



## CHALLENGE

Agriculture is the primary source of livelihood for about 58 per cent of India's population. The number of farmers in India ranges between 260 million (22%) to 450 million (38%) out of a population of 1.3 billion. Due to extreme poverty, extreme weather conditions (such as drought) and lack of proper irrigation methods, only 40% of land is arable, with 60% potentially arable land left unused. This is further compounded by the fact that 85% of farmers are entirely dependent on rainfall. The impact on the population has been devastating - between 2009-2019 alone, there have been over 150,000 cases of farmer suicides in India that is expected to increase.

The Krishak Development Fund is focusing on Thiruvallur, a district in the state of Tamil Nadu. Agriculture comprises 70% of its economy with the major crops being paddy and rice. Yet, 25% of the farmers in this district live below the poverty line (daily income is less than US\$1.25). On average, this district receives 1100 mm of rainfall a year compared to India's national average of 650mm. Despite this, water catchment and irrigation infrastructure are largely unavailable for the population.

## SOLUTION

With a fund size of US\$18M, the Krishak Development Fund will build infrastructure in the form of reservoirs with 1 rudimentary reservoir for every 40 farmers, and will also implement a high yielding irrigation system for each farmer which will result in up to a 50% increase for the farmers yields in rice, and subsequently, quality of life.

After this fund is successfully implemented in Thiruvallur, it will be possible to expand to neighbouring states in India, the rest of India, and other countries that have similar weather conditions and reliance on agriculture, as well as a population that could benefit significantly from an effective irrigation system. Some of these countries include Thailand, Indonesia, Philippines and Vietnam.

## IMPACT

Current yield of Thiruvallur's main crops of paddy and rice is 0.7kg per hectare, and a farmer's average annual income is US\$1383.

The construction and use of 380 reservoirs and irrigation systems for each farmer in the district would lead to sufficient irrigation of uncultivated and semi-cultivated land, and an expected increase of overall yield by an additional 50%.

This increase in agricultural yield would lead to at least a 50% increase in annual income, allowing farmers to invest in resources to expand yield or diversify crops, thus allowing them an opportunity to break out the vicious poverty and debt cycle.

The district of Thiruvallur has also been subject to extreme weather conditions such as floods and drought in the past 5 years, and this has had severe and adverse effects on its agriculture-reliant economy. The building of the reservoirs would help mitigate the losses caused by climate change as it would allow storage of rainfall (otherwise non-existent to marginalised farmers).

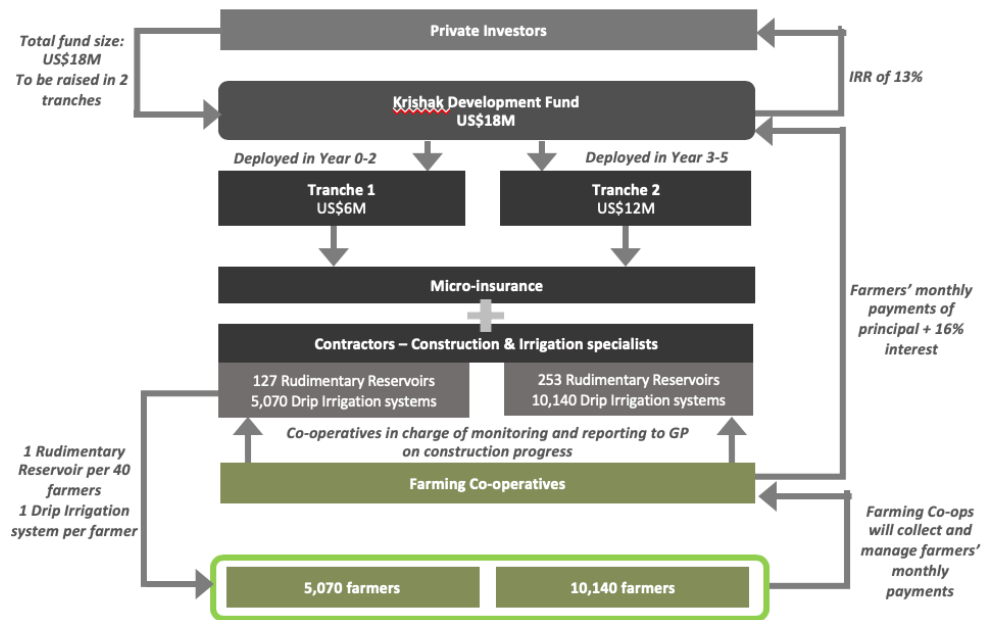
## KEY INVESTMENT DETAILS

Fund Size	US\$18M (spread across 2 tranches)
Investment Criteria	Provision of assistance and irrigation will be provided only to farmers earning less than US\$3500 per annum
	Provision of assistance and irrigation will be provided to farmers who own less than 1 hectare of arable land
Target Returns	12%-15% (net of fees)
Fees	2% management fee on committed capital, 15% performance fee on NAV at the end of each year
Partners	Food and Agriculture Organisation of United Nations (India)
	Ministry of Agriculture and Farmer's welfare
	Department of Agriculture, Tamil Nadu
	Water Technology Centre
	NITI Aayog
Geography	Thiruvallur, Tamil Nadu, India
Target Investors	High net worth individuals, financial institutions
Asset Class & Capital Structure	Participative Infrastructure bond, combining an amortizing loan with a 12% rate of interest, and a kicker in the last year of each tranche, through payment of 80% of fund reserves (post performance fees)
Time Horizon	1-10 years (life of each tranche is 7 years)

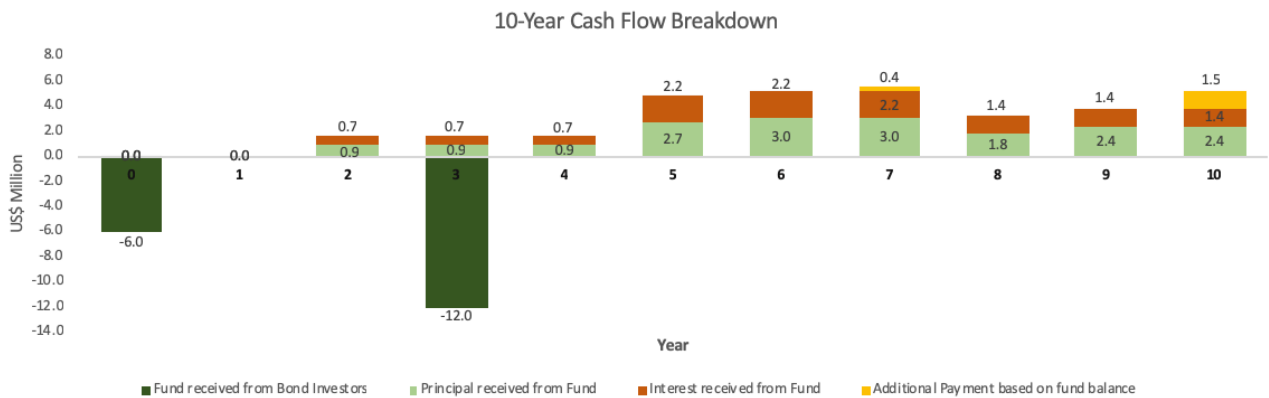
## KEY ASSUMPTIONS

Cost per reservoir	US\$10000
Cost per irrigation system	US\$723
Number of reservoirs	127 (tranche 1) and 253 (tranche 2)
Interest rate on bonds	12%
Interest rate on money market instruments	6.5%
Distribution of final tranche year ending capital to investors	80%

## FUND DIAGRAM



## 10 YEAR CASH



## INNOVATIVE ELEMENTS

Participative Bond Structure

Through investment of un-deployed capital into money market instruments, the fund generates reserves, 80% of which are paid back to bondholders in the final year of each tranche.

Promotion of self-sufficiency

The reservoirs and irrigation infrastructure implemented will create effective and sustainable returns on the bonds issued by the fund (i.e. farmers will be able to repay effectively as increased yields will result in growing profits and savings year-on-year).

## DUE DILIGENCE & RISK FACTORS

Farmer defaults

The Krishak Development Fund will assume a 5-10% rate of defaults for farmers who are unable or unwilling to make the yearly repayment of the bond. This is very unlikely however, as the maximum a farmer is expected to contribute is US\$29 per month (amount inclusive of principal and interest payments), well below earnings. Even if defaults occur, the amount lost is marginal at best and will have little to no impact on the overall performance of the fund.

Corruption, diversion of funds or poorly constructed infrastructure

In the planning stages with contractors, performance metrics and project management will hold them accountable throughout the project. Disbursement of fees will be conducted based on performance achieved and work completed.

Skills required for operation and maintenance

The reservoirs and irrigation systems we have planned to implement are rudimentary yet functional. These will require little to no skill to operate, and any maintenance/additional education can and will be conducted by our targeted partners throughout the 10 year plan.