



Moringa Tree **Fund**

Meet Afi





Land Degradation

69% nationwide
FASDEP Report 2007

Poverty

29% below poverty line

39% in rural areas
ruralpovertyportal.org 2010

Food Insecurity

5% nationwide

16% in N. Ghana

30% female-headed vs. 15% male in N. Ghana
World Food Program 2012

Child Labour

34% child labour rate
UNICEF 2012



Moringa Tree Fund



Why Moringa?



Suitable conditions for Moringa cultivation in Ghana



Before ↑

Grows in arid regions and restores degraded land

↑ **After**

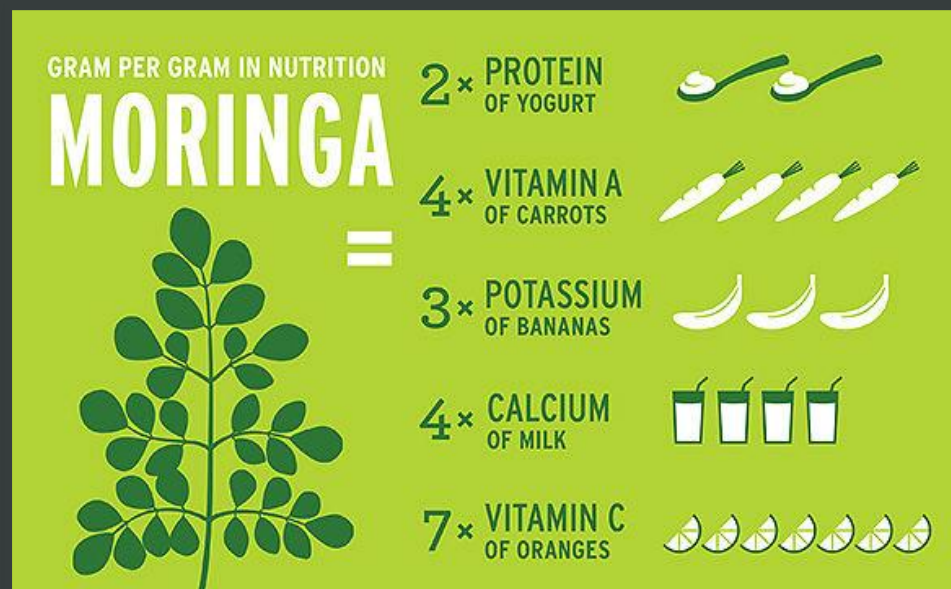
Possible Revenue Streams



Carbon sequestration



Seed oil used in cosmetics



Nutritional supplement

Medicine

Water Purification

Animal Feed

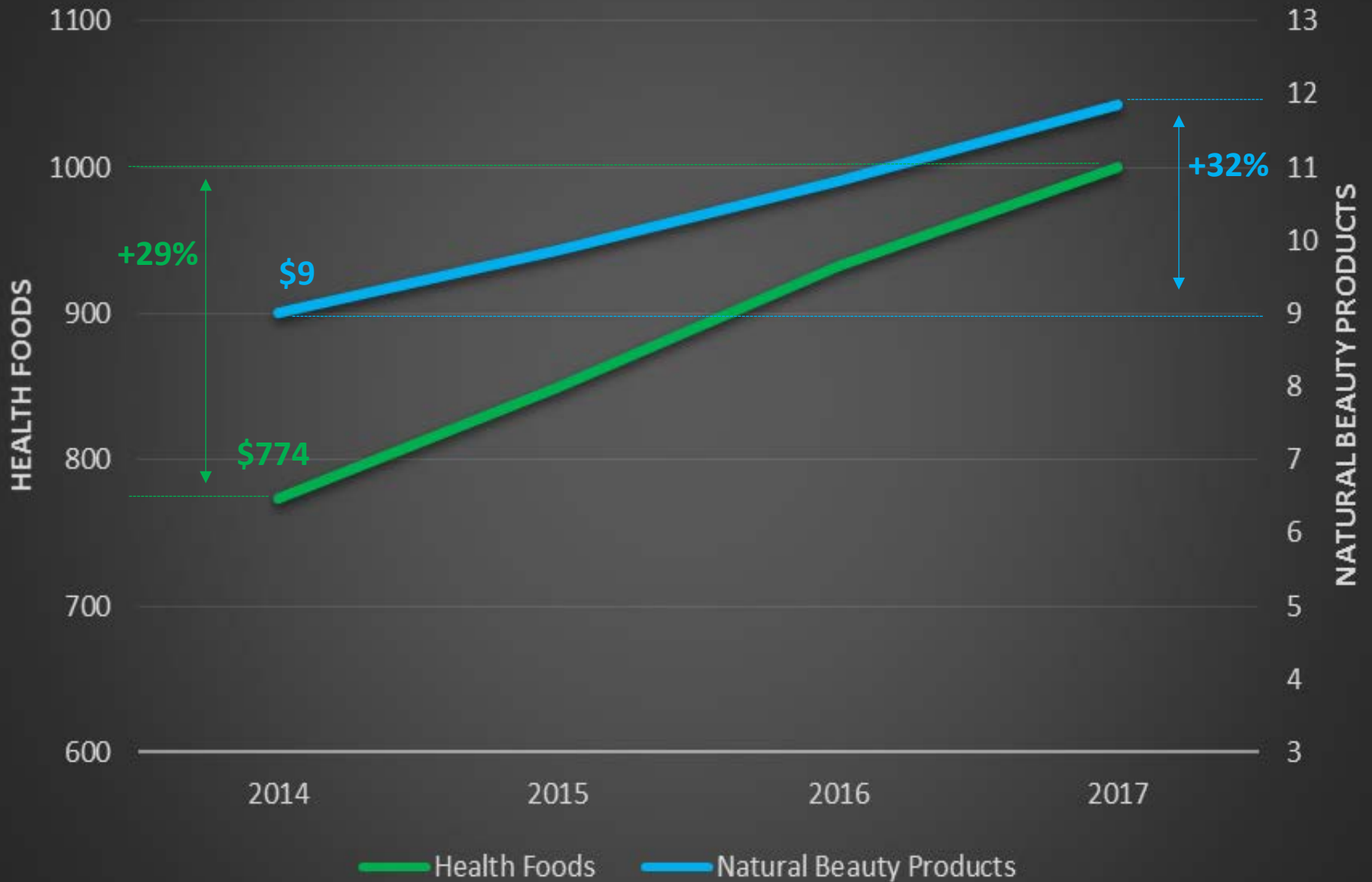
Biofuel

Paper

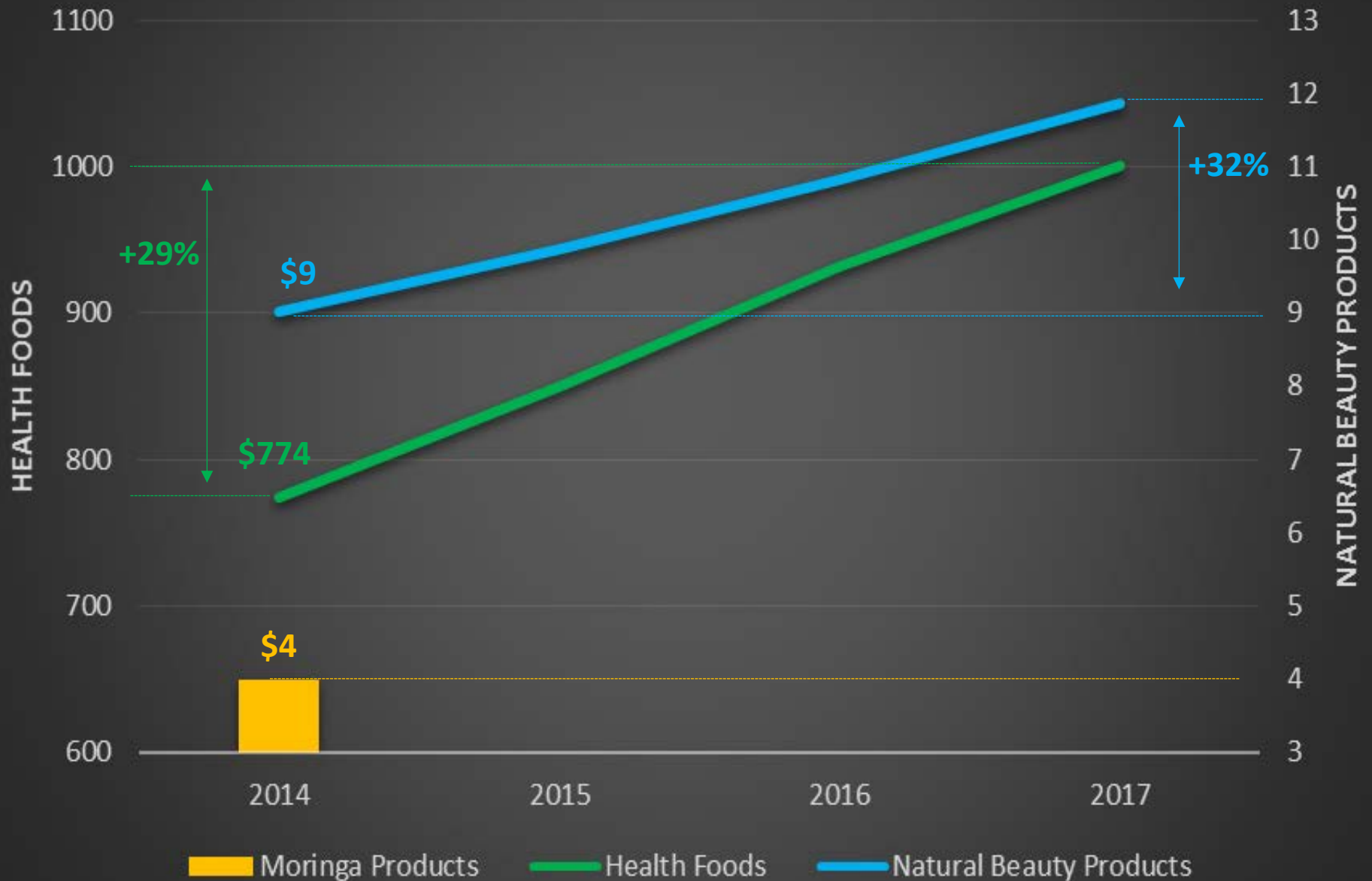
Rope

Alternatives

Global Market Potential (\$ Billion)

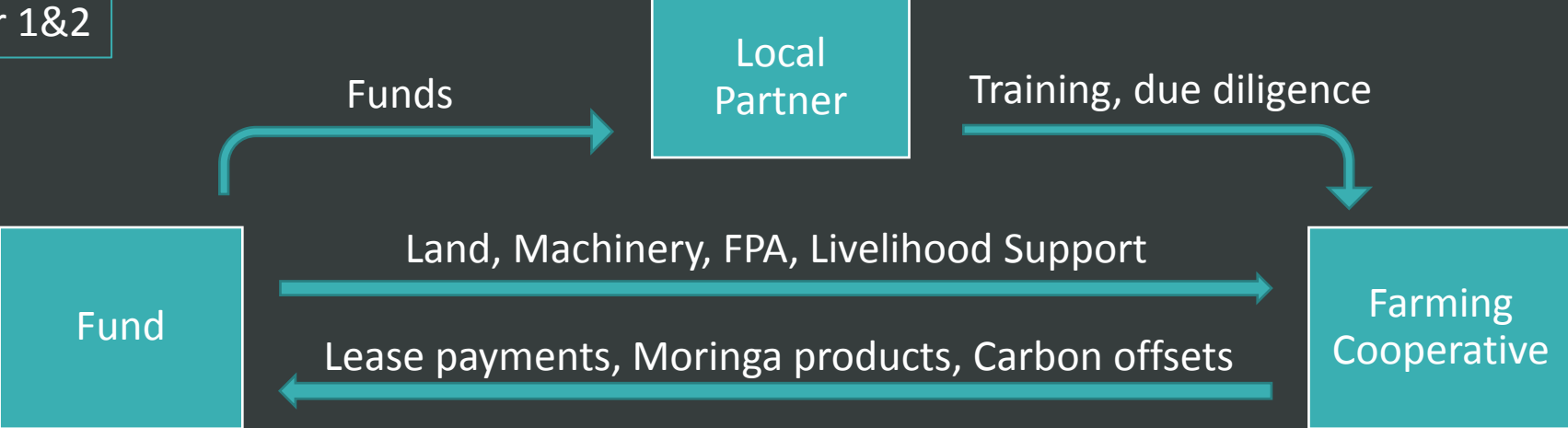


Global Market Potential (\$ Billion)

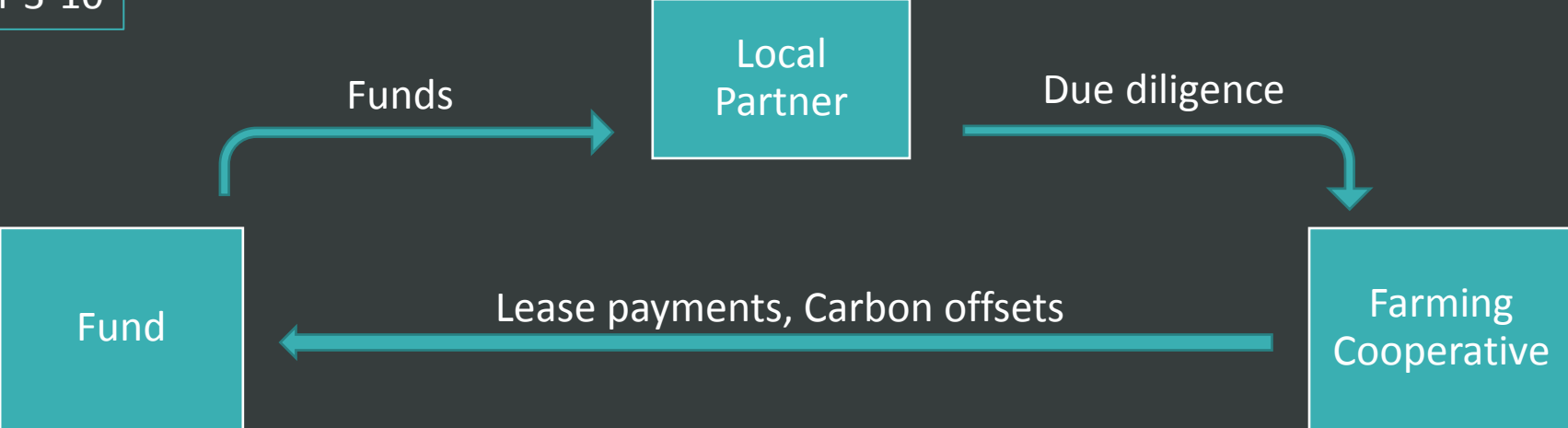


Financial Structure

Year 1&2



Year 3-10



Summary of Cash Flows (\$ Million)

	Year 1	Year 2	Year 3	Year 4	Years 5-10
Lease Payments	\$10.1	\$10.1	\$10.2	\$10.2	\$10.4
Revenue From Offset Credits		\$4.0	\$4.0	\$4.1	\$4.1
Revenue From Moringa Products	\$28.8	\$43.0	\$56.4	\$56.7	\$65.9
Payments To Local Partners	\$4.5	\$4.5	\$4.5	\$4.5	\$4.5
Payments To Investors	\$7.5	\$7.5	\$7.5	\$7.5	\$7.5

Fund Specifications

Asset Class	Asset-backed fixed income debt
Capital Structure	100% investor funded debt
Fund Size	\$50 million
Investment Size	\$1 million- \$5 million
Time Horizon	10 year renewal periods
Target Rate of Return	15% annual ROI
Fee Structure	3% management fee
Target Investors	Institutional Investors
Target Geography	Ghana (Emerging Markets in Africa: Rwanda, Tanzania)
Number of Farms	100
Total Land Area	3,000 hectares

Risk Mitigation

Country Risk

Political stability: Democracy with 20 consecutive yrs. of peaceful elections

World Bank's **Doing Business** rankings: 4th in Sub-Saharan Africa

Economic stability: Average growth of 6% over 5 yrs.; 8% expected in 2015

Agricultural exports: 2nd largest exporter of cocoa, 3rd largest producer of shea

Financial Risks

Credit Risk

- Land and machinery collateral
- Farming cooperative structure
- Women better debtors

Currency and inflation risk

- Foreign exchange swaps
- Carbon offsets in USD

Business Model Risks

Farmer Motivation

- Forward purchase agreements
- Livelihood support in Year 1

Agricultural Risk

- High pest/disease resistance
- Proven agricultural success

Social Impacts Per \$1 Million Invested



Farmers
Impacted

20

Women
Empowered

8

Increase in
Farmer
Income

16x

Children
Saved From
Labor

32

Additional
Local Jobs
Created

218



Carbon Dioxide Emissions Offset

13,280 mtCO₂e

3,200 cars off the roads

Environmental Impacts
per \$1 million invested

Degraded Land Cultivated

60 hectares

85 football fields





Appendix

Assumptions - Farm

Farm size (hectares)	30
Hectares cultivated per farmer	3
Distance between trees for seed oil	2.5 meters
Distance between trees for leaves	1 meters
Area split between cultivation for leaves : seeds	60% : 40%
Number of trees per farm	180,000 (leaves) + 19,200 (seeds)
Seeds needed for planting one tree	3
Yield of seeds per plant per harvest	19 kg
Yield of dry leaves per plant per cutting	0.04 kg
Percentage of yield sold	50%

Assumptions – Financial 1

Cost of land / hectare	\$ 9,500
Cost of seeds / kg	\$ 20
Number of seeds / kg	500
Cost of seed oil processing machine / farm	\$ 8,000 x 1
Cost of leaf powder processing machine / farm	\$ 400 x 14
Cost of bore well / farm	\$ 3,000
Cost of a solar panel set up / farm	\$ 60,000
Cost of initial year marketing to buyers / farm	\$ 20,000
Cost of initial year marketing to buyers	\$ 20,000
Marketing and distribution costs / revenue	20%
Packaging costs / revenue	10%

Assumptions – Financial 2

Sale price per liter of seed oil	\$ 20
Sale price per kg of leaf powder	\$0.75 domestic and \$1.5 international, 50-50 split
Amount sold Year 1	100%
Amount sold Year 2	100%
Amount sold Year 3-4	70%
Amount sold Year 5-10	80%
Sale price per liter of seed oil (FPA)	\$ 6
Discounted purchase price (oil) (FPA)	29%
Sale price per kg of leaf powder (FPA)	\$ 1
Discounted purchase price (powder) (FPA)	80%

Assumptions – Financial 3

Fixed cost to local partner organization / org	\$ 100,000
Hourly \$ compensation for local partner employee	\$ 15
Hourly \$ compensation for farm workers	\$ 1
Average income of farmer (USD) / day	\$ 4.25
Interest rates on lease payments	10%
Investor ROI	15%
US inflation rate	0.5%

Assumptions - Environmental

Land area in Ghana	23,850,000 hectares
Total degraded land area in Ghana	69%
Area of degraded land	16,456,500 hectares
Carbon offset per moringa tree	1 mtCO ₂ e
Price of carbon	\$ 6 / mtCO ₂ e

Moringa Processing Machines

LEAF GRINDER



SEED OIL PRESS



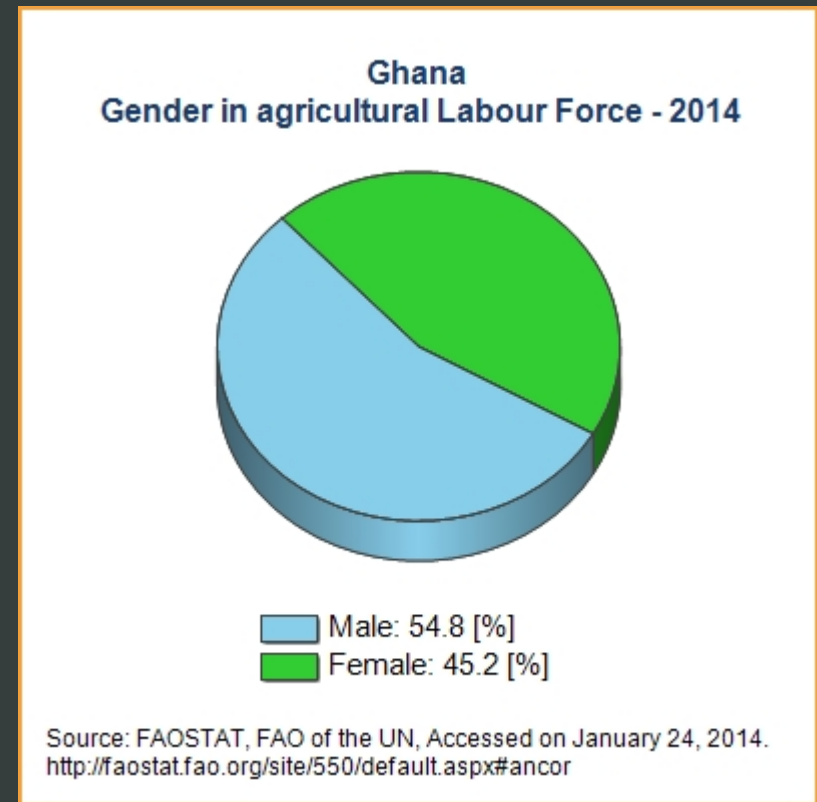
Company	Compatible Technology International	Xinxiang Jinxin Chemical Engineering Equipment Co., Ltd.
Model	Ewing Grinder	6YL-100
Price	\$400	\$8,000
Processing Power	20 kg dry leaves / hour	150 kg dry seeds / hour

Status of Women in Ghana

- Seasonal employment
- More physical labor
- Lower wages
- Higher food insecurity

“The women often do most of the physical work, planting and harvesting. But it's mostly their husbands who take the crops to market and receive the money, so the men often control the pursestrings.” The Guardian, 2013

‘During colonial times, Europeans introduced new efficient agricultural techniques exclusively to men. This created a productivity gap in favor of men, even though women had previously been the more productive gender.’ Boserup, 2013



Partners / Advisers

Volunteer Partnerships for West Africa (VPWA)

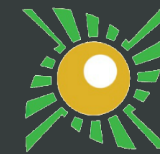
Hayford Siaw - Managing Director

Suzanne Enoh - Moringa Expert



Village Infrastructure

Stewart Craine - Founder/CEO



Village Infrastructure

HIP Investor

Paul Herman - Founder/CEO



Equilibrium Capital

Kevin Brennan – Principal



Faculty Advisors

Prof. Bruce Paton

Prof. Ming Li

Prof. Gerardo Ungson

Profiles

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ACADEMIC QUALIFICATIONS

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enterprise within native communities*

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Market entry into clean tech sector of Nepal