

FARM

Fund for Adopting Responsible Materials

INVESTMENT THESIS

FARM is addressing the agricultural plastic waste challenge. It will make catalytic investments to supplant the use of agriculture petroleum based plastic with environmentally friendly bioplastics. The fund will also invest in promoting feedstock growth to support the bioplastics industry. These regenerative agricultural practices incentivize farmers to use alternative materials, farmers to produce inputs for such materials and the bioplastics industry to develop.

CHALLENGE

Agriculture polyethylene (PE) mulch films have been used for decades to increase agricultural crop yield by controlling weeds, soil temperature and water usage. While initially thought to be cost-effective for vegetable farming but these thin **PE mulch films are non-biodegradable, non-reusable and non-recyclable**. The immediate post-harvest phase sees residual accumulation during removal, which over the years causes soil quality degradation. The mulch that is successfully removed is often stock-piled and burnt or end up in landfills, due to low scope for recycling. Additionally, corn farmers have seen a continuous decline in their profit margins driven by low prices and high commodity volatility and supply outstripping demand.

The two key challenges thus are (1) specialty crop farmers to internalize the high direct and indirect costs of using plastic products and (2) corn farmers to get an alternate, stable and high source of income.

Currently the direct and indirect costs associated with the use of PE agriculture mulch are currently not valued appropriately. There are **high labor costs** to remove the mulch after every harvest season, **loss in yields** due to reduced soil fertility, **presence of micro and nano plastics** in the soil due to inappropriate and ineffective disposal methods - all add to not only a dire environmental impact, but also socio-economic impacts in terms of low yields and profits for farmers.

SOLUTION

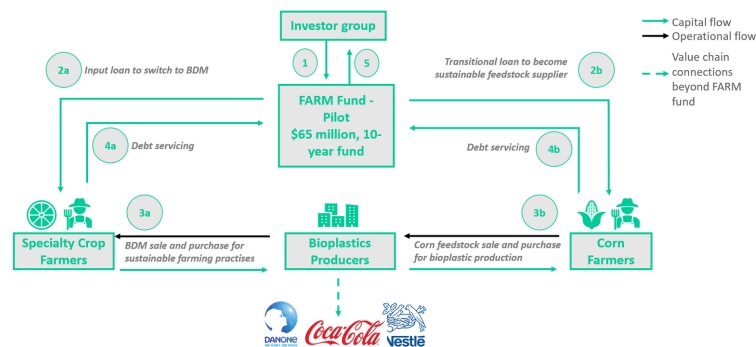
Our solution aims to supplant the usage of plastic agriculture films with an environmentally friendly alternative, by creating financial incentives to both producers and consumers of alternative solution.

A sustainable alternative to PE mulch is **biodegradable plastic mulch (BDM)**. BDM made from bioplastics perform the similar function of increasing crop yields, do not require removal since they're biodegradable. **This provides a multi pronged benefit - reduced labor costs related to mulch removal, reduction in microplastics in the soil, added fertility of the soil, and reduced waste associated with burning or dumping mulch.** Experimental studies suggest that BDM mulch tilled into the soil lead to consumption of less water, increased retention of heat in the soil, increased crop yields by 20% and improved workload and waste management.

Our fund aims to solve agriculture plastic waste challenge, by linking large farmers and BDM producers through an input credit program and the same bioplastic producers with feedstock farmers through a transitional loan program. This provides the demand base that the BDM producer needs to scale up the technology, and the farmer needs to switch to a new agriculture practice and feedstock farmers to get additional revenue streams.

FUND STRUCTURE

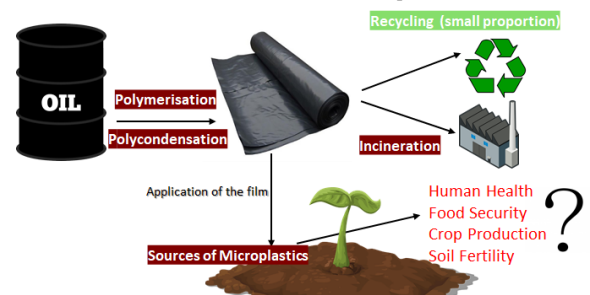
Our Fund aims to create a virtuous circular cycle by creating linkages and incentives for all players in the bioplastics value chain. We will provide transitional loan assistance to corn farmers to become 'sustainable biofeedstock providers' and divert a proportion of their produce for sale to bioplastics producers. We will also provide input loans to vegetable farmers to switch from current plastic based agriculture practices to bioplastics. These loans will be repaid at a marginal spread over current USDA farm loans. Additionally, both sets of farmers also receive technical assistance and network connection benefits.



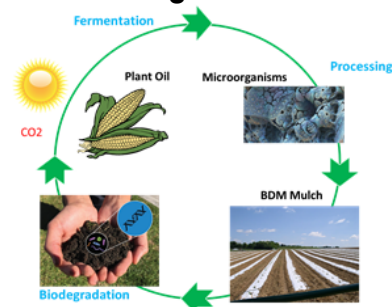
Barriers to adoption addressed by FARM:

- Reduced high upfront costs
- Aligned with the seasonal cash flow associated with farming
- Assured supplier and consumer base to BDM producers, thus spurring investment in scale-up
- Resistance to new, untested farming practices through technical assistance and support from network partners
- Guaranteed reduction in labor costs and increase in yields and new revenue streams, all of which accrue to the farmers

Current PE mulch lifecycle



Sustainable biodegradable mulch lifecycle

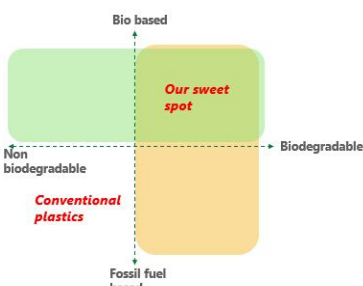


Bioplastics 101

Bio-based plastics - Plastic that made from renewable resources instead of fossil fuels.

Biodegradable plastics - Plastic that can degrade by naturally occurring microorganisms such as bacteria, fungi, and algae to yield water (H2O), carbon dioxide (CO2) and/or methane (CH4), biomass, and inorganic compounds.

Bioplastics - plastics that are bio-based, biodegradable, or both.



FUND PROFILE

Pilot Fund Investment Profile	
Fund Size	USD 65 million
Investment Criteria	200 Specialty crop farmers in California with average size of ~500 acres 200 Corn farmers in Illinois with an average farm size of ~500 acres
Target Return	5% (Gross), 4% (Net)
Fees	0.4% management fee on committed capital, 3% on performance
Time Horizon	10 years
Investors	Impact investors, oil companies, USDA, consumer goods companies
Partners	Investors, farmers, extension schools, USDA, bioplastic producers, bioplastic alliances

Fund Details	
Asset Class	Private Debt Impact Fund
Inception Date	January 2021
Benchmark	Blended
Use of Income	Reinvestment
Distribution frequency	Annual
Number of Holdings	6
Investment Assets	Mezzanine Secured Term
Total Expense Ratio	2.19%
Lock in period	3 years
Units Outstanding	65,000
Monitoring & Control	Loan to value ~50%
Financial covenant	Minimum Debt Service coverage 4x

INVESTOR PROFILE

USDA

- Has sponsored academic research into bioplastics use in agriculture
- The Rural Business Investment Company facilitates private investment in agriculture related businesses

Oil Companies

- Bioplastic provides diversification strategy as normally oil companies provide feedstock to petroleum based plastic production

Impact Investors

- Complementary to investment theses of ensuring food security and combating environmental degradation

Bioplastic Producers

- Major bottled water companies have committed to make 100 percent bio-based products and thus would increase demand for bioplastics in the near future
- Leading plastic producers have launched marketing campaign for biodegradable plastics

Farmland REITs

- REITs (Real estate investment trusts) are more inclined to lease the farmlands to farmers who either produce feedstock for bioplastics or use bioplastic materials.

IMPACT



Improves crop yields by **10% CAGR**

Increase the area under sustainable agriculture by **100,000 acres**

Increase corn farmer incomes by **~12%** on average and specialty crop farmers by **~20%** on average

Per farm capacity to allocate feedstock to produce **~17 million** bio-based yogurt cups

Reduces **38%** of present soil degradation

Reduce CO2 emissions by **5X** for every kg of mulch replaced

Reduce plastic production energy consumption by **~30%** per pound produced

Reduction of **80%** of agricultural plastic waste

Prevent **3.6 million kg** of plastic from being used annually

Prevent **1 million sea birds** and **10,000 marine creatures** from dying because of plastic entanglement annually

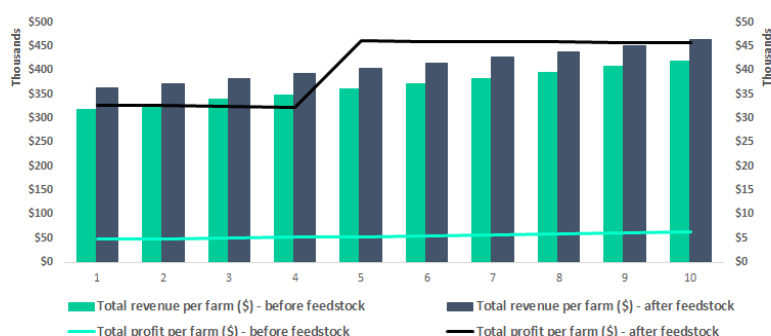
Connect **10** partners across various parts for the value chain to enable the bio-economy

RISK AND MITIGATION

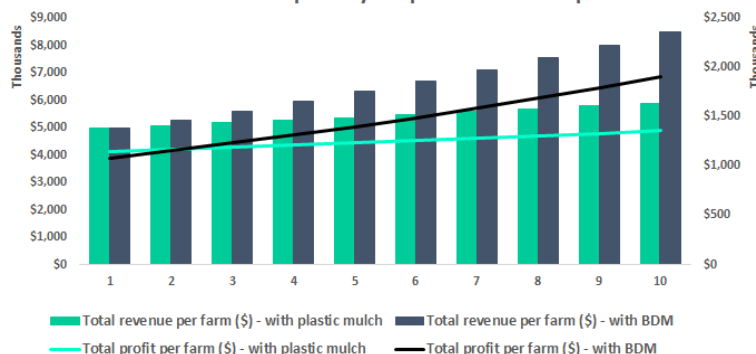
Risks	Likelihood	Mitigants
Slow adoption by end consumers		<ul style="list-style-type: none"> Work with extension schools and farm bureaus to promote use of bioplastics in agriculture and show benefits to farmers Expand base to organic farmers, non-organic but sustainable farmers and the rest of the farming community
Credit risk of farmers		<ul style="list-style-type: none"> Partner with farm associations to assist screening of farmers Consult with the FCA on delinquencies
Unfavourable Regulation		<ul style="list-style-type: none"> Engage with USDA on increasing the list of bio preferred materials Engage with the US FCA as regulatory counsel
Natural calamity impacting agriculture		<ul style="list-style-type: none"> Work with farmers to ensure they have access to at least subsidized federal government multi-peril crop insurance (MPCI) before being eligible for either kind of transitional loans or input credit
Technology improvement challenges		<ul style="list-style-type: none"> Support USDA backed research advancement on improved biodegradation of plastics, promote commercialisation as in Europe
Liquidity crunch for investors		<ul style="list-style-type: none"> Obtain a back-up line of credit

CASH FLOW ANALYSIS

Profit and Revenue for Corn Farmers - before and after feedstock



Profit and Revenue for Specialty Crop Farmers - with plastic mulch



ADDRESSABLE MARKET

Pilot Fund		FARM Fund I	
Location	California and Illinois	California, Illinois, Florida, Iowa	
Fund Size	USD 65 million	USD 320 million	
Farmers Impacted	400, ~500 acres each	2000, ~500 acres each	

Our Pilot Fund of USD 65 million is at proof of concept magnitude and our Fund I offering is expected to have USD 320 million AUM, which is above average AUM of private debt impact funds. The business model and large fund ensures scalability across crop markets in the US and that the fund can be **evergreen** in operations, while giving an opportunity to **invest in creation of a sustainable circular economy**.

Global Agricultural films market, a **\$ 9Bn opportunity in 2018** is expected to grow @ CAGR of 6% to reach **\$ 16.1 Bn by 2028**. As the benefits of rising agricultural yields and declining adoption costs spread across farmlands in developed markets, this adoption will spread to emerging markets such as China. Rising environmental concerns and regulatory bans over use of PE mulches such as a recent one announced by China will also drive demand for BDM.

