, Erica Di Ruggiero, Gregorio Leal Martínez, Natalia Mesa Sierra, and all the impactful partners, community members, and mentors involved in the research.

As part of the "Pathways from Evidence to Action" series, inspired by the African Center for Equitable Development (ACED), the Reach Alliance challenged researchers to identify connections, address gaps, and develop recommendations grounded in their findings. The series comprises thirteen briefing notes developing solutions for urgent climate, public health, and economic challenges and engages practitioners and policymakers in advancing pathways to implementation.

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