

Standard Operating Procedure for Drip Irrigation System





Standard Operating Procedure for Drip Irrigation System

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1. Introduction

1.1. Purpose of the SOP

This document is a Standard Operating Procedure (SOP) designed to provide a step-by-step guide for Micro Finance Institutions (MFIs) to design and offer a loan product for the customers.

For MFIs

- This document provides a clear understanding of the drip irrigation systems and its expected benefits to end consumers
- This document serves as a toolkit for MFIs to:
 - Check if their organization is operationally capable and ready to take the product to market
 - Create an accompanying appropriate loan product, and its appropriate repayments
 - Select appropriate vendors who they can work with to ensure the product
 - Take the drip irrigation loan product to its customer base and enable last mile sales
 - Work with vendors to provide appropriate product demos, product sales, product training, and after-sales support

For Sa-Dhan

- Identify the right MFIs who could take this product to market

The document is divided into section 2-9.

- Section 2 provides an executive summary of the entire SOP
- Section 3 provides an overview of the drip irrigation systems product
- Section 4 provides a framework for MFIs to assess the feasibility of offering the loan product and subsequent capabilities required to offer the loan
- Sections 5-9 provide detailed information on criteria, indicators and partnerships needed for the loan product to be successful

2. Executive Summary

Product Overview

Drip Irrigation is a pressurized irrigation system in which water is applied directly to the root zone of the plants at frequent intervals over a long period of time. A drip irrigation system delivers water to the crop using a network of mainlines, sub-main lines and drip lines with emission points spaced along the lengths. Each dripper supplies a measured, precisely controlled uniform application of water, nutrients, and other required growth substances directly to the root zone of the plant.

Ideal Consumer

The ideal consumer is any farmer who wants to reduce water wastage in irrigation and optimize water usage by setting up a drip irrigation system that uses the same quantity of water to irrigate more land area. The field size for a farmer can vary from 1 acre to 7 acres.

Product Benefit

The Drip Irrigation system saves up to 70% of water as compared to normal flood irrigation. Since the water and nutrients are directly provided to the roots of the plants, there is an increase in the crop yield by up to 230%. Drip Irrigation results in a lot of savings due to reduced labour requirements. Moreover, drip irrigation works across multiple undulating terrains and different types of land like saline, water-logged, sandy, and hilly.

Product Lifecycle Support

The first step of the process involves a detailed engineering survey aimed at understanding the different components and parts suited for a farmer's field. Based on the survey, the drip irrigation system is designed. The drip irrigation's water distribution system is designed according to various factors like the type of crop and distance between the rows of crops. Different components of the system are installed on the farmland as per the drip irrigation system design and the farmer is given a basic training for drip irrigation usage. After-sales service including repair and maintenance support is provided to the farmer through the vendor's network.

Product Pricing

The drip irrigation system has the following components largely divided into two categories - the head unit and the field unit. The field unit contributes to ~55% of the cost of the drip irrigation system. The field unit components vary depending on the size of the farm, the row-to-row and crop-to-crop spacing, and the distance of water source from the field. Hence, the price of a drip irrigation system varies accordingly. The price range varies from INR 50,000 to a few lakhs depending on the above-mentioned factors.

MFI Readiness

The MFI readiness framework is important to gauge an MFI's ability to offer a loan product for drip irrigation systems. This framework assesses and analyzes an MFI's capabilities on the following parameters:

- Availability of the vendors in the region of operation of MFIs
- Demand for the product
- Operational capability of the MFI

MFI needs to evaluate all three parameters. Only when all three parameters are satisfied, an MFI is deemed ready to offer the loan product.

Vendor Partnerships

MFIs must select drip irrigation vendors based on relevant criteria such as geographical areas of expertise, years of experience, product quality and capacity, ability to train MFI staff and clients, competitive price point, sales and marketing capabilities, and product lifecycle support.

The roles and responsibilities of the vendor must be clarified across all stages and an implementation strategy must be co-created before taking the product to market.

Implementation

After the loan product has been designed, MFIs can follow a 3-stage process for the implementation. The first stage involves needs assessment and customer mobilization, which includes identifying villages eligible for drip irrigation loans, door-to-door village surveys and mobilizing customers to build product awareness through demos.

The second stage is the loan application and approval process, which involves interacting with interested customers, conducting training sessions (CGT/GRT) to create an understanding of the product and process, filling out the loan application form, background verification and collecting documents.

The third stage is the disbursement and post-sales support process, which involves customers visiting the MFI branch office, disbursal of loans, loan utilization checks and repayment through field officials and post-sales support through the vendor's network.

Risk Management

Risk management in the context of MFIs involves identifying, evaluating, and controlling potential risks that could impact loan sales. At every stage of the loan product life cycle, MFIs should identify and control risks. The table in the risk management section highlights some of the mitigation strategies that MFIs can adopt.

3. Product Details

This section provides detailed information on the drip irrigation system and its features. MFIs can use this section to understand drip irrigation system details and their benefits to customers. A case study on Jain Irrigation Systems (a drip irrigation manufacturing company) provides additional insights into vendor operations.

3.1. Product Overview

Drip Irrigation is a pressurized irrigation system in which water is applied directly to the root zone of the plants at frequent intervals over a long period of time. Therefore, drip irrigation saves up to 70% of water as compared to flood irrigation, ensuring that more land can be irrigated with the same amount of water.¹

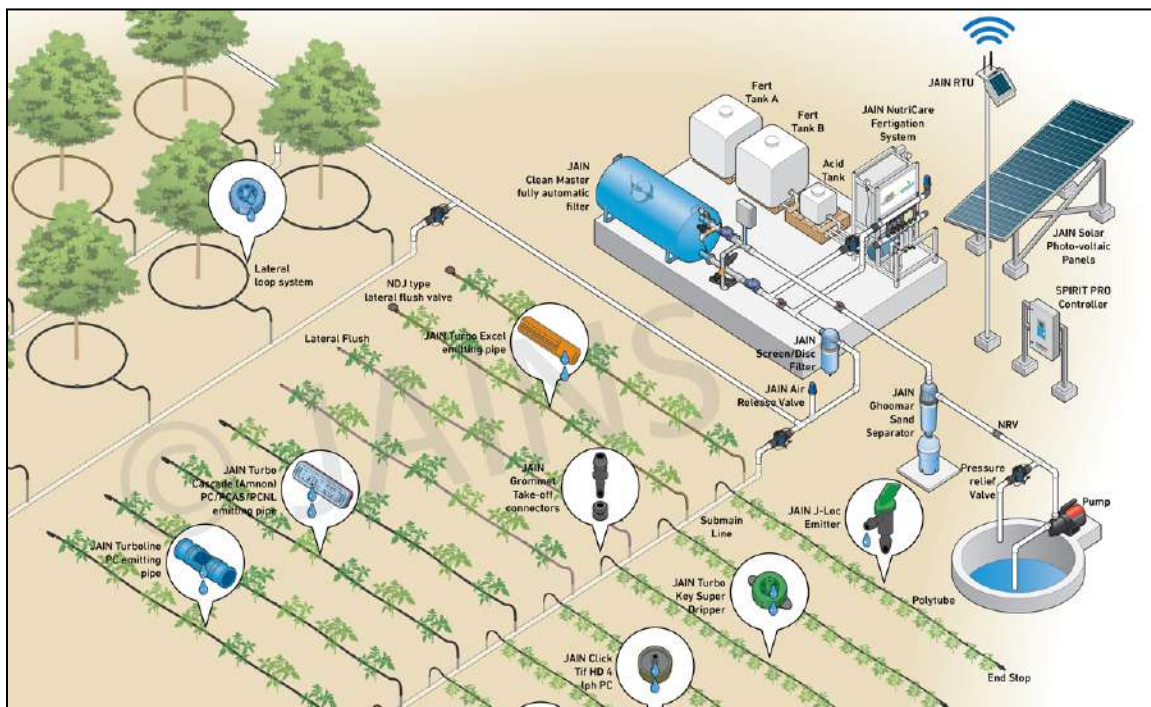


Figure 1. Mechanism of a Drip Irrigation system

The drip irrigation system delivers water to the crop using a network of mainlines, sub-main lines and drip lines with emission points spaced along their lengths. Each dripper supplies a measured, precisely controlled uniform application of water, nutrients, and other required growth substances directly into the root zone of the plant.

¹ <https://www.sciencedirect.com/topics/agricultural-and-biological-sciences/flood-irrigation>

² <https://www.sciencedirect.com/topics/agricultural-and-biological-sciences/flood-irrigation>

In this way, the plant's requirement for moisture and nutrients is replenished almost immediately, ensuring that the plant never suffers from water stress. This enhances the overall quality and growth, leading to an increase in crop yield up to 230%.²

In addition to this, fertilizers are added to the water directly in the drip irrigation system, thereby reducing the effort for the farmer and leading to savings on labour costs.

Drip Irrigation involves a lot of customization based on the farmer's requirements, but essentially there are 4 components in a drip irrigation system - Head Control Unit, Fertilizer Tank, Water Distribution System and Drip Lines.

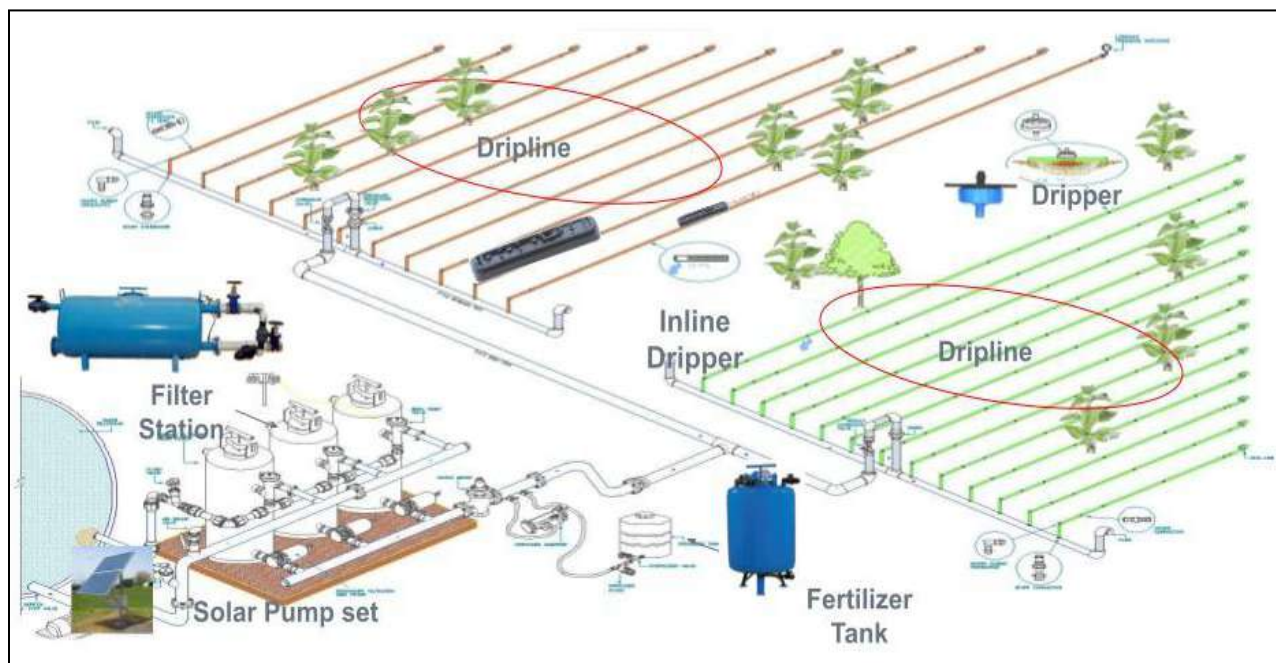


Figure 2. Set-up of Drip Irrigation System on farmland

Head Control Unit

The Head Control Unit consists of a water pump, separators, filters and valves.

Water Pump: The water pump delivers the water from the source into the drip irrigation system, and can either be powered by traditional fuels or by renewable energy such as solar.

Separators: The separator removes sand and any other large particles from the water to ensure smooth flow of water through the irrigation system without any blockage.

Filters: Depending on the type of water source and size of the motor, there are different sizes and types of filters used. Hydrocyclone filters act as primary filters which filter the water directly from the source to remove sand, soil and any other organic material that the separators were unable to remove. The size of these filters is directly related to the size of the field i.e., large

fields would require larger filters. Screen or Disc filters are used as secondary filters to remove any impurities that pass through from the primary filters.

Valves: Different types of valves are used to ensure the unidirectional flow of water as well as to maintain the required pressure. For instance, a bypass valve is used near the pump to maintain the pressure value; a non-return valve is used to ensure that water does not flow in the opposite direction; and an air release valve is used to release excess air trapped inside the drip system.

Fertilizer Tank

Once the water is pumped from the source and passes through the head control unit, it enters the fertilizer tank. The fertilizer tank ensures that the water supplied to the plants contains all necessary nutrients and fertilizers, such that no separate fertilization is required for the farmer. This is highly beneficial as the processes of providing water to the field and adding fertilizers to the soil are now combined into one single process. Here, the farmer can use chemical or organic fertilizers based on availability and crop requirement. The fertigation equipment varies depending on the size of the field.

Water Distribution System

After the fertilizers are added, the water flows out from the fertilizer tank to the water distribution system, which consists of the Main Line and the Sub-main Line.

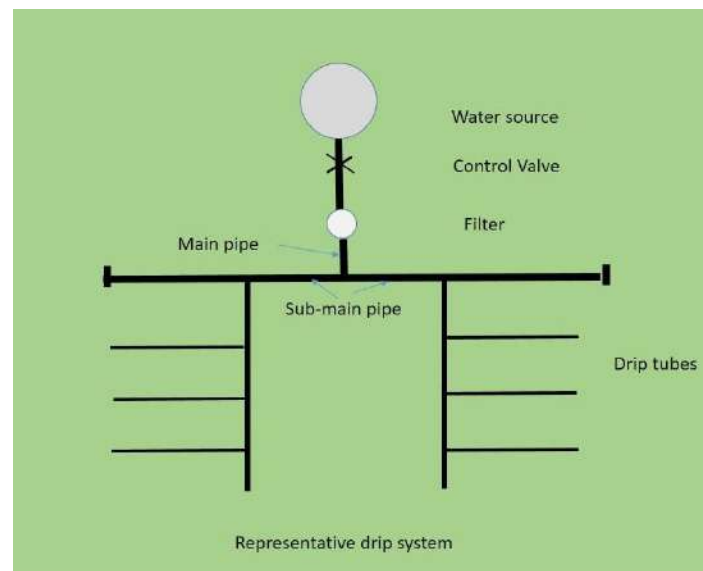


Figure 3. The water distribution system in drip irrigation

The Main Line is made up of PVC and HDPE material, and channels water from the central unit to the field through the Sub-Main lines. The Sub-Main lines ensure that the water is available along the breadth of the field, which can then be supplied to the plants through Drip Lines.

Drip Lines

Drip Lines provide water to the farm and are arranged in a row pattern depending on the size of the land, type of crops, spacing between the plants, etc. As Drip Lines have to cover the entire area of the field, they account for over 50% of the cost of the drip irrigation system. From the Drip Lines, drippers or emitters provide the water directly to the root of the crops.³

Maintenance required:

Drip irrigation systems can also use water with salt content. There are two ways to protect the system from salt water:

- Using water soluble fertilizers with an acid pH level up to 4
- Adding acid separately to the equipment, around 5-10 Kg of acid would be required per acre

The head unit of the drip irrigation system requires maintenance after 3-4 years, while the field unit requires maintenance after 8-10 years of use.

Warranty:

Usually, vendors offer a 1 year warranty for all the products, but good quality products can function properly for up to 10 years.

Following is a list of different components required for a drip irrigation system for 1 acre.

S.No.	Item Description	Qty	Unit	REMARKS
A	Filters & Fertigation Equipment (Head unit)			
1	DIS/SIS PL HEADER ASSEM MANI 63MMX32MM	1	SET	HEADER
3	DIS/SIS J-GHOOMAR SAND SEP.25M3/HR63MM P	1	NOS	PRIMARY FILTER(OPTIONAL) WHERE SAND PARTICALS ARE THERE IN WATER SOURCE
2	DIS/SIS J-S-FLOW 25M3/HR 63MM DISCLN	1	NOS	SECONDARY FILTER
4	DIS/SIS VENTURY WITH SUCTION ASM 32MM	1	NOS	FERTIGATION EQUIPMENTS
5	DIS/SIS CTRL VALV 32MM TEFLON SEAL PLAIN	1	NOS	VALVE FOR FERTIGATION EQUIPMENTS
6	DIS/SIS PGGF2 W/PG ADAPTOR 1/4 FEMAL TH	1	NOS	PRSSURE GAUGE TO CHECK THE PRESSURE
7	DIS/SIS PVC ARV 32MM(1) MALE SU	1	NOS	AIR REALESE VALVE TO RELEASE AIR
8	DIS/SIS BUTTERFLY VALVE C.I. 50 MM	2	NOS	BYPASS VALVE AND VALVE TO OPERATE FERTIGATION EQUIPMENTS
B	Field Unit			
9	DIS/SIS PIPE 063 MM X 04 KG 6M	78	M	MAIN LINE/SUBMAINLINE OF PVC MATERIAL, SUBMAIN LINE CAN ALSO TAKE PE MATERIAL FOR ABOVE GROUND INSTALLATION
10	DIS/SIS CTRL VALV 63 MM MOULDEDSEALPLAIN	2	NOS	CONTROL VALVE
11	DIS/SIS FLUSH VALVE 63 MM	2	NOS	FLUSH VALVE AT THE END OF SUBMAINLINE
12	DRIP LATERAL OD16MM CL2X400 MTR	50	M	PLAIN LATERAL
13	DRIP LINE E+16MM 2.0LPH 40CM CL1 500M	2700	M	INLINE EITHER CLASS1 OR CLASS 2
14	DRIP JAIN GROMMET 13 MM	50	NOS	
15	JTURBO AQUA /JTL TAKE OFF16X13	50	NOS	
16	EMITTING PIPE JOINER 16X16OD	50	NOS	POLY FITTINGS TO CONNECT THE INLINE FROM SUBMAIN LINE
17	DRIP LATERAL END STOP 8SHAPE 16 MM	50	NOS	POLY FITTINGS AT THE END OF INLINE
PVC Fitting & Accessories		5% OF HEAD UNIT COST + FIELD UNIT COST		

Figure 4. Different components of a Drip Irrigation System ³

³ Sourced from the product deck (attached in the annexure)

3.2. Product Consumer Demographics

The ideal consumer is any farmer who wants to reduce water usage for irrigation and hence wants to set up a drip irrigation system in their field. The field size for a farmer can vary from 1 acre to 7 acres.

The Drip Irrigation system is highly customizable. The system setup depends on the needs of the farmer including the size of the land, crop spacing, and distance of the farm from the water source.

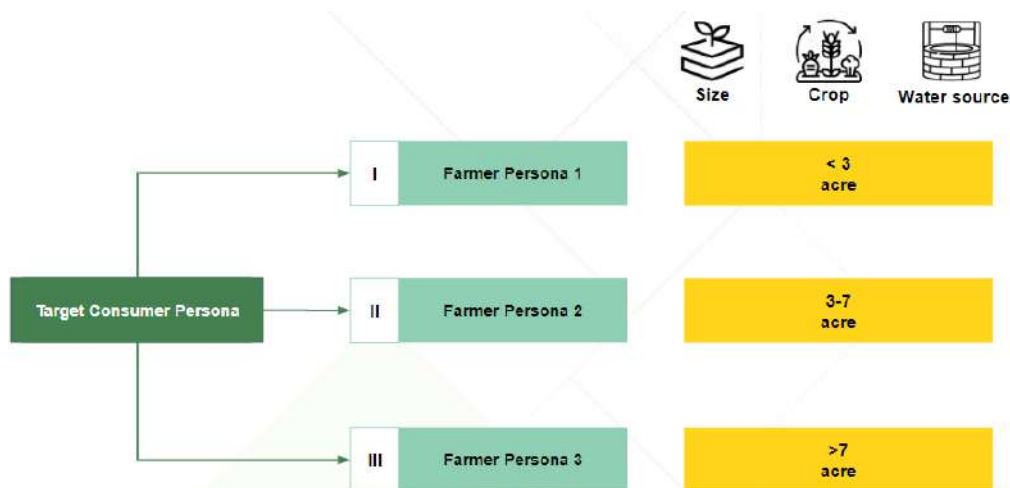


Figure 5. Target Consumer Persona for the product

3.3. Product Benefit

Consumer Benefits



REDUCED WATER USAGE

Drip Irrigation system saves up to 70% water as compared to normal flood irrigation. Therefore, using drip irrigation, more land can be irrigated with the same amount of water.



INCREASE IN CROP YIELD

Drip Irrigation results in an increase in crop yield by up to 230%. Providing water and nutrients directly to the root of the crops leads to early maturity resulting in higher and faster returns on investment. With the usage of drip irrigation, the crop grows consistently, matures quickly and is healthier.



INCREASE IN FERTILIZER EFFICIENCY

With the help of the fertilizer tank in the drip irrigation system, fertilizers and chemical treatment is given directly to the crop. This increases the fertilizer usage efficiency by 30%, thereby reducing the expenses on fertilizers.⁴



REDUCED LABOUR COSTS

Drip Irrigation results in savings due to reduced labour requirements. Irrigation of the field happens automatically, so the farmer does not need labour and can focus on other tasks. Additionally, the time and effort spent in adding fertilizers is now freed up as fertilizers are directly mixed with the drip water system. This results in reduced labour costs for the product.



RESILIENT ACROSS DIFFERENT TERRAINS

Drip Irrigation works across multiple undulating terrains. Therefore, different types of lands like saline, water-logged, sandy, hilly, etc can also be brought under productive cultivation.

Environmental Benefits



REDUCED EMISSIONS

Drip irrigation systems can reduce per-yield soil Carbon dioxide emissions by 59% depending on the type of crop grown.⁵



EFFECTIVE SOIL MANAGEMENT

Drip irrigation minimizes the negative environmental effects of traditional irrigation, namely soil erosion, salinization, and agricultural runoff.

⁴ https://www.researchgate.net/publication/336985939_Efficient_Use_of_Water_and_Fertilizers_in_Irrigated_Agriculture_Drip_Irrigation_and_Fertigation

⁵ <https://watermasterirrigation.com/environmental-benefits-of-a-drip-irrigation-system/>



CONTRIBUTION TO UN SDGs

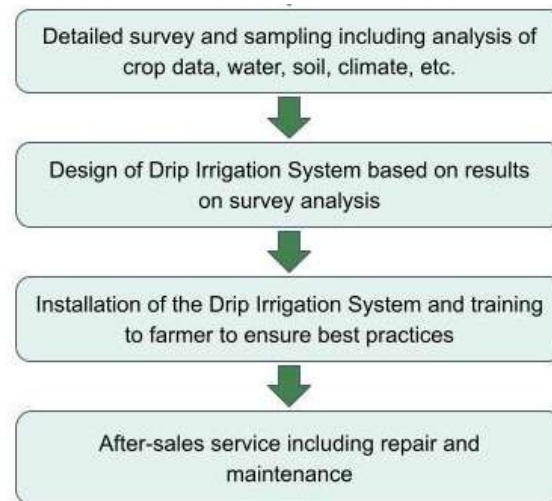
Using drip irrigation systems creates benefits in providing dignified work, supporting farmer livelihoods, promoting domestic technology and innovation, managing water sustainably, and strengthening climate resilience.

Drip irrigation also enables gender equality by aiding women's workforce participation. Since women do not need to carry water from faraway sources, more women can participate in the farming ecosystem with the involvement being less physically taxing for women.

Drip Irrigation system contribute to the UN Sustainable Development Goals in the following way:



3.4. Product Lifecycle Support



The entire product lifecycle engagement is carried out through the drip irrigation vendor's network.

Survey and Sampling

This is the first step of the process which involves a detailed engineering survey aimed at understanding the different components and parts suited for a farmer's field. Data is collected from the farmer regarding the needs, preferences, size of land, and crops planned for the next season.

Design of Drip Irrigation System

Based on the survey, the drip irrigation system is designed which includes various choices among different components. The system is designed keeping in mind factors like crop, soil, water, climatic data, etc. The drip irrigation's water distribution system is designed based on various factors like the type of crop, the distance between the rows of crops, and the distance between each crop.

Installation of Drip Irrigation System

Different components of the systems including the head control unit, fertigation equipment, and the water distribution system are installed on the farmland as per the drip irrigation system design. The farmer is made aware of the different components and their functions and is given basic training for drip irrigation usage.

After-Sales Service

The farmer is trained to ensure optimum maintenance of the drip irrigation system. After-sales service including repair and maintenance support is provided to the farmer. In most cases, the drip lines that provide the water to the root of the plants get displaced or damaged and require readjustment and repair.

3.5. Product Pricing

The drip irrigation system has the following components largely divided into two categories - the head unit and the field unit. The field unit contributes to ~55% of the cost of the drip irrigation system.⁶ The field unit components vary depending on the size of the farm, the row-to-row and crop-to-crop spacing, and the distance of water source from the field. Hence, the price of a drip irrigation system varies accordingly. The price range varies from INR 50,000 to a few lakhs depending on the above-mentioned factors.

The table below presents an indicative cost of a drip irrigation system with varying sizes of field and crop-to-crop spacing:

Spacing (mxm)	(Cost in Rs.)					
	0.4 ha	1 ha	2 ha	3 ha	4 ha	5 ha
12x12	18231	24889	39579	61453	76452	97351
10x10	18882	26504	42747	66294	83036	105577
9x9	19350	27640	45017	69702	87674	111380
8x8	19954	29132	47897	74175	93756	118978
6x6	21960	35114	58702	94843	115018	144323
5x5	23775	39864	68027	98307	124930	167859
4x4	24626	42046	73697	114960	150517	179145
3x3	26513	48339	83673	128875	162076	202926
2.5x2.5	35829	69075	125747	192063	269555	329242
2x2	41812	84109	163251	237167	329480	404417
1.5x1.5	47574	98443	187608	280178	386957	476102
2.5x0.6	35431	72617	133448	203947	283217	347666
1.8x0.6	43522	92689	175434	264083	359702	447938
1.2x0.6 (or lower spacing)	57946	129073	245410	371472	501156	626958

Figure 6. The indicative pricing model of drip irrigation system based on land size and crop spacing for states with low penetration of vendors ⁷

Government subsidy

The State and Central finance team of the Government under the scheme of Pradhan Mantri Krishi Sinchayee Yojana (PM-KSY) provides financial assistance to farmers for the purchase of drip irrigation systems. Under this scheme, the Government has benchmarked costs based on the price of the drip irrigation systems. A farmer gets close to ~ 45-55% subsidy of the benchmark cost or the price of the irrigation system (whichever is lower).⁸ The benchmark subsidy amount has been fixed by the Government based on the size of the farm and plant

⁶ Sourced from the product deck (attached in the annexure)

⁷ <https://pmksy.gov.in/microirrigation/Archive/GuidelinesMIRevised250817.pdf>

⁸ <https://pib.gov.in/PressReleaseIframePage.aspx?PRID=1795499#:~:text=The%20Government%20provides%20financial%20assistance,scheme%20to%20enhance%20the%20coverage>

spacing. Although there are no restrictions on claiming the subsidy for drip irrigation systems with respect to land size, a farmer who has already availed this subsidy under the scheme cannot claim another one for 7 years.⁹

The farmer can avail subsidy by registering themselves on Government websites and uploading relevant documents. Once the verification is done, the subsidy amount is released by the Government through a direct benefit transfer to the farmer's account. Typically, this process takes 3-4 months.

3.6. Case Study on Jain Irrigation Systems Limited (JISL)¹⁰

This section provides an outlay of Jain Irrigation Systems Limited (JISL), a global manufacturer of irrigation systems headquartered in Jalgaon, Maharashtra, India with a turnover of US \$ 1.2 Billion.

JISL has a global presence with 33 manufacturing bases spread across four continents. JISL's products are supplied to 126+ countries and provide assistance from a network of 11,000+ dealers and distributors worldwide. In the last 5 decades of their presence in the marketplace, JISL has helped over 10 million farmers.

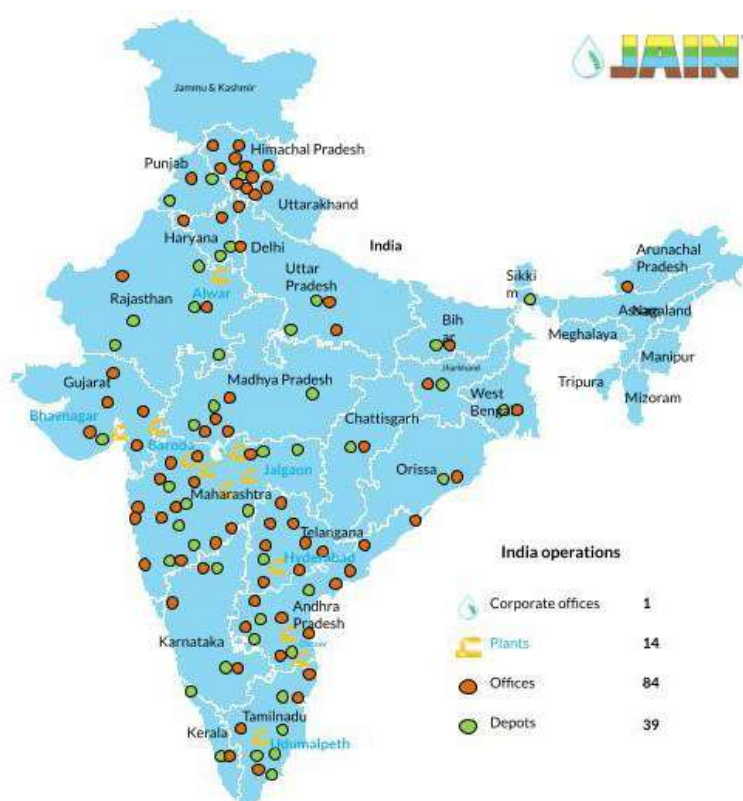


Figure 7. JISL's geographic presence in India

⁹ <https://pmksy.gov.in/microirrigation/Archive/GuidelinesMIRRevised250817.pdf>

¹⁰ All details in the section have been sourced from the Product deck and insights shared by the Vendor

JISL's Drip Irrigation System is made from high-quality virgin raw materials using advanced machinery. It is durable, reliable and meets international quality standards. All the system components are manufactured at the JISL plant in Jalgaon, Maharashtra under strict quality control norms at every stage of production.

3.6.1. JISL Partnership with Dealers

JISL has partnered with over 11,000 dealers worldwide to take the drip irrigation product to the end consumer. JISL plays the role of manufacturer, material supplier and service provider, whereas, the dealer leads the execution and is in direct touch with the end consumer.

As the dealers interact with the farmers regularly, they are better positioned to understand the farmers' requirements and determine the design of the drip irrigation system by using appropriate criteria. JISL promotes the adoption of drip irrigation systems through its dealer network in each taluka or block.

Therefore, MFI needs to partner and sign agreements with both JISL and the dealers to take the loan product to market.

JISL uses a comprehensive due diligence process whilst partnering with new dealers. Following is a list of criteria used for selecting dealers:

Technical Skills and installation ability

Dealers must have the technical expertise to understand the components of the drip irrigation system. Additionally, they should be able to provide installation support to the farmers.

Ability to support and repair

Dealers must have the capacity (operational and technical) to provide after-sales service to farmers.

Ability to pay deposit

Each dealer that considers promoting JISL's products has to pay a certain deposit which can range from INR 50,000-1,00,000 depending on the division from which they are sourcing the components.

3.6.2. JISL Sales and Marketing

JISL has established a comprehensive sales and marketing system and uses the following channels to promote their products.

Local channel TV ads

JISL uses television ads in local channels to reach end consumers.

Newspaper ads

Newspaper ads are another channel through which JISL promotes its products in rural areas.

Banners, hoardings and wall paintings

JISL also promotes its product by putting various banners and hoardings in rural areas to make customers aware of their products.

Demo and campaigning

JISL operates through 11,000+ dealers worldwide. To promote their products, these dealers conduct various campaigns and product demos in different villages. The promotional cost is split between the dealer and JISL via a 50-50% partnership.

3.6.3. JISL Product Lifecycle Support

Action items	Lead	Support
1) Pre-sales counseling to understand customer needs	Dealer	--
2) Survey of the field to understand the parameters determining the cost of the drip system	Dealer	Farmer
3) Installation of the drip system and training the farmer	Dealer	--
4) Regular maintenance of the drip irrigation system	Farmer	--
5) Post-sales repair and support	Dealer	--

JISL has partnerships with thousands of dealers across the country and the entire product lifecycle support happens through the dealers.

Pre-sales counseling

JISL provides pre-sales counseling to the farmers to understand their needs and preferences through the channel partners i.e. dealers. The dealers connect with farmers who express interest in the drip irrigation product, understand the farmer's needs, and explain to them the benefits of using a JISL drip irrigation system.

Survey of the field

After the farmer's needs are identified, the dealer's field team visits the farmland to conduct a survey of the field to understand the following:

- Distance of the water source from the farm
- Size of the farmland
- Depth of the water bed
- Crop spacing used for the crop

Since these parameters determine the cost of the drip system, the field survey is a crucial step in the sales process. The dealers also provide additional surveys and tests such as soil testing, detailed engineering survey, etc which the farmers can avail at additional costs.

Installation of Drip Irrigation System and Training

The dealers keep stock of the JISL components depending on the demand of the product in specific regions and are responsible for the installation of the drip irrigation system. During installation, the dealer's technician explains in detail the different components of the system and trains the farmer to use it efficiently. Once set up, the farmer can use the system effectively as it requires minimal expertise. The responsibility for cost of transportation is mutually agreed upon between the farmer and the dealer.

After-Sales Service

The dealers provide technical assistance since they are directly in contact with the end customer. Once installed, the drip irrigation system is easy to use and maintain. JISL's products are ISO certified and thus are of high quality. JISL offers a 1 year warranty for all the products. The head unit of the drip irrigation system requires maintenance after 3-4 years which will cost around 20% of the total price of the head unit. On the other hand, the field unit requires maintenance after 8-10 years of usage.

Typically, the product does not require any repairs, except for pipe leakages that can happen due to field operations. The farmer has to bear the logistics and material cost in case of damages, while the service cost is free. In addition to this, the farmers also keep spare parts for drip lines worth INR 100-500 to ensure smooth operation of the drip irrigation system.

Support for better crop returns

Post sales, JISL also provides additional agronomic and extension support such as technical support for getting better crop returns. To enable this, JISL has more than 1094 technocrats, engineers, agronomists, horticulturists and regional offices, as well as trained dealers, and distributors all over India and abroad. These, however, are paid services offered by JISL.

3.6.4. JISL Pricing

For a 1 acre farmland, JISL's basic irrigation system with the below mentioned components costs around INR 50,000 - 60,000 based on the following assumptions:

- Lateral spacing 1.5 meter
- Gromate spacing also consider @1.37 meter spacing
- Dripper spacing consider @40cm
- Water source and Main Line is considered to be at the corner of the 1 acre plot

- Borewell considered as water source, hence hydrocyclone (primary) filter is provided
- Sub-main line is considered at the border of the field and must be underground
- Plot size considered - 80m (East-West) x 50m (North-South)
- Pump flow considered - 225 LPM (liters per minute)
- Two valves operational at a time

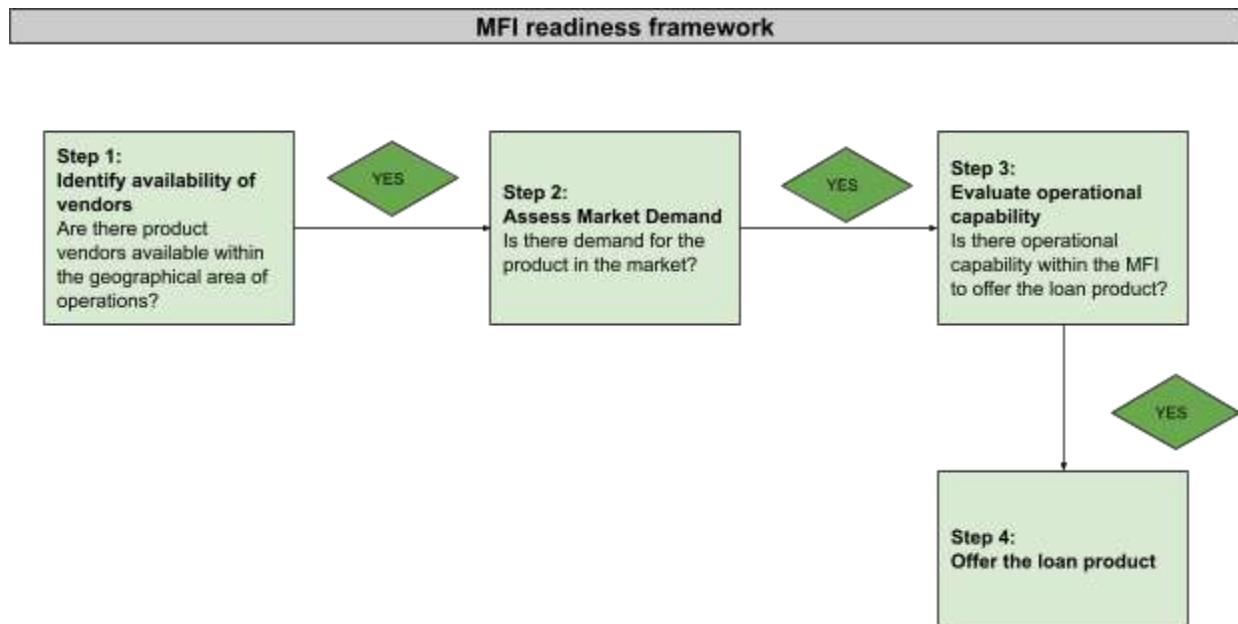
DRIP IRRIGATION SYSTEM ITEM LIST						
Client :						
Address :			AREA:			
S.No.	Item Description	Qty	Unit	Rate/Unit	Total Amt (Rs)	REMARKS
A	Filters & Fertigation Equipment					
1	DIS/SIS PL HEADER ASSEM MANI 63MMX32MM	1	SET	1914.3	1914.3	HEADER
3	DIS/SIS J-GHOOMAR SAND SEP 25M3/HR63MM P	1	NOS	4557.35	4557.35	PRIMARY FILTER (OPTIONAL) WHERE SAND PARTICALS ARE THERE IN WATER SOURCE
2	DIS/SIS J-S-FLOW 25M3/HR 63MM DISCLN	1	NOS	2994	2994	SECONDARY FILTER
4	DIS/SIS VENTURY WITH SUCTION ASM 32MM	1	NOS	1314.5	1314.5	FERTIGATION EQUIPMENTS
5	DIS/SIS CTRL VALV 32MM TEFLON SEAL PLAIN	1	NOS	215	215	VALVE FOR FERTIGATION EQUIPMENTS
6	DIS/SIS PGGF2 WI PG ADAPTOR 1/4 FEMAL TH	1	NOS	436.5	436.5	PRSSURE GAUGE TO CHECK THE PRESSURE
7	DIS/SIS PVC ARV 32MM(1) MALE SU	1	NOS	162.5	162.5	AIR REALESE VALVE TO RELEASE AIR
8	DIS/SIS BUTTERFLY VALVE C.I. 50 MM	2	NOS	2087	4174	BYPASS VALVE AND VALVE TO OPERATE FERTIGATION EQUIPMENTS
B	Field Unit					
9	DIS/SIS PIPE 063 MM X 04 KG 6M	78	M	120.6	9406.8	MAIN LINE/SUBMAINLINE OF PVC MATERIAL, SUBMAIN LINE CAN ALSO TAKE PE MATERIAL FOR ABOVE GROUND INSTALLATION
10	DIS/SIS CTRL VALV 63 MM MOULDEDESEALPLAIN	2	NOS	594	1188	CONTROL VALVE
11	DIS/SIS FLUSH VALVE 63 MM	2	NOS	65	130	FLUSH VALVE AT THE END OF SUBMAINLINE
12	DRIP LATERAL OD16MM CL2X400 MTR	50	M	11.3	565	PLAIN LATERAL
13	DRIP LINE E+16MM 2.0LPH 40CM CL1 500M	2700	M	6.4	17280	INLINE EITHER CLASS1 OR CLASS 2
14	DRIP JAIN GROMMET 13 MM	50	NOS	3.02	151	POLY FITTINGS TO CONNECT THE INLINE FROM SUBMAIN LINE
15	JTURBO AQURA /JTL TAKE OFF16X13	50	NOS	1.93	96.5	
16	EMITTING PIPE JOINER 16X16OD	50	NOS	2.91	145.5	
17	DRIP LATERAL END STOP 8SHAPE 16 MM	50	NOS	2.03	101.5	POLY FITTINGS AT THE END OF INLINE
PVC Fitting & Accessories		5% OF HEAD UNIT COST + FILED UNIT COST			2241.62	
Installation Charge without trenching, backfilling and lateral laying approximate			AS PER SITE		5000	
TOTAL					52074	
GST				12%		6249
GRAND TOTAL					58323	
TERMS & CONDITION/ASSUMPTION:						
1)Transportation cost not included in the quotation will be charge at actual from our Ex.Godown(Baroda)						
2)Required recommended Electric Pump will be supplied and installed by the client.						
3)Civil work like like Pump house Construction, filter platform ,primary filter construction etc is in the scope of client						
4)GST actual the time of execution of project.						
5) Material will be supplied against 100% advance payment, through our chanel partner.						
6) Installation will also be carried out by our chanel partner.						
7)List of Items is based on the below assumption.						
(a) Lateral spacing 1.5meter						
(b)Gromate spacing also consider @1.37meter spacing						
(c)Dripper spacing consider @40cm						
(d)Water source consider at the corner of the one acre plot and main line also consider from corner						
(e) Water souce consider as a Borewell hence provided hydrocyclone filter(Primary filter).						
(f) Submainline consider at the border of the field. It should be underground						
(g) Plot size consider 80m(E-W) x50m (N-S)						
(h) Pump flow considered 225LPM						
(i) At a time two valve will be operate						
8) All filter size is depending up on the souce of water and pump capacity and area to be irrigated						
9) Mainline and submain line size also depending up on the plot size, discharge capacity						
10) Lateral quantity may vary depending up on Row to row spacing						

A detailed list of all components required to set up a drip irrigation system for 1 acre of farmland are mentioned in this [sheet](#).

4. MFI Readiness

4.1. Framework for the MFIs to assess their ability and capacity to launch a loan product for a particular product offering

The objective of this section is to provide MFIs with a framework to assess and analyze the operational capabilities needed to launch a new loan product for drip irrigation systems. By using this MFI readiness framework, an MFI will be able to identify the capacity and resources needed to launch a new loan product into the market. The readiness framework is in the form of a step-by-step guideline which MFIs can follow sequentially.



Step 1 - Identify the availability of vendors

Within the serviceable market, identify if there are vendors in the market selling drip irrigation systems. If there are no vendors in the MFI region of operation, then the MFI should not proceed further.

Step 2 - Assess market demand

If the answer in step 1 was “Yes”, proceed to step 2 to assess the market demand. This step answers the question “Is there market demand for the product in the market?”

The following [toolkit](#) will guide on assessing the market demand with an example.

Note: This is a sample toolkit. The numbers are used for example purposes however, the formulae and steps are rightly placed. MFIs can use this tool to enter their numbers in the gray highlighted cells to estimate the sales within an area of operation (This could be a combination of multiple villages)				
			Customers	Comments
1	Select ideal customer persona	Number of farmer households (HH) in the area of operation	15000	
2	Apply eligibility criteria using following indicators	Apply criteria check - Household income - Number of members in the household		
3	Segment farmer households	Farmer households that have upto 30% of disposable income	7000	Vulnerable households. Not suitable for loan product
		Farmer households that have upto 40% of disposable income	5500	Low income households
		Farmer households that have upto 45% of disposable income	2500	Manageable households
				Note the sum of the three types of farmer households should add up to total number of farmer households. (i.e. point 1 = sum of all the three households mentioned in point 3) $15000 = 7000 + 5500 + 2500$
4	Estimate Sales (SOM) for an area of operation	Therefore, Targer number of customer	8000	This is sum of low income households and manageable households because that is the segment MFIs should target
		Demand for product in vulnerable HH (assumption)	0%	assumed to be 0
		Demand for product in low income HH (assumption)	60%	The other percentages mentioned as estimates. MFI can change the demand % based on their estimation and understanding of the consumer demography
		Demand for product in manageable HH (assumption)	70%	Assumption. MFI can change this number based on their estimate of the total market that they can capture
		Estimated Market capture by the MFI	25%	Jain MIS product price for 1 acre
		Average loan size for the Drip irrigation	58000	Formula is: Demand for product in vulnerable households*Farmer households that upto 30% disposable income + Demand for product in low income households*Farmer households that have upto 40% of disposable income+ demand for product in manageable households*Farmer households that have upto 45% of disposable income
		Total Sales (units of product) for which loan is taken	1262.5	
		Drip irrigation loan Portfolio AUM (for the year)	₹73,225,000	

Follow the toolkit step by step to select ideal customers and apply filter criteria.

- Selecting the ideal customer persona: The ideal customer base are farmer households that want to purchase a drip irrigation system to reduce water consumption.
- Apply eligibility criteria to filter farmer households that may not be ready for buying the product. Eligibility criteria check indicators are:

- Household income
- Number of members in the household

(Note: These indicators are not exhaustive. MFI can do a criteria check based on available information from the following list. They can also include more criteria if they want)

- Once the criteria check is executed, classify customers into the following segment:

Segment 1: Vulnerable households	Segment 2: Low-income households	Segment 3: Manageable households
Farmer households that have up to 30% of disposable income	Farmer households that have up to 40% of disposable income	Farmer households that have up to 45% of disposable income

- Segment 2 and Segment 3 are the MFI target customers.

- b. For each segment, an estimation of sales should be calculated. Refer to the toolkit for an example to get sales projections.

Step 3 - Evaluate operational capability

The sales projection becomes the Serviceable Obtainable Market (SOM). The last step is to assess the operational capabilities existing in the organization to enter the market and start operations. The questions below provide a checklist towards assessing the operational capabilities.

MFI	Vendor
<ul style="list-style-type: none"><input type="checkbox"/> Leadership is aligned on offering the loan product in the decided geographic location<input type="checkbox"/> Staff is trained in product details and benefits<input type="checkbox"/> Staff is well trained to encourage women to be primary loan applicants<input type="checkbox"/> Staff is well trained in the process of loan process (from awareness stage to loan disbursal stage)<input type="checkbox"/> Staff is technical i.e. can operate digital systems to update documents<input type="checkbox"/> MFI has dedicated and enough staff to meet loan demand	<ul style="list-style-type: none"><input type="checkbox"/> Vendor is ready to provide post-sales support.<input type="checkbox"/> Vendor is aligned on roles and responsibilities of MFI and Vendor.

4.2. Market Size Estimation

According to a study conducted by the Indian Council of Food and Agriculture, the Indian micro irrigation systems market witnessed a CAGR of 9.6% between 2005 to 2015.¹¹

¹¹ <https://www.icfa.org.in/assets/doc/reports/indian-micro-irrigation-market.pdf>

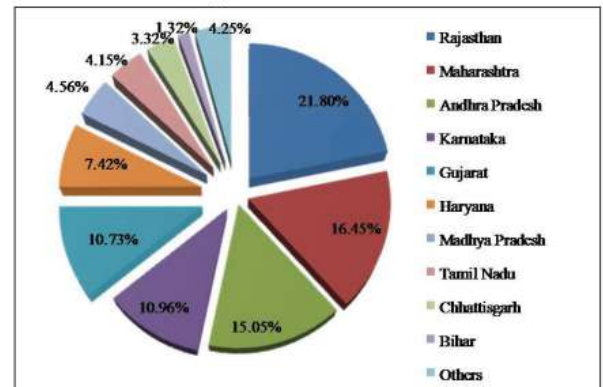
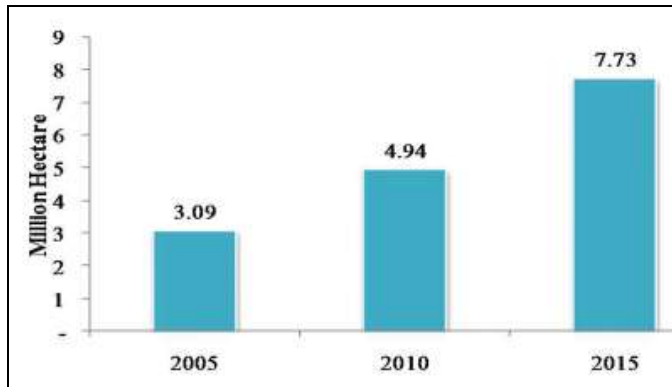


Figure 8. Area covered by drip irrigation system **Figure 9. Top 10 States with drip irrigation¹²**

The total area covered by micro irrigation systems in 2015 was 7.73 million hectares.¹³ However, according to the report, the potential area that could be covered was around 69 million hectares. As per the market need, there is a tremendous gap and requirement for the farmers to use the technology. This presents an opportunity for MFIs to partner with drip irrigation systems providers to fulfill the market need.

¹² <https://www.icfa.org.in/assets/doc/reports/indian-micro-irrigation-market.pdf>

¹³ <https://www.icfa.org.in/assets/doc/reports/indian-micro-irrigation-market.pdf>

5. Vendor Partnership

The section explains the process to ensure a successful partnership with a Drip Irrigation System vendor.

5.1. Vendor Selection Criteria



Geographical areas of expertise

MFIs must have strong operational capabilities in the vendor's geographical area of expertise to take the loan product to market.

Vendor Case Study : JISL's geographical expertise is spread across the country, so MFI can partner with JISL in any state.

Years of experience

MFIs must partner with vendors who bring many years of experience in the market to ensure smoother operations, improved capability, stability and stronger brand loyalty.

Vendor Case Study : JISL was established in the late 1980s and is one of the world's largest manufacturers of irrigation systems.

Product Quality, Capacity and Efficiency

MFIs must ensure that vendors have strong, stable and diverse product portfolios. Additionally, there could be some local vendors in the market who provide low-quality products (e.g. thickness of pipes and other components). Thus, the MFI should be careful in assessing these vendors for product quality and ISO certification.

Vendor Case Study : JISL offers an end-to-end solution for irrigation systems and has very diverse products including pumps, motors, filters, separators, fertigation equipment, pipes,

drippers, etc. JISL is also ISO certified and provides high-quality components and has a warranty on its products.¹⁴

Training MFI staff and clients

MFIs should ensure that the vendor has the capability to train all necessary stakeholders across the customer awareness journey.

Vendor Case Study : JISL works with over 11,000 dealers who offer training and product demos for the MFI staff as well as for end consumers.

Price Point

MFIs should ensure that vendors offer competitive prices and explore other ways of discounting the product price.

Vendor Case Study : JISL offers competitive pricing in the market whilst offering superior quality, and has also tried exploring carbon financing options for drip irrigation systems.

Sales and Marketing capabilities

MFIs should ensure the vendors have a thorough sales and marketing process to capture clients in their geography.

Vendor Case Study : JISL uses a comprehensive dealer-partnerships approach to cover almost every state in the country. Over the years, JISL has built trust with its customers, thereby ensuring brand loyalty.

Post-sales support

MFIs must conduct comprehensive due diligence to assess the product lifecycle quality and the capability of the vendor to provide post-sales product lifecycle support.

Vendor Case Study : JISL's dealers offer complete lifecycle support including installation, maintenance and repair.

5.2. Vendor Responsibilities

The following is an indicative table that clarifies the roles and responsibilities of the vendor, MFIs and other stakeholders like local dealers. An implementation strategy must be co-created amongst the stakeholders before taking the product to market.

Responsibility	Vendor	Local dealers	MFI
Product manufacturing and quality assurance			
Competitive pricing having made full use of subsidies			
Demo and product training to MFI staff			

¹⁴ Sourced from the product deck (attached in the annexure)

Loan product design			
Outreach and awareness building			
Product Sales			
Loan application, disbursement and collection			
After sales service and support			

Product quality assurance

Vendor is responsible for ensuring materials and product quality standards of the various components of the drip irrigation system.

Competitive pricing

Vendor has explored different ways to reduce the cost of the irrigation system, including subsidies and Carbon Financing.

Demo and product training to MFI staff

The dealers working with the vendor are responsible for providing product demos to the MFI staff and then training them on all the technical details of the product.

Loan product design

MFI needs to design the loan product internally after obtaining necessary product details like pricing, lifecycle, income generation, factors affecting repayment, etc.

Outreach and awareness building

The dealer and the MFI need to pool their resources and network together to ensure maximum outreach to clients through demos and product training. The focus should be on understanding the farmer's needs and preferences and providing broad advice on cultivation choices.

Product Sales

The dealer is responsible to ensure the final sales of the product. The dealer is responsible for exploring and finalizing different partners and channels that can be used for selling drip irrigation systems.

Loan application, disbursement and collection

The MFI is responsible for receiving loan applications, designing the approval process, rolling out the disbursements and monitoring the clients to ensure timely loan repayments.

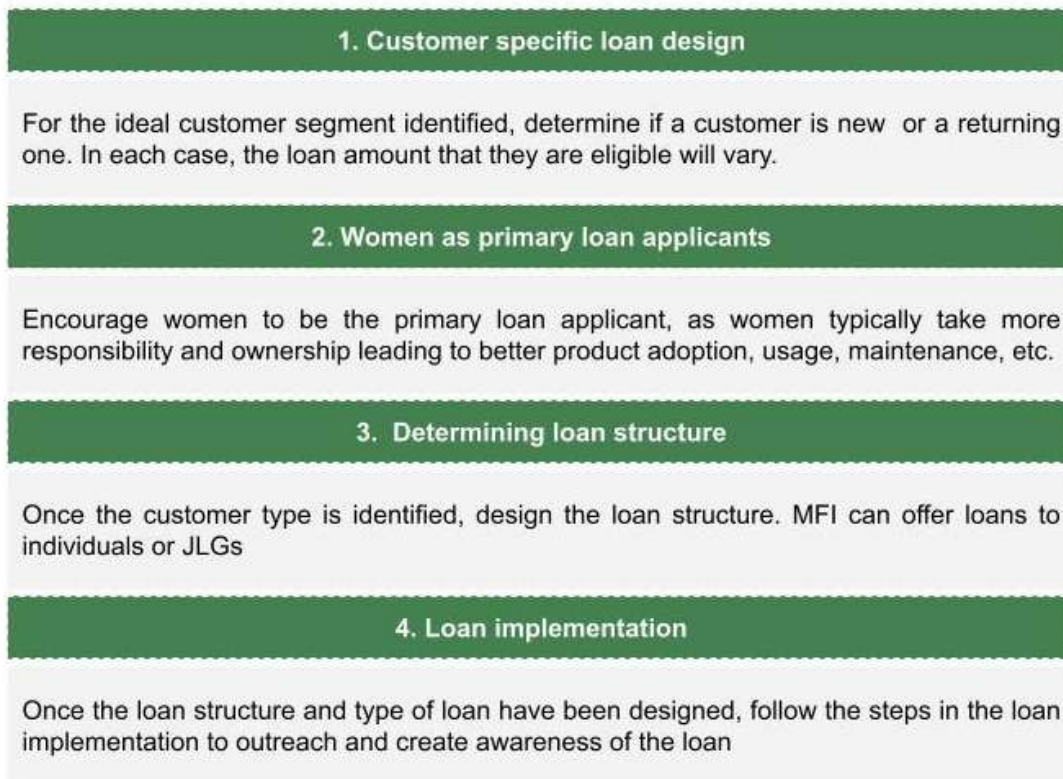
After-sales service and support

The dealer is responsible for providing post-sales support including installation, repair and maintenance support of various components of the drip irrigation system.

Note: A list of drip irrigation vendors apart from JISL is mentioned in the annexure.

6. Loan Product Design

This section highlights the process for the loan product design. The following best practices in designing a loan product will enable the creation of a customer centric product. The chart below highlights the steps in designing the loan product.



MFI must ensure that the components of the loan product are designed in a manner that makes it more affordable, accessible and sustainable whilst meeting the needs of the clients.

Loan Product Design

Following is the indicative loan product design of drip irrigation varying based on the size of the land required.

	Drip Irrigation for 1 acre	Drip Irrigation for 1-3 acre	Drip Irrigation for 3-5 acre	Drip Irrigation for 5-7 acre
Loan Amount	55,000/-	1,10,000/-	2,00,000/-	2,90,000/-
Interest Rate	18-24%	18-24%	18-24%	18-24%
Loan Term	24 months	24 months	24 months	24 months
EMI	3,400-3,600	6,600-6,900	12,000-12,400	17,800-18,200
Effective EMI*	2,200-2,400	4,400-4,600	8,100-8,400	12,000-12,400

Figure 10. Loan product design for different models of drip irrigation system¹⁵

- Note: 1. Calculations are done considering crop spacing of 1.5 x 1.5 meter.
 2. All of the mentioned numbers including loan amount, interest rate and EMI are indicative, and will vary based on MFIs and vendors.
 3. Effective EMI* includes the subsidy amount received. For Drip irrigation, subsidy is around 45-55%. While the farmer needs to take the complete loan amount upfront, the applicable subsidy usually gets credited to the farmer's account in ~ 3 months after applying for the subsidy.
 4. The loan amount is exclusive of GST and the interest rate considered is 24%.

Business case for MFIs

The drip irrigation system's effective EMI is in the range of INR 2,200 - 4,600 for a farmer with less than 3 acres. Large landholding farmers will incur a higher effective EMI in the range of INR 8,100 - 12,400. MFIs must explore innovative forms of repayment such as bullet payments post harvest season to enable farmers to match the EMI schedule with their income generation cycle.

¹⁵ Sourced from the product deck (attached in the annexure)

This product is still feasible for a farmer because of the:

- Cost savings in the form of water bill reduction
- Cost saving because of less fertilizer needed for the same crop
- Revenue increase due to increase in crop yield

7. Implementation

The section provides an overview of the entire process of reaching out to the beneficiaries, loan application and disbursement. The MFIs need to follow the three steps outlined below in implementing the loan product.

Stage	Action items	Lead	Support
Stage 1 Needs Assessment and Customer Mobilisation	1) Conduct door-to-door village surveys	MFI	--
	2) Identify villages that are eligible for the loan product	MFI	--
	3) Mobilising crowd in the identified villages to conduct a basic product demo for awareness	Dealer	MFI
Stage 2 Loan Application and Approval Process	4) Interact with customers who have an intent of buying the product	Dealer	MFI
	5) Conduct training sessions (CGT/GRT) to create an understanding of the product and process	MFI	Dealer
	6) Customers to fill the loan application form	MFI	--
	7) Collect documents and conduct background checks for verification	MFI	--
Stage 3 Loan Disbursement and Post-sales Support	8) Customer to visit the MFI branch office after verification to claim loan	MFI	--
	9) MFIs to disburse loan after the loan approval process	MFI	--
	10) MFI officials to visit the customers to collect repayment and monitor loan utilisation	MFI	--
	11) Post Disbursement support to the customer	Dealer	MFI

7.1. Stage 1: Needs Assessment and Customer Mobilization

The Needs Assessment and Customer Mobilization section highlights the steps and best practices to identify potential customers of drip irrigation systems and establish customer relationships.

7.1.1. Conduct on-field village surveys

In this step, field officials need to identify and visit rural areas and conduct an assessment of the village. A door-to-door survey is conducted interacting with some of the beneficiaries in the village. Here, the field officials conduct a basic eligibility check to assess if customers have the required background to take a loan for drip irrigation systems.

A [sample questionnaire](#) has been created with a checklist of recommended parameters.

- Household Income Assessment - Enabling MFI to identify eligible households that exist in the village for the drip irrigation loan product
- Well-being Assessment - Using necessary indicators from the sample questionnaire to help the MFI develop a qualitative assessment of the household.

Sample Questionnaire for Village survey*

Parameters
Rented house/ Kuchha house
Roof Material (Tiles, Sheet, Thatch)
Number of rooms in the house
Availability of Toilet
Availability of Furniture
Access to Gas Cylinders and Grid Electricity
Landhold for agriculture
Soil condition
Crop grown for cultivation
Location of water source
MGNREGA work
Client's Access to Smartphone, Scooter
Access to BPL Card
Treatment from Govt. Hospital

1. What is your mode of accommodation?
 - a. Have your own place
 - b. Renting out
2. Also what type of house is it?
 - a. Kacha House (Thatch roof)
 - b. Pakka House (Tiles, Sheet)
3. How many rooms are there in the house?
 - a. 1
 - b. 2
 - c. 3
 - d. 4
4. Do you have toilet and sanitation facilities in the house?
 - a. Yes
 - b. No
5. What type of furniture do you have? Select as many as applicable. Do
 - Air cooler

- Refrigerator
 - Gas stove
 - Bed and Mattress
 - Wardrobe
 - Sofa
 - Entertainment devices like TV, Radio
6. Do you have access to Grid electricity and Gas cylinders?
- a. Yes
 - b. No
7. Do you own any agricultural land?
- a. Complete ownership
 - b. Land on lease
8. What is the size of your farm and how much land do you use for irrigation?
- a. 3 acre
 - b. 3 - 7 acre
 - c. More than 7 acres
9. What are the soil conditions on your farm and how do you currently irrigate your crops?
-
10. What is the crop type you cultivate and how much water is required for irrigation per acre of land?
-
11. What is the distance between the water source (well, borehole, etc.) and the farmland for irrigation?
- a. Less than 50 m
 - b. 50 - 100 m
 - c. 100 - 150 m
 - d. More than 150 m
12. How much do you spend on fuel per month for irrigation per acre of land?
-
13. Have you taken benefit from the MGNREGA scheme?
- a. Yes
 - b. No

14. Do you have access to a BPL / AADHAR card?

- a. Yes
- b. No

15. Do you have access to a smartphone or a personal vehicle like a scooter?

- a. Yes
- b. No

16. Have you taken any treatment from a Government Hospital before?

- a. Yes
- b. No

** This is not an exhaustive list and includes qualitative and quantitative parameters that will help in assessing a customer's ability to take a loan and repay the same. More parameters can be added to make it more contextualized.*

The survey can be translated into Hindi or other regional languages based on geography.

7.1.2. Identify villages eligible for the loan product

The results from the survey will help the officials shortlist villages with the right demography for the loan product. The awareness and adoption will differ across geographies.

7.1.3. Crowd mobilization and product demonstration

Once the villages are identified, a basic product demonstration is conducted for the beneficiaries to give them an idea of the product. The officials should help the vendor-recommended dealer mobilize the crowd to a common place for the demonstration.

The dealer and the MFI officials should focus on the mobilization of women leaders and other women-centric groups and collectives to drive the adoption of the product. The officials should ensure that women are present in large numbers for the product demonstration. The demonstration should focus on ensuring that women understand the product details, usage and benefits.

The product dealer must also share important literature like pamphlets on the product details.

7.2. Stage 2: Loan Application and Approval Process

This section highlights the steps for the loan application and approval process. The complete approval process takes up to 5-7 days.

7.2.1. Interaction with potential customers

The customers who intend to purchase the product can reach out to the vendor-recommended dealer or the MFI officials. As women constitute a significant portion of the agricultural labour force, MFI's field teams should encourage them to be the primary loan applicants. There is evidence which suggests that there are lesser defaults in cases of women being primary loan applicants thus encouraging women to be loan applicants would be beneficial for the MFI.

7.2.2. Extensive training to understand the loan product

Next, the officials conduct Continuous Group Training (CGT) and Group Recognition Test (GRT) to provide a detailed understanding of the loan product. This training process usually takes 2-3 days to complete.

Since the product can be used easily by everyone, officials must ensure women participation and training whilst highlighting the key product features of drip irrigation. Ideally, the vendor-recommended dealers should also be present for this meeting since they will be in contact with the end customer.

The following pointers should be considered while conducting the training:

- Provide details about the product features
- Elaborate on product usage and benefits for the consumer
- List of vendors/dealers that sell the product.
- Provide information on the loan products, loan types, cycles, interest rate and timeline
- Share best practices for repaying loans to minimize the probability of loan default

7.2.3. Filling out the Application Form

After the Continuous Group Training (CGT) and Group Recognition Test (GRT), customers who express interest in the product should be asked to fill out the application form. Necessary training and sensitization should be provided to the officials so as to encourage women to be the primary loan applicant.

Officials should ask the customers to visit the branch office to file the application. MFI officials should help the customers fill out the application form to fasten this process.

7.2.4. Background check and verification

After the application form is filled out, the officials must visit the customers to conduct a background check after the loan application is filled. Below are some important parameters* to be considered for the background check.

- ☐ Personal details

- ☐ Assets (Agriculture tools, Land and ownership, own house)
- ☐ CIBIL Score and credit history
- ☐ The purpose for loan application
- ☐ Documents on Income Tax Data, KYC details

**This is not an exhaustive list and includes qualitative and quantitative parameters that will help in assessing a customer's ability to take a loan and repay the same. MFIs must follow the parameters that RBI has mandated for the loan application.*

These details are crucial to determine the eligibility of the customer to procure the loan.

7.3 Stage 3: Disbursement and post-sales support

The section describes steps to disburse the loan, post-sales support and payment collection process. They are important to examine the correct utilization of the loan.

7.3.1. Customer visit to the branch office

Once the customer is deemed eligible for the loan product after the background check, the final step would require the customer to come to the branch office to sign the disbursal document. The branch manager must use this opportunity to clarify any doubts regarding the loan and repayment.

7.3.2. Disbursement of loan

The loan is disbursed within 24-96 hours after the signing of the loan approval document. A specific EMI date and time should be communicated to the client and the field executive must collect it on the same day.

7.3.3. Repayment and Monitoring

The officials must visit the field across regular intervals post the disbursement to check the correct utilization of the loan. Verification checks focus on observing the changes in the farmer's household as a result of product utilization, such as product installation, pump usage, irrigation and crop cultivation during summer, etc.

As mentioned in the product limitations, drip irrigation can help the farmers generate income in the summer season through crop cultivation only if there is water availability in the region. Therefore, MFIs must take this into account and design repayments accordingly in case farmers are unable to generate income during the summer months.

Digital collection methods should be leveraged to make the process of repayment transparent and convenient. Partnering up with fintech providers like Paytm, Phonepe, Cashfree, etc will help increase digital transactions.

7.3.4. Post Disbursement Support

The vendor recommended dealers are responsible for processes on the product's lifecycle such as product technical assistance, maintenance, after-sales services, etc. The MFIs are responsible for providing technical assistance with respect to the loan product, financial education, handholding with repayments, etc.

8. Risk Management

This section provides an overview of the risk that can come during the stages of loan product design, outreach, implementation, disbursement and post disbursement. To effectively offer a loan product, MFIs need to identify risks and ways to mitigate the same. The section below lists some of the common risks that an MFI may encounter during the different phases of the loan cycle.

Risk	Stage of the risk	Impact of risk	Mitigation strategy
Lack of financial partners	Design stage	High	1. Identify 2-3 financial partners who would be willing to fund the loan product. This should happen before the MFI readiness check
Low customer demand	Outreach stage	High	1. During village surveys, focus on villages that have high demand and more customers fitting the ideal customer base for the product. 2. Conduct awareness sessions with the product vendors so that more queries about products and loans can be addressed to mitigate any doubts about the effectiveness and benefits of the product.
Competitor MFIs offering loans at lower rates	Outreach stage	High	1. As part of outreach and awareness, prioritize the customer base where there are existing relationships and vendor trust.
Staff not fully aware of product benefits, operation mechanism and challenges	Operational stage	Moderate	1. Train field staff using the SOP document before field surveys and awareness programs.
Delay in loan disbursement	Operational stage	Low	1. Collect all documents and other information during the customer's visit to the branch
Poor product quality offered by Vendor	Operational stage	High	1. Since this has implications for loan repayment, MFI should always do a background check on the

			<p>Vendor.</p> <p>2. A Vendor should be ISO certified and must use only quality products. For example, while partnering with any vendor, MFI must look at product quality, thickness of pipes and components used as some of the shortlisting criteria.</p>
Poor after-sales support by vendor	Operational stage	High	<p>1. While doing vendor identification, have a very clear MOU established with the vendor on the after-sales service. Only select those vendors, who are reputed for the after-sales support.</p>

9. Annexure

9.1. Technical Details of the Product

Refer to this [source](#) to access a product deck provided by JISL.

9.2. Carbon Credits Financing

In a carbon financing program, carbon credits obtained from the product are sold to various organizations looking to offset their CO₂ emissions. The revenue from this process is used to discount the price of the product.

Drip irrigation systems use precision water application to crop roots and less fertilizer, hence reducing methane emissions. Therefore, drip irrigation systems qualify for carbon projects because methane which otherwise would have been released in the atmosphere would have been converted into CO₂ is being released in reduced quantities. Thus, there is scope for CO₂ emissions offset.

Process Flow

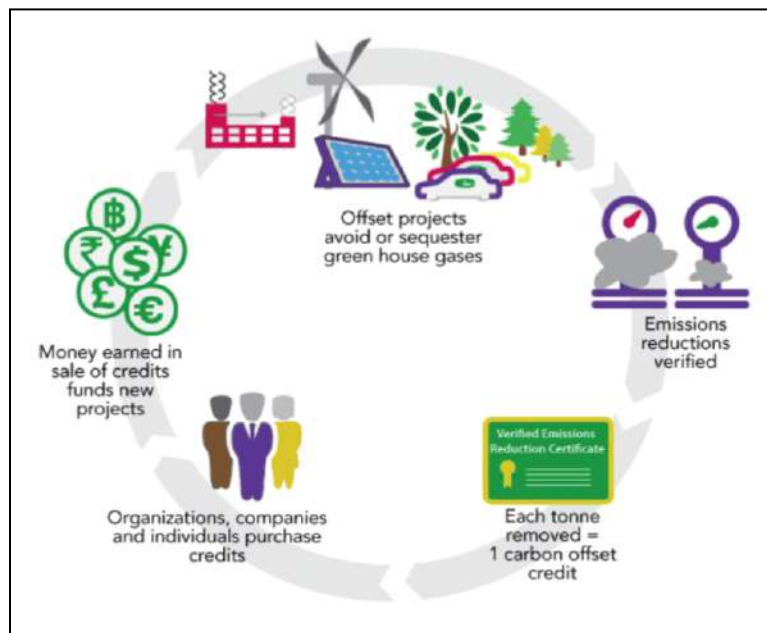


Figure 11. Process flow for Carbon Credits Financing

The amount of CO₂ emissions offset by each unit is measured through technical calculations based on the amount of GHG emissions saved per year by drip irrigation. Based on these calculations, 'carbon credits' are generated for each unit, where one carbon credit is equivalent

to offsetting 1 tonne of CO₂ eq. emissions. Typically, a farmer can earn ~10 carbon credits per hectare in a year by incorporating drip irrigation of paddy fields.¹⁶

- Technical calculations are done for each field in which the drip irrigation system is installed and base case paper is prepared. An audit firm is presented with the technical calculations and testing is carried out on a working unit and calculations are verified.
- The vendor then applies for a carbon financing project that contains multiple farm clusters of different farmers who have implemented the drip irrigation system. The vendor is presented with provisional approval for the estimated carbon credits of the project.
- At the end of every year, a verifying agency randomly samples different units in the project. Each project is given a rating between 50% to 100% which determines the value of the carbon credit. A 100% rating indicates that 100% of the estimated amount of carbon emissions have been offset by the project, whereas a 60% rating indicates that only 60% of the forecasted emissions were offset by the project due to various performance issues.
- Post this verification, the provisional approval is converted into a Verified Emission Rating (VER) which can be sold to any buyer on a carbon trading platform.*

** Note: India does not have a carbon trading market yet. Currently, carbon credits are sold on a voluntary market model, where any buyer and seller can create a legal agreement to trade credits at a mutually agreed price*

¹⁶ <https://carboncredits.com/carbon-credits-from-drip-irrigation/>

9.3. Vendor List for Drip Irrigation Systems

A list* of vendors who provide drip irrigation solutions is given below for reference. The list of vendors:

1. JISL
2. Netafim
3. Mahindra EPC
4. Finolex Plasson

#	JISL	Netafim*	Mahindra EPC	Finolex Plasson
Geography	Global presence in 126 countries	Operations in 50+ countries, sales in 100+	7 States in India - Maharashtra, Gujarat, Rajasthan, Bihar, Karnataka, Madhya Pradesh, Andhra Pradesh	Branches in Gujarat, Madhya Pradesh, Andhra Pradesh, Telangana, Karnataka, Chhattisgarh, Punjab, Maharashtra, Odisha
Brand Recognition	One of the largest micro irrigation companies in the world	Part of the Orbia group of companies and a global leader in drip irrigation tech	<i>Data not publicly available</i>	A Joint Venture between Finolex Group – India and Plasson Ltd. – Israel
Experience	Established in 1963	Established in 1997	Established in 1981	Established in 1992
Product Quality and Catalogue	https://www.jains.com/irrigation/drip%20irrigation%20system.htm	https://www.netafimindia.com/products-and-solutions/product-offering/drip-irrigation-products/	https://www.epcmahindra.com/dripirrigation.aspx	https://www.finolexdrip.com/drip-irrigation
Pricing	INR 54,000 for 1 acre	INR 13,000 for 1 acre *(including Carbon financing)	<i>Data not publicly available</i>	<i>Data not publicly available</i>
Sales and Marketing	Network of 11,000+ dealers worldwide	Product demos	<i>Data not publicly available</i>	Wide network of 1200+ distributors in India

* Note: Indicative Vendor Landscape details sourced only from publicly available data



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