# The Krishak Development Fund



# Overview

1	The Problem
2	Our Solution
3	Potential Impact
4	Team & Advisors
5	Appendix

# Climate change has led to significant devastation of agriculture through floods and drought

422 million small and marginalized farming holdings in Asia-Pacific rely heavily on rainfall and are most affected by changing weather patterns



https://www.sciencedirect.com/science/article/pii/S0305750X15002703?via=ihub

# The plight of small and marginalized farmers in India is especially desperate, particularly in South India



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#### State of interest: Tamil Nadu

- In 2016-2017, the state of Tamil Nadu recorded its worst annual rainfall in 140 years
- 85% of farmers are entirely reliant on rainfall for cultivation of agriculture
- Crops failure across the state was devastating due to:
  - Failure of both monsoons
  - Poor and non-widespread of water storage facilities



ENVIS Centre: Tamil Nadu State of Environment and Related Issues, Report on Thiruvallur District

Shanmugam, K & Srivastava, D.K. & Rao, Bhujanga. (2012). MDGS-based Poverty Reduction Strategy for Tamil Nadu. MSE Monograph No. 6. 45 farmers commit suicide each day in India. (n.d.). Retrieved from https://www.downtoearth.org.in/news/45-farmers-commit-suicide-each-day-in-india---34387

#### **Pilot Project: Thiruvallur**

Thiruvallur Tamil Nadu, South India

#### **Key Statistics: Thiruvallur**

- Average Rainfall: 1100mm
- Major Crops: Rice/Paddy
  - Rice sown as direct crop in 5,000 Ha
- 25% of farmers live below poverty line
- 74% of population occupied in the agricultural sector
  - 61,000 cultivators , 173,000 laborers
- Small farms produce more than 35% of State's total grain

# Through the combination of an infrastructure development loan coupled with micro-insurance...





# We will empower farmers by providing them with the means to sustain themselves and by mitigating their risks

**Problem:** 

Non-existent or inefficient

irrigation

Problem: Lack of consistent access to water



Our Solution: Construction of 1 rudimentary reservoir for every 40 farmers in the Thiruvallur region <u>Our Solution:</u> Implementation of drip irrigation system to increase yields up to 100% Problem: Risk of crop failure and burden of debt



Our Solution: Provide micro-insurance to cover crop failure and damage of rudimentary reservoirs and irrigation systems



# The impact on farmers and other stakeholders in Thiruvallur and the region surrounding it will be significant



#### Farmers:

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**Overall** 

Impact:

#### **Community:**

- Despite higher costs, substantially increased revenue will allow farmers to retain more earnings than before
- Implementation of insurance allows farmers to be free from vicious debt cycle
- Marginalized households will be able to spend on higher quality agricultural resources, nutrition and education
- More likely to break out of poverty cycle

- Farming Co-operatives incentivized through 0.5% commission for management of farmer re-payments
- Growth for

#### **Neighboring districts:**

- Network effect on Thiruvallur's neighboring districts in Tamil Nadu
- Network effect on Tamil Nadu's neighboring states

#### Investors:

 The increase in effectiveness and efficiency of generating revenue from crop, coupled with risk mitigation of losses from insurance results in sustainable rate of return, with chances for significant growth within the country and across the Asia-Pacific region

## Potential issues have been identified and mitigated





# **Snapshot of financial structure and returns**

- Capital is deployed in tranches, but since payments for the irrigation systems and reservoirs have to be made at intervals, the capital that is undeployed will be invested in Indian T-bills, which earn a yield of 6.4-6.5%
- Since these T-bills can be easily sold in the secondary market before their maturity, we do not have to worry about unforeseen maintenance payments and expenses
- The additional income from this source helps the fund in maintaining a cash reserve throughout, and this benefits investors, as they receive 80% of the final fund balance at the end of the 10<sup>th</sup> year





## **Roadmap to Execution**

Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Tranche 1		Pilot Tranche	
Construct rudimentary r + implement irrigation sy	ion of reservoirs nt drip ystems	Fa	irmers repay	principal + in	terest over f	rom Year 2-7					
		Investors	receive princi balance) an	pal payment d interest pa	s (including yments from	additional fro 1 Year 2-7	om fund				

Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Tranche 2
Construction rudimentary res implement drip systems	on of servoirs + irrigation	Farme	rs repay prin	cipal + intere	est over from	Year 5-10	

Investors receive principal payments (including additional from fund balance) and interest payments from Year 5-10



# The potential network effects of a successful pilot project would ease our expansion into the rest of Tamil Nadu and its neighboring states



References:

Agricultural Census Division Department of Agriculture. Co-operation& Farmers Welfare (2018), All India Report on Number and Area of Operational Holdings



# Outside of India, there is significant opportunity to create an impact in other markets across Asia Pacific

India still remains our key market due to the size of impact and return opportunity, and expected growing familiarity with processes and in-country stakeholders



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### **Advisors to the Fund**

#### Key Advisors: Ilya Cuypers, Ang Ser Keng



Abhinav Mehra, Vice President, ID Capital Pte Ltd



Shivam Sharma Associate, Agricultural Development

#### Infrastructure & Irrigation

Ludhiana Beverages Pte Ltd

Satinder Singh Technical Director





### Team



#### Annette Lim

- Strategy at tech MNC based in Singapore
- Country Manager at startup based across Asia Pacific
- Co-founder of Shaper Impact Capital





#### Akshay Hemrajani

- M&A and PE division at boutique investment banking firm based in Mumbai
- Worked on IPOs and crossborder M&A Evaluation





#### Simran Singh

 International Tax Law
Senior Manager at social impact startup based in Gurgaon





#### Soham Goenka

- Debt and operational restructuring at FMCG based in India
- Corporate finance and capital budgeting at one of the biggest professional services firms





# Thank you!





# APPENDIX

# **Fund Details**

Fund size	US\$18M			
Investment criteria	Provision of rudimentary reservoirs and irrigation systems only for small and marginalised farmers (less than 2 hectares of arable land)			
Target Returns	12-15% (net of fees)			
Fees	2% management fee on committed capital, 15% performance fee on net asset value of the fund at the end of each year			
	Food and Agriculture Organisation of UN (India)			
	Ministry of Agriculture and Farmer's Welfare			
Darthors	Department of Agriculture, Tamil Nadu			
Faithers	Water Technology Centre			
	NITI Aayog			
	TNAU Agritech Portal			
Geography	Thiruvallur, Tamil Nadu, India			
Target Investors	Impact-oriented HNWIs, Family offices, Private Banks			
Asset Class Participative Infrastructure bond				



# **Base Cash Flow Breakdown**

- The fund will make the payments to the bondholders according to the schedule if the payments received from farmers is equal or greater than the payments to be made to the bondholders according to the schedule.
- The additional payment made to the bondholders is a combination of interest earned by investing undeployed capital in 364 day T-bills

Deutieuleus						Yea	r					
	-	1	2	3	4	5	6	7	8	9	10	
Principal received from Fund			900,000	900,000	900,000	2,700,000	3,000,000	3,000,000	1,800,000	2,400,000	2,400,000	
Interest received from Fund			720,000	720,000	720,000	2,160,000	2,160,000	2,160,000	1,440,000	1,440,000	1,440,000	
Best Case												
Principal received from Fund			900,000	900,000	900,000	2,700,000	3,000,000	3,000,000	1,800,000	2,400,000	2,400,000	Best
Interest received from Fund			720,000	720,000	720,000	2,160,000	2,160,000	2,160,000	1,440,000	1,440,000	1,440,000	1
Additional Payment based on fund b	<mark>balance</mark>		-	-	-	-	-	<mark>871,259</mark>	-	-	<mark>2,265,005</mark>	
Principal Received from Farmers			900 000	900 000	900 000	2 700 000	3 000 000	3 000 000	1 800 000	2 400 000	2 400 000	14.
Interest Received From Farmers			904 200	904 200	904 200	2,700,000	2 703 244	2 703 244	1,800,000	2,400,000	1 789 987	
			501,200	501,200	501,200	2,7 12,2 1 1	2,703,211	2,703,211	1,000,011	1,703,307	1,703,507	
Base Case												
Principal received from Fund		-	900,000	900,000	900,000	2,700,000	3,000,000	3,000,000	1,800,000	2,400,000	2,400,000	
Interest received from Fund		-	720,000	720,000	720,000	2,160,000	2,160,000	2,160,000	1,440,000	1,440,000	1,440,000	Base
Additional Payment based on fund b	<mark>balance</mark>							<mark>385,629</mark>			<mark>1,467,358</mark>	<b>I</b> I
												1.0
Principal Received from Farmers		-	900,000	900,000	900,000	2,700,000	3,000,000	3,000,000	1,800,000	2,400,000	2,400,000	14.
Interest Received From Farmers		-	849,330	831,837	814,518	2,531,028	2,449,750	2,395,252	1,628,702	1,541,901	1,502,482	
Worst Case												
Principal received from Fund		-	900,000	900,000	900,000	2,700,000	3,000,000	3,000,000	1,800,000	2,400,000	2,400,000	Wor
Interest received from Fund		-	720,000	675,067	627,815	2,129,660	1,916,628	1,769,129	1,255,337	1,041,689	938,438	
Additional Payment based on fund b	<mark>balance</mark>		-	-	-	-	-	<mark>2,644</mark>	-	-	629,184	
			000.000	000.000	000.000	000.000	000.000	000.000	000.000	000.000	000.000	11
Principal Received from Farmers		-	900,000	900,000	900,000	900,000	900,000	900,000	900,000	900,000	900,000	
Interest Received From Farmers		-	/23,/80	6/5,06/	627,815	2,129,660	1,916,628	1,769,129	1,255,337	1,041,689	938,438	

### **Key Assumptions**





# Sensitivity/Scenario Analysis

Best

	W	/orst	
7%	8%	9%	10%
14.18%	14.02%	13.85%	13.69%
13.97%	13.80%	13.65%	13.49%



Default

# **Cash flow per farmer**

Dataila		Increase in vield							
Details	26%	30%	40%	50%	60%	70%			
Revenue (Original)		1383	1383	1383	1383	1383	1383		
New Revenue from <b>b</b>	nigher yield	1742	1797	1936	2074	2212	2350		
Increase in revenue		359	415	553	691	830	968		
Cost for farmer per y	vear	349	349	349	349	349	349		
Additional dollar yie	ld	10	66	205	343	481	619		
Cost as a % of increa	97%	84%	63%	51%	42%	36%			
Key Points:					Base Case				
Farmers Breakeven	At a yield increase of 25.3%, the increase in income from increased crop yields will be equal to their principal and interest commitments for that particular year								
Farmers' Costs	For simplicity, we have taken the cost to be constant for all scenarios. The cost taken is the actual cost incurred by the farmer in the first few years of our fund operations								
Base Case Scenario	Our base case scena \$2,000 per farmer, a	ario (50% inc and reduces	rease in yield cost as a % o	l) shows an ii f increased re	ncrease in fai evenue to ~ 5	rmer's incom 51%	e to over		
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# **Assessment of Potential Increase in Yield**

Existing practices and outcomes	India has the world's largest area under rice cultivation, accounting for 20% of the global white rice production. The crop constitutes 42% of the total food grain output of India. Rice is traditionally cultivated through flood irrigation and consumes 85% of the water used in agriculture.
Yield Potential	Drip irrigation delivers water, through pipes, along the rows of crops, directly to the root zone. It has the potential to reduce water consumption water up to 66% and also increase yield by 25%-80% .
Increased Effectiveness	The drip irrigation method keeps the soil saturated with water, eliminating the need for standing water in the field. Keeping the soil wet could result in equivalent or higher yields than standing water conditions.
Increased Efficiency	Drip irrigation also helps conserve energy use for pumping by up to 52%. It leads to more efficient utilization of every hectare as more than one crop can be grown on every rotation.



# **Micro-Insurance Details**

Due to the scale of The Krishak Development Fund, the costs of insurance are kept to a marginal sum (2% of our fund over 10 years)



#### **Micro Crop Insurance:**

Covers major losses of crops (due to to changes in weather or other catastrophic events/incidents)



#### Infrastructure Insurance:

• Covers damage of infrastructure – costs required for reparations or replacement (both the rudimentary reservoirs and irrigation systems)



# **Organization and Risk Management Structure**





# **Proposed Infrastructure**



#### What is it?

Rudimentary reservoirs are reservoirs built to capture, store and distribute water for a variety of purposes including irrigation and aqua farming. The reservoir is lined using a pond liner to help in retention of water in the reservoir

### Drip Irrigation Systems



#### What is it?

Drip irrigation systems are micro-irrigation systems that slowly distribute water to the roots of crops through a network of pipes, valves, tubing and emitters. This minimizes water evaporation and thus, decreasing water requirements for a farmer



# **Contractor/Infrastructure KPI assessment framework**

Rudimentary Reservoirs

- Contract to be given to an infrastructure company with a proven track record in building reservoirs
- Payment schedule to contractors will be structured on a 'percentage of completion' basis (e.g. aside from initial down-payment of 10%, 10% completion = 10% of remaining payment, and so forth until completion)
- Checklists for reservoir parameters and quality control will be distributed to farming co-operatives they will monitor and provide weekly reports on status of completion and quality of work
- Payment to contactors will only be disbursed after receiving confirmation from the farming cooperatives on the full and quality-approved construction of rudimentary reservoirs
- Long-term Farming co-operative representatives to check for breaks in pond lining to determine need for replacement of liner

Drip Irrigation Systems

- Contract to be given to an experienced product and service provider in the micro-irrigation industry
- Checklists for irrigation system parameters and quality control will be distributed to farming cooperatives
- Farming co-operative representatives will conduct random monthly spot checks on farms to assess the quality of irrigation system (i.e. 1 in 50 farms will be checked at random)

