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Promoting Sustainability  
Improving Affordability

***Bridging the credit gap: Water sustainability through innovative financing***





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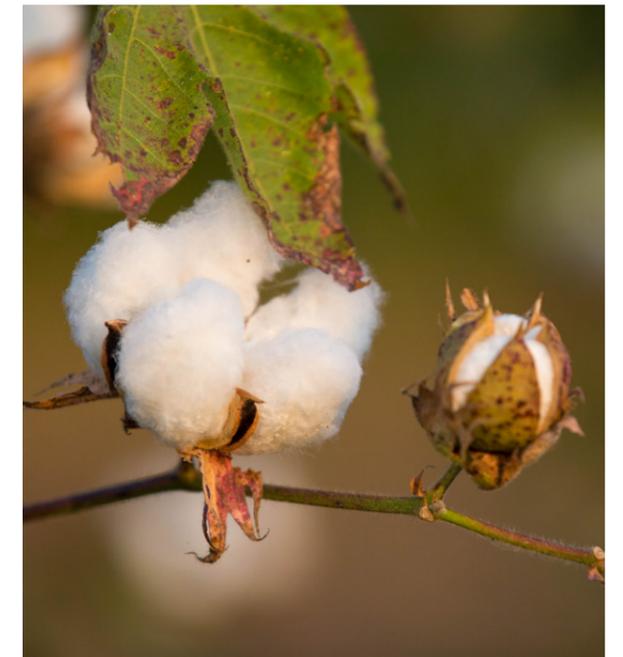
Preparing this document and collecting data would not have been possible without the support and facilitation of team members of Aga Khan Rural Support Programme-India (AKRSP-I): Mr Apoorva Oza, CEO of the programme, Ms Deepa Yadav, Mr Vitthal, Mr Ashok Vyas, and Ms Tinni Sawhney, CEO Aga Khan Foundation.

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*PricewaterhouseCoopers Private Limited, India*





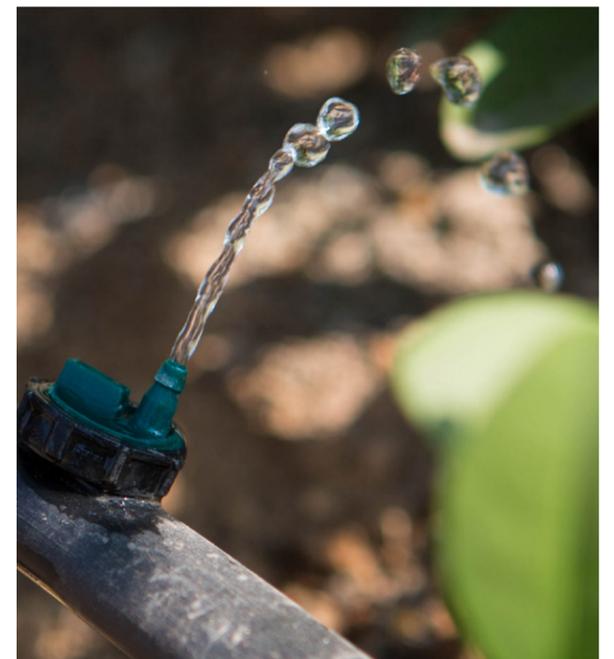
## Preface

The need to conserve every drop of water is more apparent today, at the inflection point of climate change, than ever before. Supply of water is limited, and there is an ever-increasing competition for it among resource-intensive systems, such as food and energy production. This results in a water supply crisis, widely accepted as one of the world's greatest contemporary societal risks. Therefore, 'climate smart' decision-making must form an integral part of food and water management policies.

While the availability of sustainable, safe and usable water is a global challenge, water stress is particularly acute in India. This is compounded by India's huge and dense population, a large agrarian economy and variability in rainfall. A World Bank report estimates that by 2030, India's demand for water will exceed all the available sources of supply. India is also the world's largest producer of cotton, a hydro-intensive crop.

Anchored in the belief that fashion can be a force for good, C&A Foundation supports and promotes innovative and scalable models to address sustainability issues in the fashion business. Overuse of water in the conventional production of cotton is certainly not sustainable and warrants urgent attention. The Drip Pool Programme is one of our innovative initiatives that makes it possible for poorly resourced cotton farmers to adopt water management technologies and conserve water in the production of cotton. It was piloted with the idea of establishing proof points that we hope will help frame public policy so that climate change analysis is incorporated into strategic and operational decision making. PwC was commissioned to script the case study to capture our approach and its impacts as well as detail lessons learned along the journey.

## C&A Foundation



# Executive summary

Water covers 70 per cent of our planet. However, freshwater accounts for only 3 per cent of the world's water, and two-thirds of that is in the form of frozen glaciers or otherwise unavailable for use. Globally, more than a billion people live in water-scarce regions, and it is projected that as many as 3.5 billion people could experience water scarcity by 2025.<sup>1</sup> Nevertheless, the global water crisis is more of a governance issue than of resource availability. It can be managed by improving the efficiency of water usage and reducing wastage.

Agriculture consumes 70 per cent of the worldwide freshwater withdrawal, so efficient water management in agriculture is critical to ensure sustainability of water resources. Within the agriculture sector, water intake varies from crop to crop. Cotton has a very high water requirement for irrigation. In one crop cycle, it needs about 700–1,300 mm of water, which is almost double the amount of water needed by major food crops such as rice. This underlines the need for water management in cotton farming. Moreover, since smallholder cotton farmers constitute about 80 per cent of cotton growers globally, building their capacity is imperative to achieve efficiency in utilization of water in agriculture.

India is the world's largest producer of cotton, with an estimated crop area of about 12 million hectares, accounting for 40 per cent of the global area under cotton production. Two-thirds of India's cotton is grown in three states—Maharashtra, Gujarat and Telangana. The conventional practice of cotton production in India, with indiscriminate usage of water and chemicals, is highly unsustainable. The World Economic Forum has identified India as a water-stressed country. Therefore, it is important to adopt technologies such as drip irrigation that lead to more efficient usage of water and chemicals, and improve the productivity of farms.

To this end, and to improve farmers' livelihoods, the government of Gujarat has formed a Special Purpose Vehicle (SPV) called Gujarat Green Revolution Company (GGRC). GGRC provides subsidies to farmers to install micro-irrigation technologies, such as drip irrigation. These subsidies cover about 40 per cent of the cost of installation and the remaining amount is expected to be borne by the farmers themselves. As small and marginal farmers do not have the financial resources to pay this additional amount, large and medium farmers constitute 60 per cent of the beneficiaries of this subsidy.<sup>2</sup>

## The Drip Pool Programme

To address the gap, C&A Foundation has designed the Drip Pool Programme along with its partner Aga Khan Rural Support Programme-India (AKRSP-I). The programme was started in 2010 in the Surendranagar district of the Saurashtra region of Gujarat. In 2015, the programme was extended to three more districts of the region—Morbi, Botad and Rajkot.

Saurashtra is a water-stressed region with scanty rainfall and depleting groundwater levels. Farmers often over-extract underground water for irrigation. They also flood fields using conventional irrigation methods. Such practices pose a serious threat to the soil, causing uneven distribution of silt and fertilisers in the fields, increasing salt content in the soil, and leading to ever more depletion of the water table. A vicious cycle ensues. Besides resulting in water scarcity, flooding also tends to increase weeds and pests in the fields, which makes cultivation more expensive and reduces net returns from the crop.

The C&A Foundation-supported programme in Saurashtra makes installing drip irrigation units affordable for farmers with limited financial means. The programme has set up a community financing mechanism to provide interest-free loans to such farmers. The loans help them avail the subsidy by providing the additional amount required for installation of drip irrigation units.

About 98 per cent of the farmers who availed the GGRC subsidy with support from this programme are small and marginal farmers. Thus, the programme is helping achieve the original twin objectives of GGRC—ensuring environmental sustainability and improving farmers' livelihoods.

The fund is currently being managed by Farmer Producer Companies (FPCs) with support from AKRSP-I. The programme is also working towards building the capacity of FPCs to manage the fund on their own by training them in fund management. AKRSP-I is strengthening the financial capacity of FPCs by connecting farmers' produce to the market. This will promote local ownership of the fund in the long run and ensure its sustainability after the exit of C&A Foundation and AKRSP-I.

<sup>1</sup> <https://www.smithsonianmag.com/science-nature/global-water-shortages-180959318/>  
<sup>2</sup> Small and marginal farmers: <=2 ha; Medium farmers: 2–5 ha; Large farmers: >5 ha

## Impacts of the programme

### Environmental impact

Farmers who participated in the programme were able to irrigate almost double the area of their fields through drip irrigation using the same volume of water. It has been reported that cultivation of cotton in an acre of land under the programme saves around 2.5 million litres of water. In addition, with appropriate fertigation, farmers benefit from up to 7 per cent savings on fertiliser usage. Reduction in fertiliser use also means less water and soil contamination. Drip irrigation conserves soil fertility by avoiding top soil erosion. This preserves the quality of the soil.

### Agronomic impact

Assured irrigation at a critical stage of the crop lifecycle has led to better germination and reduced seed mortality. This means less re-sowing and gap filling, leading to a uniform and robust crop. Farmers participating in the programme have reported reduction in seed cost by 6 per cent and increase in productivity by 24 per cent as compared to farmers without drip irrigation. Uniformity in the crop and proper nutrient management has also resulted in lower production loss in subsequent flushes. Regulated nutrient supply across the crop duration results in uniform production flushes. Participating farmers have reported a meagre 6 per cent dip in productivity between the first and third flush harvest compared to 21 per cent reduction in the case of farmers not using drip irrigation.

### Socio-economic impact

Better yields and uniform flushes of cotton have resulted in higher incomes for participating farmers. They have reported net incomes of EUR 301 per acre compared to EUR 231 per acre reported by farmers without drip irrigation. This is mainly due to lower cost of production for participating farmers as the installation of drips has helped them save money on purchase of weedicides and as payment of labour wages. In drip irrigation, water is applied near the root zone of the crop and this leads to fewer weeds in a particular crop. It has also meant a reduction in workload of women as weeding in the fields is mainly done by women and less weeding gives them more time with their families and for other activities. To date, the programme has seen 120 per cent repayment (i.e., 20 per cent pre-payment on scheduled EMIs) of loans from smallholder farmers.

## Institutional impact

The programme has focused on creating Farmer Interest Groups (FIGs) at the village level that are federated to FPCs. Going forward, FPCs will manage the community financing mechanism on their own. As farmers repay loans, other farmers of an FPC can obtain loans. These FPCs will become important institutions with additional benefits, such as collective purchasing of agricultural inputs and sale of crops. They will help small and marginal farmers overcome the limitations of lesser land, lesser produce and the associated reduction in bargaining power in the markets. The programme has now been embedded locally by creating these farmer-level institutions. By 2024–25, the foundation's contribution of EUR 2.92 million will be rotated to give loans worth EUR 9.59 million and will unlock a contribution of EUR 15.68 million from GGRC. The farmers' contribution in this period will be EUR 2.12 million. By 2024–25, the fund is expected to provide loans to more than 20,000 farmers.

## Lessons learned

The programme has shown positive results in improving farmers' livelihoods and environmental sustainability. It has successfully set up an innovative financial product to provide credit to small and marginal farmers who face difficulty in accessing formal credit. There are some key lessons from the programme that highlight how it can be replicated in other regions or scaled up within Gujarat:

- GGRC as an SPV was critical for the success of the programme. This independent institution administered the subsidy scheme professionally and with focus, leading to a more effective coverage of drip technology in the state. This is a model that could be replicated in other states as well.
- Contrary to popular belief that small farmers are not bankable, the zero-default rate of the loans is something to reflect upon. If financial instruments are customised to the needs of small and marginal farmers, repayment is timely with negligible default.
- Formation of FPCs is important for building local ownership and sustainability of the fund. The fund has been designed so loans can be provided in perpetuity. A small component of interest, if introduced, will cover the administrative costs of managing the fund.
- Intervention support is needed beyond the provision of loans and installing drip irrigation. Capacity-building of farmers, through extension services and creating support infrastructure around water management, is extremely important for the long-term success of such programmes in water-stressed regions.



## Understanding the challenge

### Global woes around water

The World Economic Forum has identified water crises as one of the important global risks in the coming decades and India has been declared a “water-stressed country” according to international norms.

But there is a silver lining. The UN’s 2015 World Water Development Report says, “There is enough water available to meet the world’s growing needs, but not without dramatically changing the way water is used, managed and shared. The global water crisis is one of governance issues, much more than of resource availability, and this is where the bulk of the action is required in order to achieve a water secure world.” The report identifies the need for better water management, use and governance to address the emerging global water crisis.

Agriculture consumes a major portion of water resources, accounting for roughly 70 per cent of all freshwater withdrawals globally.<sup>3</sup> Efficient use of water in agriculture is, therefore, important for sustaining water resources.

### Water needed by some crops during their growing period<sup>4</sup>

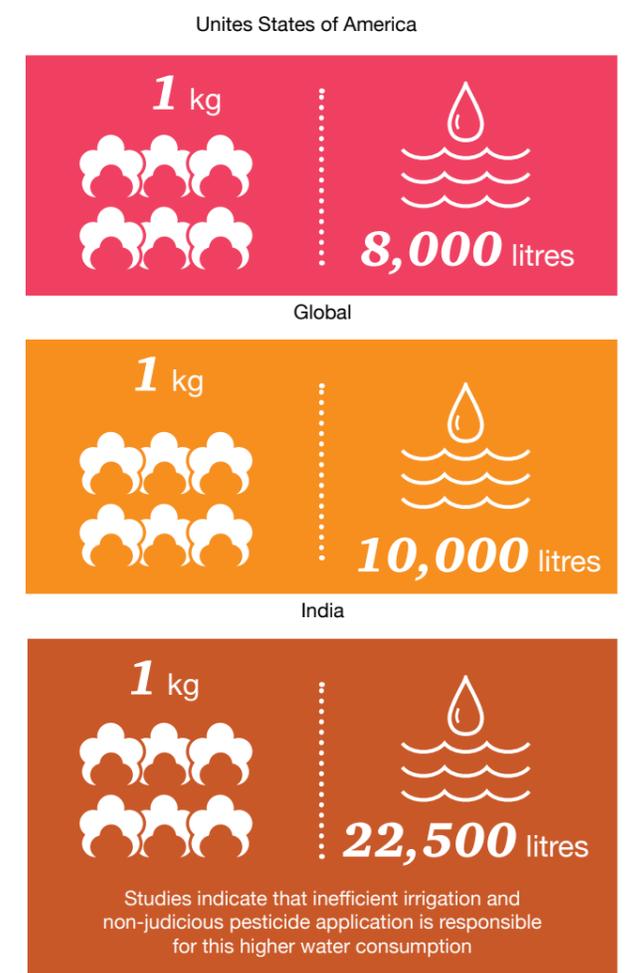
Crop	Water needed (mm)
Sugarcane	1,500–2,500
Cotton	700–1,300
Maize	500–800
Potato	500–700
Rice	450–700
Soyabean	450–700

Source: FAO report on crop water needs

Better water efficiency is particularly important in crops that consume more water per unit of production. Cotton is one such crop, needing more water during its growing period than others. Food and Agriculture Organization (FAO) estimates that cotton requires around 700–1,300

mm water during a single crop period, whereas this requirement is 450–700 mm for rice and about 500–800 mm for maize.<sup>5</sup> Managing the hydro-intensive cotton crop is vital to ensure the entire planet’s water security.

### Water consumption per kg of cotton produced



Source: The Water Footprint of Cotton Consumption, 2005

### Cotton production: India and Gujarat

After the Indian government launched the Technology Mission on Cotton in 2000, genetically engineered BT cotton came into cultivation in 2002.

This helped increase productivity dramatically, from a plateau of 300 kg per ha to 472 kg per ha by 2005–06.

<sup>3</sup> As per water use efficiency formula from IWMI  
<sup>4</sup> In mm  
<sup>5</sup> FAO Report on Crop Water needs

## Understanding the challenge



Currently, India is the largest producer of cotton in the world, accounting for about a quarter (5.88 million MT) of the world cotton production at an average productivity of about 522 kg per ha. About 40 per cent of the 12.4 million ha under cotton cultivation globally are in India.

Two-thirds of the production in India comes from three key cotton-growing states—Maharashtra, Gujarat and Telangana. Gujarat has the highest productivity at 758 kg per ha.<sup>6</sup> Nearly 64 per cent of the cotton-cropping area of Gujarat is in the Saurashtra region.<sup>7</sup>

### Knots in Saurashtra's cotton crop

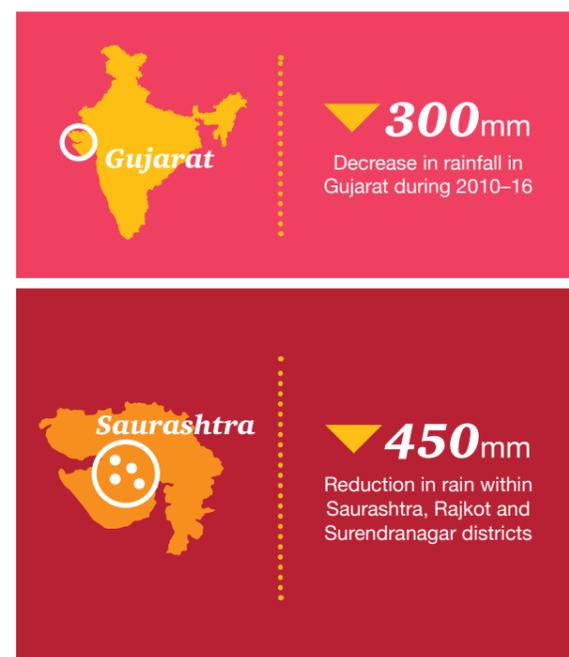
Saurashtra is the peninsular region of western Gujarat, on the Arabian Sea coast. Eleven districts of the state, (about a third of its geographical area) fall in Saurashtra. The ramifications of scarce and erratic rainfall, and short river courses in the region are inadequate surface water resources. With scanty rainfall, ground aquifers are also not refilled properly, which adds to the shortage of water for irrigation. In this agro-ecosystem, cotton is grown as the predominant monsoon crop.

Using electricity, farmers often over-extract the limited underground water. They also flood fields using conventional irrigation methods. Such indiscriminate irrigation practices lead to immense wastage of water. This poses a serious threat to the soil, causing uneven

distribution of silt and fertilisers in the fields, increasing the salt content in the soil, and depleting the water table. Besides causing water scarcity, flooding also tends to increase weed and pest infestations in the fields.

Other issues emerging in the cotton cropping include higher seed mortality, non-uniform crop density and low yields. The problems of salinity, over-irrigation and careless use of pesticides poses an environmental challenge as well. Higher labour and chemical expenses and lower yield of crops increases the cost of cultivation and reduces net returns from the crop. These hindrances are making cotton cultivation in the region less sustainable.

### Annual average precipitation in the programme area



Source: Socio-economic review, Gujarat State; 2016–17

Faced with the challenge of water availability, use and management, the government of Gujarat has started to promote Micro-Irrigation Systems (MIS) like drip irrigation to ensure “more crop per drop”. Research done at the State Agriculture University in Haryana shows that drip irrigation not only leads to more efficient water use but also significantly reduces pesticide cost, power requirement, irrigation hours per hectare and seed rate. The study also shows that productivity increased for cotton grown via drip irrigation as compared to flood irrigation.

### Key stats: Drip irrigated vs flood irrigated cotton

Particular	Drip irrigation	Flood irrigation
Pump set (HP)	7.5	7.5
Number of rounds of irrigation per ha	48	6
Hours per irrigation round per ha	1.65	19.75
Electricity consumption (kWh/ha)	447.5	667.5
Seed rate of cotton (g/ha)	2,510	3,393
Cost incurred in weedicide and intercultural operations (Rs/ha)	4,275	6,682
Production in quintal/ha	23.35	18.37

Source: Research Analysis at CCS Haryana Agriculture University, Hissar, Agriculture Science Digest, 35 (4) 2015: 300-303

### Drip installation by GGRC

Installing drip irrigation is capital-intensive and often out of reach of small farmers. In order to increase the uptake of this technology, the Gujarat government provides up to 40 per cent subsidy on the cost of installation. It has created a Special Purpose Vehicle (SPV), the Gujarat Green Revolution Company (GGRC) to implement this micro-irrigation subsidy scheme.

The remaining share (of 60 per cent) of the cost has to be borne by the farmers themselves. This money can come from their own pockets, or they can take a loan, or a mix of both. It was observed that while large and medium farmers managed to raise the additional sum and apply for the subsidy, small and marginal farmers found it hard to contribute the balance 60 per cent of the installation cost. They had limited financial means to begin with, which made it difficult to obtain bank loans as well.

In 2016, the government estimated that the percentage of agricultural loans out of the total advances in Gujarat

stood at just 16 per cent. Advances to small and marginal farmers accounted for just 5 per cent of the “adjusted net bank credit”.<sup>8</sup> In a state where most cotton cultivation is done by small and marginal farmers, low penetration of formal credit created a difficult situation for leveraging GGRC’s scheme on micro-irrigation. It meant that financially more secure farmers could benefit from government subsidy, but small and marginal farmers could not.

This is where C&A Foundation makes a difference by helping small and marginal cotton farmers afford drip technology. The foundation provides interest-free loans through a community financing mechanism to these farmers so that they can meet the 60 per cent contribution pre-requisite for GGRC support. With implementation support from the AKRSP-I, this initiative has been set up in four districts of Saurashtra—Surendranagar, Morbi, Botad and Rajkot.

# The Drip Pool Programme

The core of the Drip Pool Programme is the 'community financing mechanism', which provide interest-free loans to farmers and supports them in availing GGRC subsidy. A farmer gets a loan from the community financing mechanism which is repaid over two years through monthly installments. Repayments are returned to the community finance and used to provide loans to other farmers. In this way, the money keeps circulating and the benefits of drip technology reach more and more farmers.

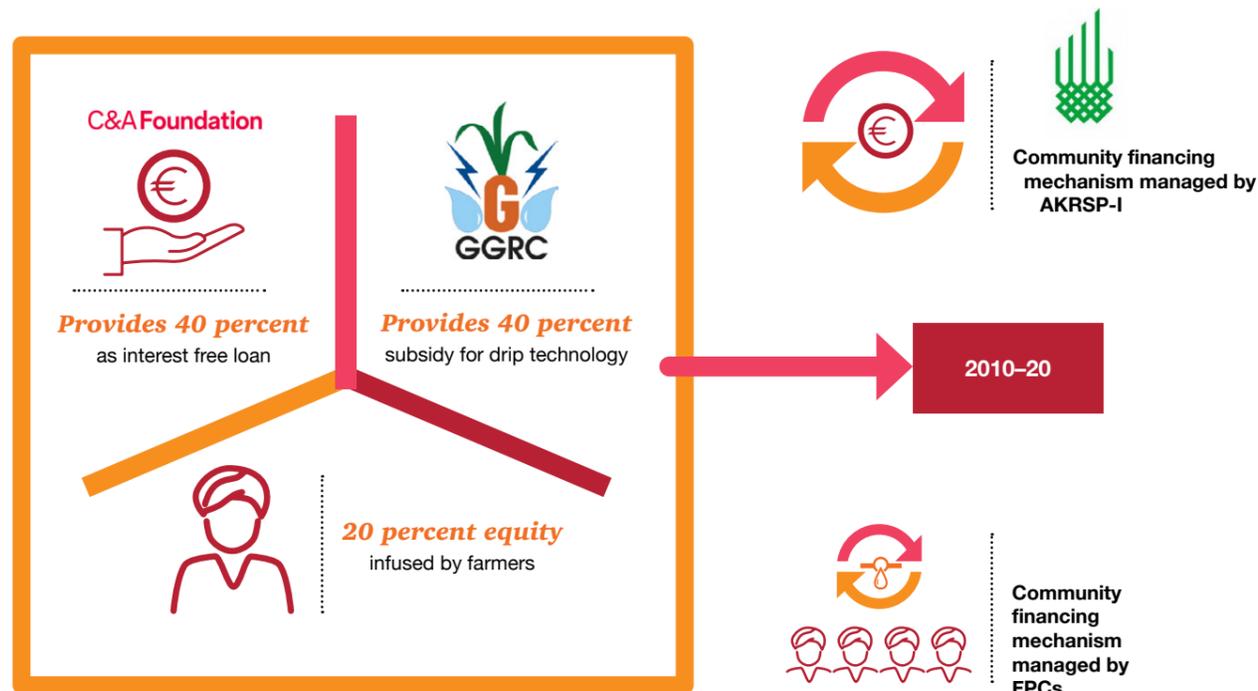
The Drip Pool Programme was started in 2010. During 2010–15, C&A Foundation, through its partner Cotton Connect, funded AKRSP-I to provide interest-free loans through the community fund to small and marginal cotton farmers to buy drip irrigation units.

The aim of the programme was to make drip irrigation affordable to those farmers who could not find the funds to apply for the GGRC subsidy. The programme covered 1,352 farmers in the Surendranagar district of Gujarat. The programme was based on two major offerings—technology and finance.

Technological aspects involved promoting drip irrigation in cotton cultivation, showing how it could increase profits and reduce the use of water. The financial component was the community financing mechanism, which helped farmers to adopt the technology. In a nutshell, the programme aimed to address the inherent limitations of the GGRC subsidy programme by assisting financially weaker farmers adopt drip irrigation.

With the successful completion of this programme, C&A Foundation decided to scale it up. It was extended to four districts in Saurashtra and a new aspect of "farmer's institution development" was included. This ingrained the technological and financial aspects of the programme into the community and helped make the initiative farmer-driven via strong farmer institutions such as FPCs. This phase of the programme aims to reach an additional 9,750 farmers by 2020, and continues to be implemented by AKRSP-I.

## The Drip Pool Programme



Source: C&A Foundation

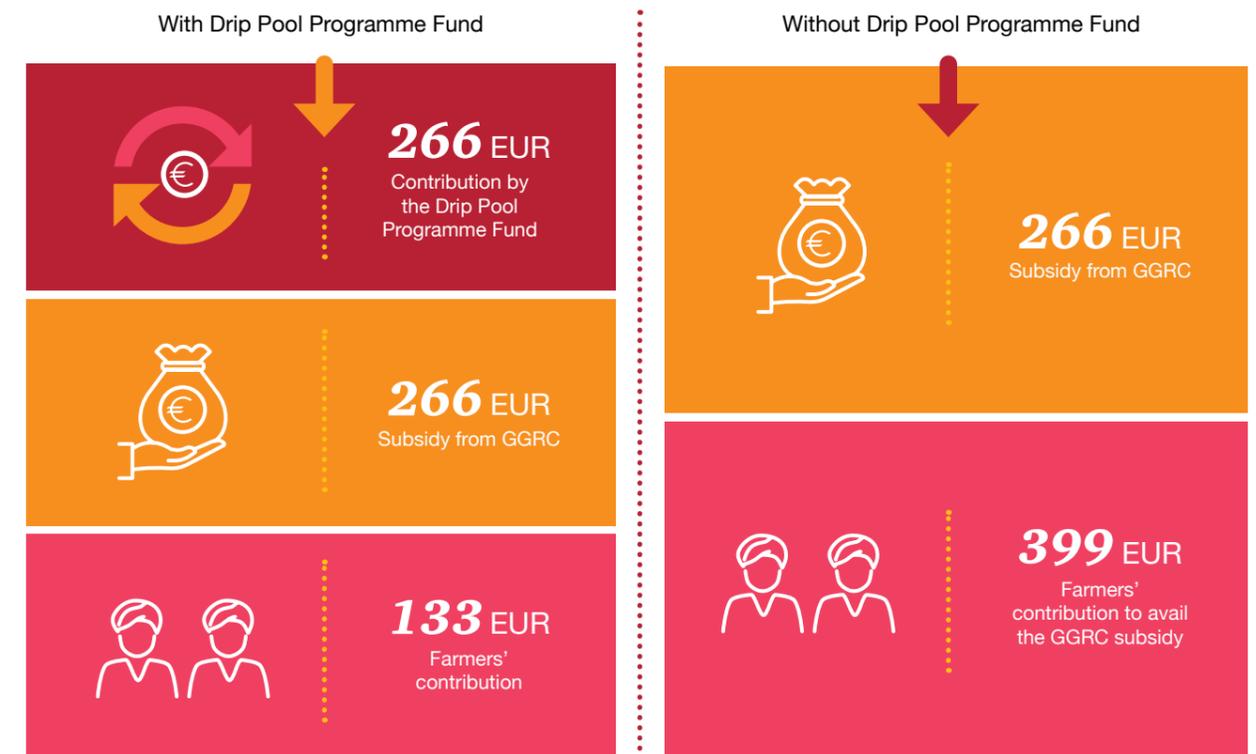
## Basic tenets of the Drip Pool Programme

Under the Drip Pool Programme, GGRC is providing subsidy of up to 40 per cent. The remaining 60 per cent of the cost is borne jointly by farmers (20 per cent) and the community finance loan amount (40 per cent). This loan is processed, disbursed and collected from the participating farmers by the field team of AKRSP-I. While disbursing loans, AKRSP-I's team makes use of a simple enrolment process for farmers requiring minimal documentation. Loans extended to farmers are interest-free, with their EMIs spread over 24 months.

## Identifying loan recipients

Villages are selected on the basis of the number of small landholders, sources of irrigation, drip irrigation penetration and overall livelihood opportunities. Selection of loan recipients is conducted via regular discussions with villagers. Unlike routine credit initiatives, AKRSP-I works through a 'close to the ground' team of para-workers and development officers at the village level, who are instrumental in identifying appropriate loan recipients, loan amounts and schedule of repayments as well as ensuring timely recovery from the farmers. Selected farmers are also trained and supported to introduce better agronomic practices in cotton cultivation, water management and related aspects.

## Enabling drip irrigation through the Drip Pool Programme



Source: C&A Foundation

## The Drip Pool Programme



*'Operational success of the Drip Pool Programme lies in addressing both the financial and extension issues of smallholder cotton farmers.'*

**Apoorva Oza**  
CEO, AKRSP-I



### Easing credit processing for farmers

Getting a loan from a bank can be a lengthy process requiring reams of paperwork. This can deter farmers from seeking institutional credit and they either remain under-financed or use informal channels of credit that charge exorbitant interest rates. The programme's interest-free loan is readily provided to identified farmers by the field team who service farmers at their homes with minimal paper shuffling.

### Customised repayment schedules

Under the programme, repayment schedules are customised according to farmers' cash flow, real-time assessment of crop production, repayment capacity, credit worthiness, alternative sources of income (such as dairy or horticulture) etc. This tailor-made repayment schedule helps in timely and even early repayment of loans and decreases the probability of default.

### Strong relationship = Stronger delivery

With strategic interventions of the foundation, para-workers and project delivery teams have established strong relationships with stakeholders. Capacity building of farmers in crop production and water conservation is carried out in collaboration with government institutions like Krishi Vigyan Kendras (KVKs) i.e., Farm Science Centres. To build upon the cross-learning

*AKRSP-I organises village meetings to create awareness and outline the benefits of the Drip Pool Programme. The team from AKRSP-I also arranges visits to other villages to show farmers the benefits of the programme. The field team uses the idea of "seeing is believing" and "learning by doing" to convince farmers to adopt drip technology.*

from sector experts, an advisory committee has also been formed. This committee involves experts from the International Water Management Institute, the Indian Institute of Management, Ahmedabad, Navasari Agriculture University, and senior members from the Aga Khan Foundation and C&A Foundation. The committee helps to identify solutions and provides guidance on implementing the programme.

Continuous interaction with farmers, MIS dealers, GGRC officers and other concerned stakeholders helps to develop trust between key stakeholders. Programme officers also help farmers identify the best MIS provider and draft applications to GGRC for the subsidy support. The team offers farmers end-to-end support on drip installation.

### Implementation—a two-way process

The Drip Pool Programme has been designed to value and include input from the farmers. Aspects such as repayment schedule, MIS supplier selection and agronomic trainings are finalised only after close discussions with the farmers. Feedback from farmers during talks with the AKRSP-I ground team has helped implement the programme in a manner that is farmer-friendly.

## Promoting a farmer-driven model

The programme has created four FPCs to carry forward the implementation of the Drip Pool Programme after the exit of C&A Foundation and AKRSP-I. It is envisaged that the FPCs will also take care of agri-input purchases and output sales for the member farmers. Successful

### Programme implementation structure

Programme envisioning  
Programme funding  
Overall monitoring

**C&A Foundation**

Aga Khan Foundation through Aga Khan Rural Support Programme-India



\* DO = Development officer

Source: C&A Foundation

implementation of the programme has brought many benefits to the farmers and, more importantly, to the cotton crop cultivation practices and the environment at large.

### Supporting stakeholders



*'Until 2015, I was solely dependent on rain-fed cotton crop as a source of income. I could not afford drip irrigation technology because of its inherent high cost and the complications involved in its application.'*

*Mansukhbhai, a para-worker of the Drip Pool Programme, guided me through the entire process of application to GGRC and also assisted me in availing an interest-free loan available under the programme. Thanks to the farmer-friendly para-worker of the programme, I cultivated jowar along with cotton and increased my gross earnings by more than Rs 22, 000 (EUR 277) from only 1.4 acres of land.'*

**Mathurbhai Jivrajbhai**  
Village Goraiya Vinchhiya, Gujarat

Source: C&A Foundation

## Programme impacts

The Drip Pool Programme has improved the affordability of drip irrigation for small landholders. In comparison to farmers not using drip irrigation, farmers who have availed the technology report a 31 per cent increase in their net income from cotton cultivation. The programme has impacted four key aspects of cotton cultivation—environmental, agronomic, socio-economic and institutional. In order to understand the impacts of the programme better, a comparative analysis was carried out between the cotton farmers supported by the programme (with drip irrigation access) and farmers using conventional irrigation methods in growing cotton.

### Environmental impact

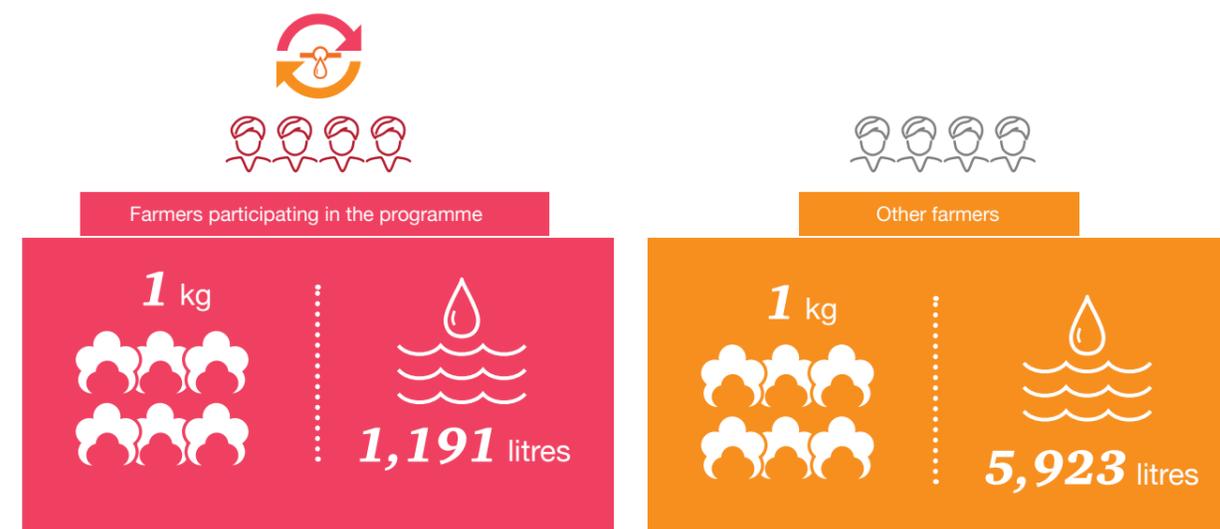
#### Promoting sustainable cultivation through water conservation

Promoting micro-irrigation of a thirsty crop like cotton in water-scarce Saurashtra has some environmental benefits

as well as multiple cropping advantages. Drip technology avoids flooding of an entire field and wets only the root of the plant, reducing the volume of water needed for irrigation. Farmers participating in the programme have reported use of only 1,191 litres of water for growing a kg of cotton, whereas 5,923 litres of water per kg cotton are being consumed by other farmers.



### Water consumption scenarios per kg cotton produced



### Increase in water productivity in cotton cultivation under the programme

Increase in area under cotton cultivation by utilising the amount of water saved per acre



To date, the Drip Pool Programme has been able to cover around 2,000 acres under cotton cultivation



Water saved in the 2,000 acres of land covered so far

### Target by 2020

22,500 acres

Drip Pool Programme to cover



Source: C&A Foundation



Water will be saved in the 22,500 acres of land that will be covered under this programme

The impact of enhanced water productivity will be felt beyond cotton cultivation, and will positively affect the overall ecosystem of the region

## Programme impacts

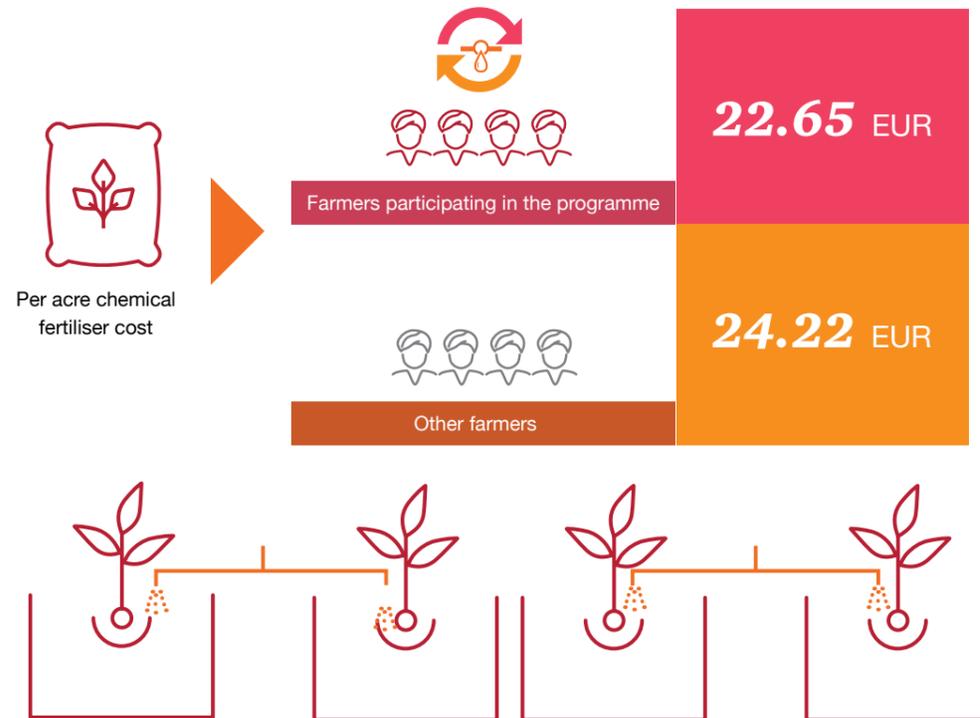


Jenamben, a farmer from Arnitimba village, installed drip irrigation on her two-acre cotton farm after getting financial support from AKRSP-I. She has seen clear differences in her drip irrigation-installed cotton farm as compared to flood irrigated farms. She saved money on fertiliser, seed and labour costs.

In terms of cotton seeds for sowing, usage has decreased from two and a half to two packets. She is delighted that the technology has brought happiness to her family by reducing the drudgeries of fertiliser application and weeding.

Jenamben Farukbhai Badi, Arnitimba

### Reduction in chemical contamination of water and soil using drip technology



Fertigation methods have propagated balanced use of chemical fertilisers

Fields installed with drip technology are less prone to fertiliser drift and leaching losses

Drip technology has reduced fertiliser application in the fields

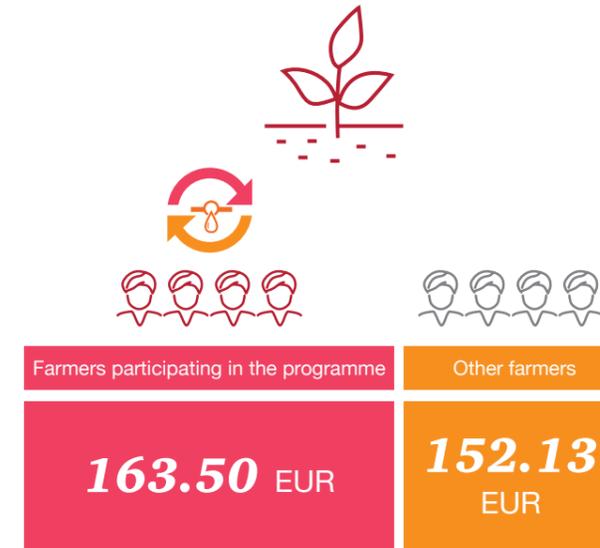
Drip technology has helped in reduction of soil and water contamination, and soil salinity problems

Source: C&A Foundation

## Agronomic impact

With adequate irrigation at critical crop stages, including sowing, farmers have observed better germination and decreased seed mortality. This has considerably reduced the need for gap-filling, resulting in lower seed costs.

### Cost of cultivation



Source: C&A Foundation

### Uniformity in production flushes brings in uniform returns

With less water and nutrients running off the fields, participating farmers have obtained more uniform crops. This uniformity, along with regulated nutrient management through drip technology, has resulted in a smaller drop in production in later flushes. The dip in productivity between the first and third flush harvest was a mere 6 per cent for participating farmers, compared to 21 per cent for other farmers.

### Increased fertiliser cost efficiency

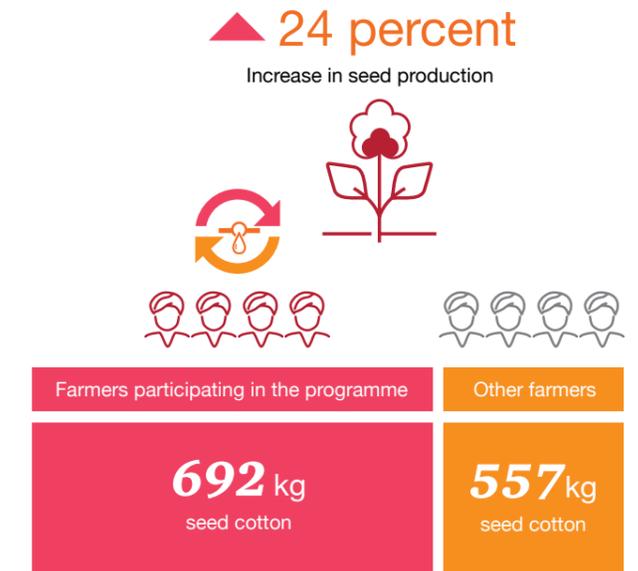
Fertigation through the use of drip technology saves considerable labour costs and creates an opportunity for precise application of nutrients in a uniform manner. It also helps control drift and other abiotic losses observed because of foliar application. Participating farmers have reported 6 per cent lower chemical fertiliser use compared to other farmers. Drip irrigation curtails the growth of weeds and pests. It also ensures better cost efficiency of chemical fertilisers and pesticides.<sup>9</sup>

<sup>9</sup> Cost efficiency is derived as a ratio of input cost (fertiliser or pesticide) to the gross revenue

### Reduction in per acre seed cost



### Increase in per acre seed cotton production



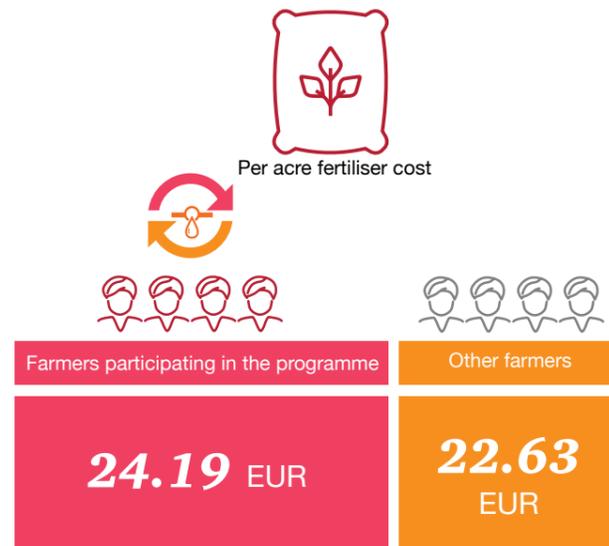
Source: C&A Foundation

### Better yield of seed cotton

A well-regulated irrigation and nutrient schedule has increased the production for participating farmers by 24 per cent compared to other farmers in the same geographical location and during the same cropping season.

## Programme impacts

### Per acre fertiliser cost

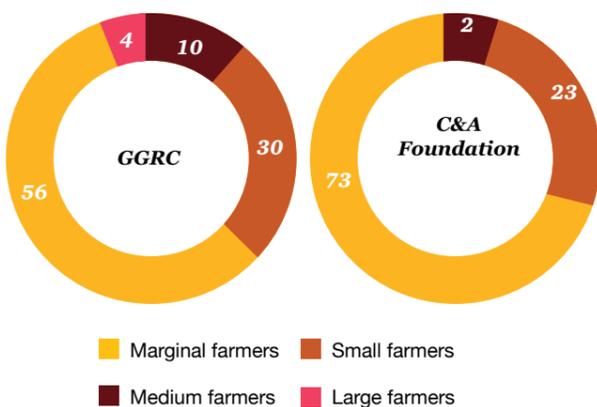


Source: C&A Foundation

### Customisation of the government's MIS Subsidy Programme

The Drip Pool Programme has helped the benefits of GGRC's subsidy programme to reach small and marginal land holders, who did not have the resources to apply for the subsidy. With the Drip Pool Programme providing an interest-free loan for meeting a farmer's contribution, it has been easier for farmers with limited financial means to participate in the government programme.

### GGRC and C&A Foundation loan recipient mix



Source: C&A Foundation

### Reduced weed menace and lower labour costs

Ensuring that water is available only near the root zone of the crop reduces weed infestation in the fields. In turn, this saves money on herbicides and labour. Weeding used to be mostly done by women, who can now use their time better for family and social activities, increasing the social well-being of the farmers.

### Per acre labour costs



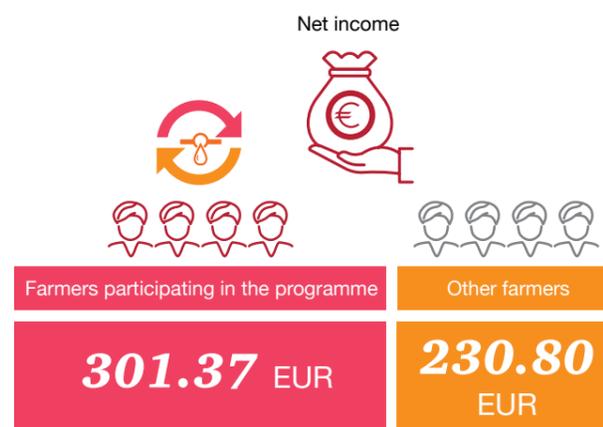
Source: C&A Foundation

### Socio-economic impact

#### Enhanced net income of farmers

With better yields and uniform flushes of cotton, participating farmers have been able to earn more money. Enhanced cash flows have helped them improve their living standards and repay their loans on or before time. To date, the programme has observed 120 per cent repayment (i.e., 20 per cent pre-payment on scheduled EMIs) of loans from small landholder farmers.

### Increase in per acre net income



Source: C&A Foundation

### Zero default in repayment of Drip Pool loan

One of the most commendable achievements of this programme is the zero-default record in loan repayment while working with small and marginal farmers. This is largely because of two features of the programme.

First, the repayment schedule is customised according to the farmers' cash flows, real-time assessment of crop production, repayment capacity and alternative sources of income (like dairy or horticulture).

Second, interest-free loans from AKRSP-I create a social and moral obligation for farmers to repay them on time. In this, para-workers play a critical role in building relationships and engaging with the larger village community.

### Institutional impact

#### Creating farmers' institutions

AKRSP-I is supporting farmers to form FIGs and FPCs. These groups have been trained to promote good practices in cotton cultivation. So far, four FPCs have been formed. Six more are planned under the programme. These FPCs will manage the fund and leverage benefits of collective negotiation. This would enable them to buy inputs at a cheaper rate and help find markets for their produce at better prices.

### The community managed funds in the Drip Pool Programme (in EUR)



Source: C&A Foundation

In the four year period (2016–20), the foundation will work with 9,750 cotton farmers in the cotton-growing Saurashtra region of Gujarat, supporting farmers to adopt water efficiency measures and other sustainable farming practices. A total of 19,000 additional acres of cotton farming will be brought under drip irrigation. Water use per acre will be reduced by 25 per cent through drip irrigation installation across the 19,500 acres during the four year period. The income of farmers participating in the programme is expected to increase by 31 per cent compared to other farmers, through reduction in cultivation costs and improvement in cotton productivity.

## Lessons learned

The hallmarks of any successful programme are that it builds upon the strengths of existing structures and initiatives, and creates strong partnerships with key stakeholders. Such a programme is instructive for all sides and every participant as they profit from a mutual sharing of understanding and knowledge. The Drip Pool Programme highlights the importance of involving the right partners and encouraging a sense of shared ownership (rather than a top-down approach). Some of the key lessons from the programme can be outlined as follows:

### ***A supportive government institution helps improve programme delivery***

The importance of having GGRC at the helm of affairs at the state level in the form of an SPV cannot be over-emphasized. The financial and institutional shape which the Drip Pool Programme has taken was largely determined by the GGRC initiative to subsidise installation of micro-irrigation technologies in the state. The government of Gujarat, through GGRC, provides capital subsidies of about 40 per cent of the cost of drip irrigation equipment. This environment created by the government of the state enables optimal execution of the programme. It would be very difficult to implement a technology-driven intervention like the Drip Pool Programme without this scheme and the SPV structure. Moreover, a fair measure of transparency and official monitoring remain vital for the continuing success of the programme.

### ***Structuring repayments is key to reducing loan defaults***

The programme has a zero-default rate in the repayment of loans because of its unique implementation strategy. Para-workers interact with farmers regularly to understand their situation and needs. Repayment schedules are not rigidly fixed like in other loan products. Instead, they are designed according to farmers' cash inflows from agriculture and other activities like dairy and horticulture. Creating a community financing mechanism managed by the farmers themselves, from which money can be lent to other farmers in need ensures that the whole village community takes interest in repayment of loans, thus creating a moral and social obligation for timely repayment.

### ***Ingraining sustainability through farmer organisations***

Participating farmers are organised into FPCs to benefit from a collective economy, at both the input and output sides of the agri-value chain. These groups are being trained to adopt better practices and group management. It is envisaged that these institutions will manage the community finance independently and extend the reach of the programme, thus ensuring that the intervention continues after external support has ended. Going forward, these FPCs will charge a token interest on the loans extended to farmers for meeting their administrative and operational costs.

### ***Intervention is required beyond financial support for drip irrigation***

Interactions with farmers and implementers of the programme reveal that switch to drip irrigation and other similar technologies is not enough to address the problem of water scarcity in the region. Where there is little or no water, the benefits of drip technology would be limited. This triggers the need for an increased focus on promoting water availability along with effective water management.

An integrated approach promoting water harvesting and conservation techniques together with the adoption of drip irrigation technology is the need of the hour. A portion of the funds (if additional funds are not available) may be allowed to be diverted for these activities and to conserve water collected during the rainy season. This would ensure availability of more water throughout the year and also help increase cropping intensity in intervention areas.

### ***Agricultural extension is also crucial***

Besides the financial intervention, para-workers are being identified at the village level and their capacities enhanced through trainings. In collaboration with government institutions like KVKs, farmers are also being trained on better crop production and water conservation techniques. An advisory committee has been formed with experts from IWMI, Indian Institute of Management, Ahmedabad, Navasari Agriculture University and senior members from the Aga Khan Foundation and C&A Foundation to inculcate good agricultural practices and to provide emerging crop solutions. Ultimately, subsidies and loans can only work optimally in the hands of an enlightened farmer.

## List of abbreviations

Acronym	Full form
AKRSP-I	Aga Khan Rural Support Programme-India
CEO	Chief Executive Officer
DOs	Development Organisers
EMI	Equated monthly instalments
EUR	Euros (the currency used by European Union)
FAO	Food and Agriculture Organization
FIGs	Farmer interest groups
FPCs	Farmer Producer Companies
GGRC	Gujarat Green Revolution Company Limited
ha	Hectare
HP	Horse power
IWMI	International Water Management Institute
kg	Kilogram
kWh	Kilo-Watt hour
KVKs	Krishi Vigyan Kendras
MIS	Micro-irrigation Systems
mm	Millimetre
MT	Metric tonne
PWC	PricewaterhouseCoopers
Rs	Rupees
SPV	Special Purpose Vehicle
US	United States of America

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