

CLEANSTART Renewable Energy Challenge

Fund: Solar Window

8 November 2017



RENEWABLE ENERGY CHALLENGE
FUND (RECF):
SOLAR WINDOW



SECTOR OPPORTUNITIES



Eduardo Appleyard, UNCDF

HIGH IMPACT OPPORTUNITIES & INNOVATIONS

Innovative last mile distribution models

Cross-sector, strategic partnerships

Agriculture value chains

Productive uses and income generation

Fully integrated solutions for specific high potential applications

Novel financing models

Increasing adoption of efficient appliances

Solar for refugee settlements

PayGo, DECSO, or other end-user financing solutions

Innovative and commercially driven models for institutions

Other sustainable and scalable solutions

Improved data practices and use of data analytics

Use of digital financial services, mobile payments, and mobile money agents

Use of ICT, smart meters, and remote monitoring solutions

Mini-grids that can serve multiple households or communities and businesses

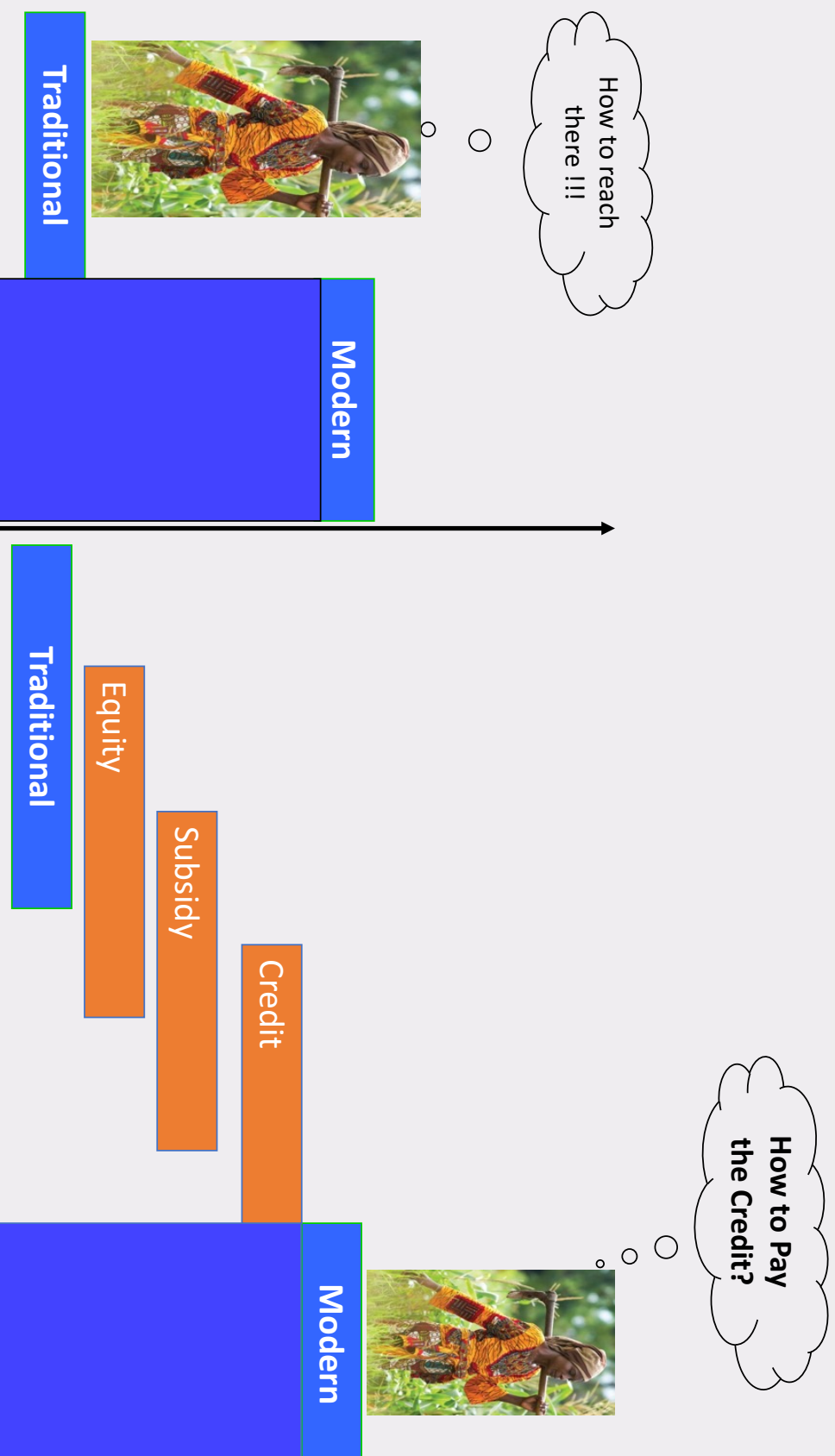
Use of top-up loans to existing PayGo customers

HOW TO INNOVATE: SOLAR VIA MFI MODELS



Prem Sagar Subedi, UNCDF CLEANSTART Nepal

RETS AND FINANCING NEED



CLEANSTART EXPERIENCES IN NEPAL

MFIs' outreach as entry point for RET promotion

Energy needs are ever changing

Clean Energy Financing: Adding value to the microfinance sector

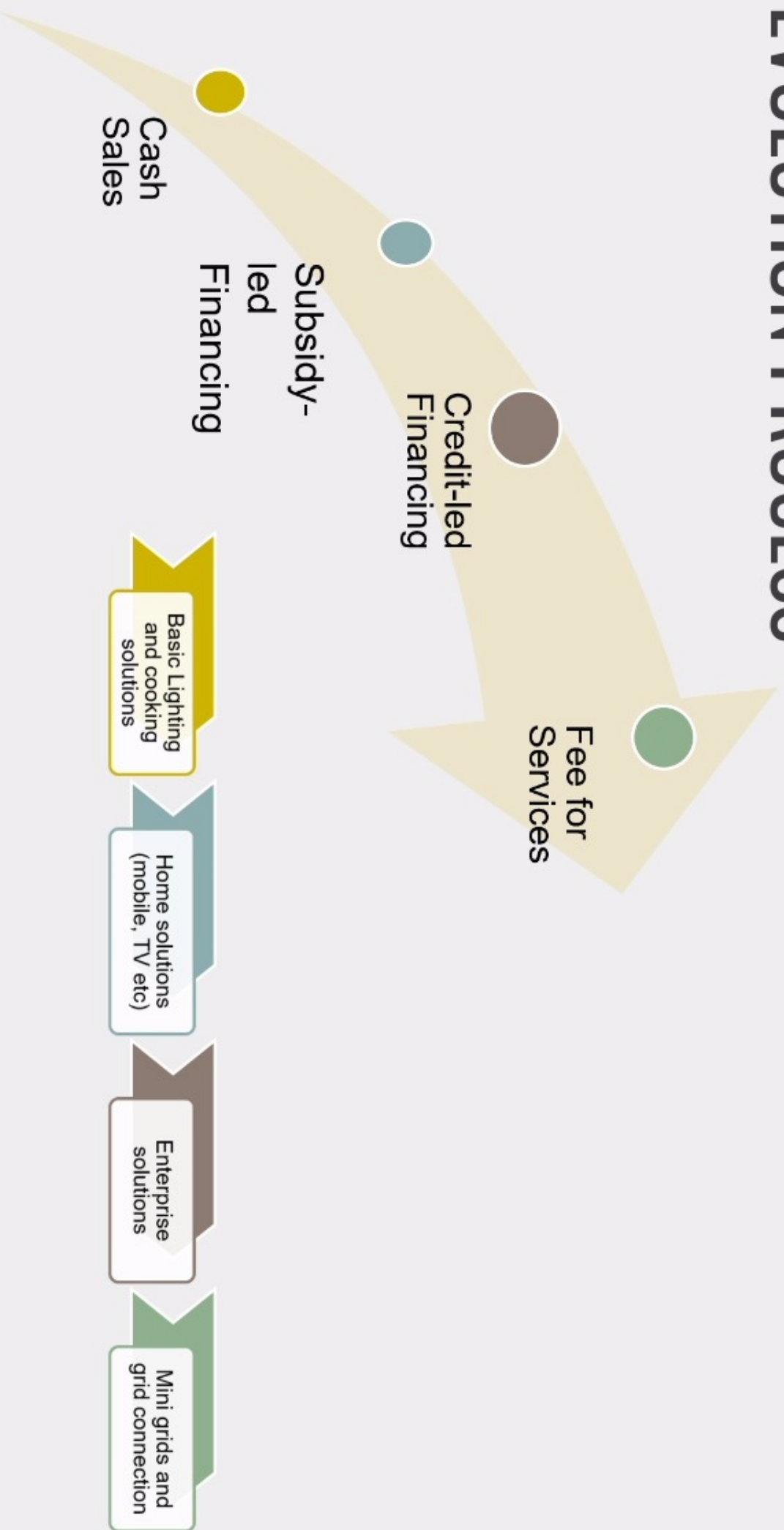
Looking RET financing from different angle: Social Impact, Interest income, Trade margins, Incentives for field staff

Conventional demand based support model may not cover the last mile

CleanStart Nepal Progress Trend



EVOLUTION PROCESS



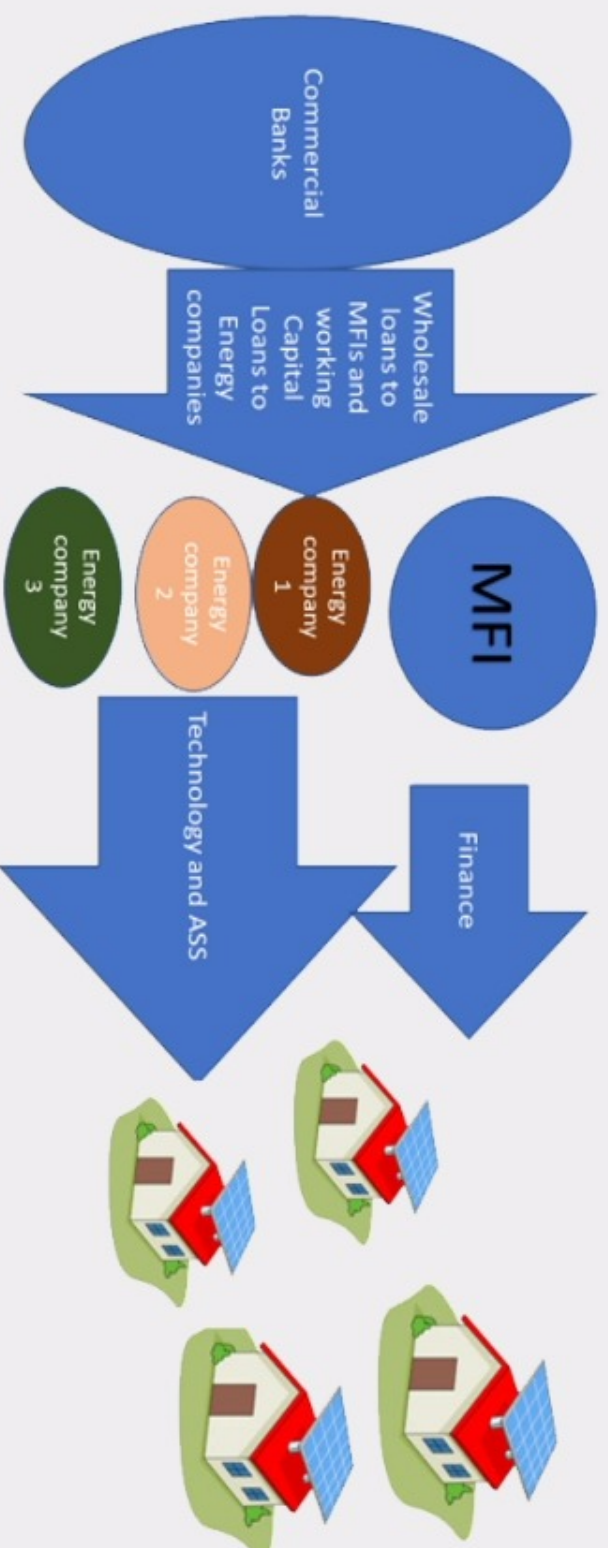
GENERIC MICROFINANCING OF RET MODEL

The MFI selects a number of energy companies to supply, install, and provide after sales services for energy technology.

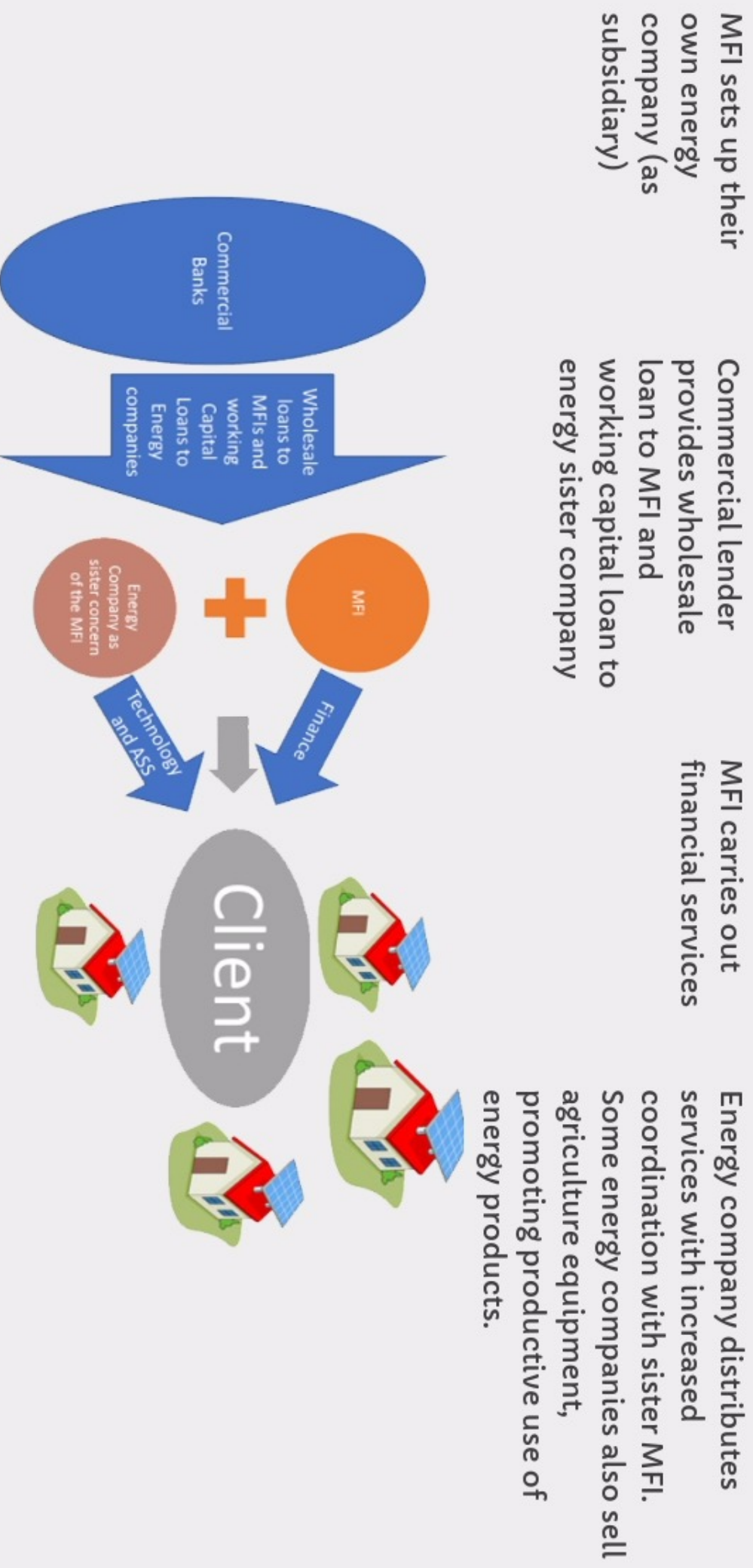
Commercial lender provides wholesale loan to MFI and working capital loan to energy service provider.

The energy companies distribute services.

The MFI provides the financial service and client awareness raising activities, for existing clients.



ENERGY COMPANY AS SISTER CONCERN OF MFI MODEL

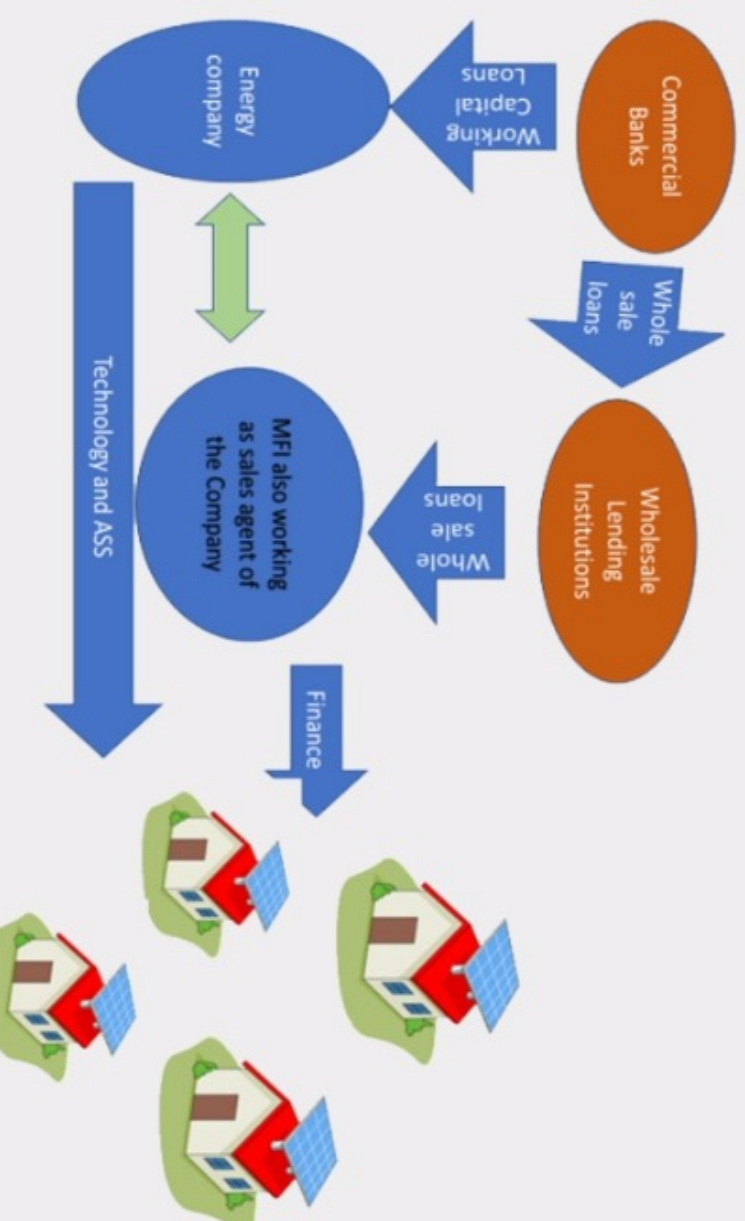


MFIs AS SALES AGENT OF ENERGY COMPANIES MODEL

Energy companies work with small farmer cooperatives as agents for energy products.

Cooperative agents receive small margin on energy products sold.

Cooperative agents can be trained as local technicians to provide additional after sales services.

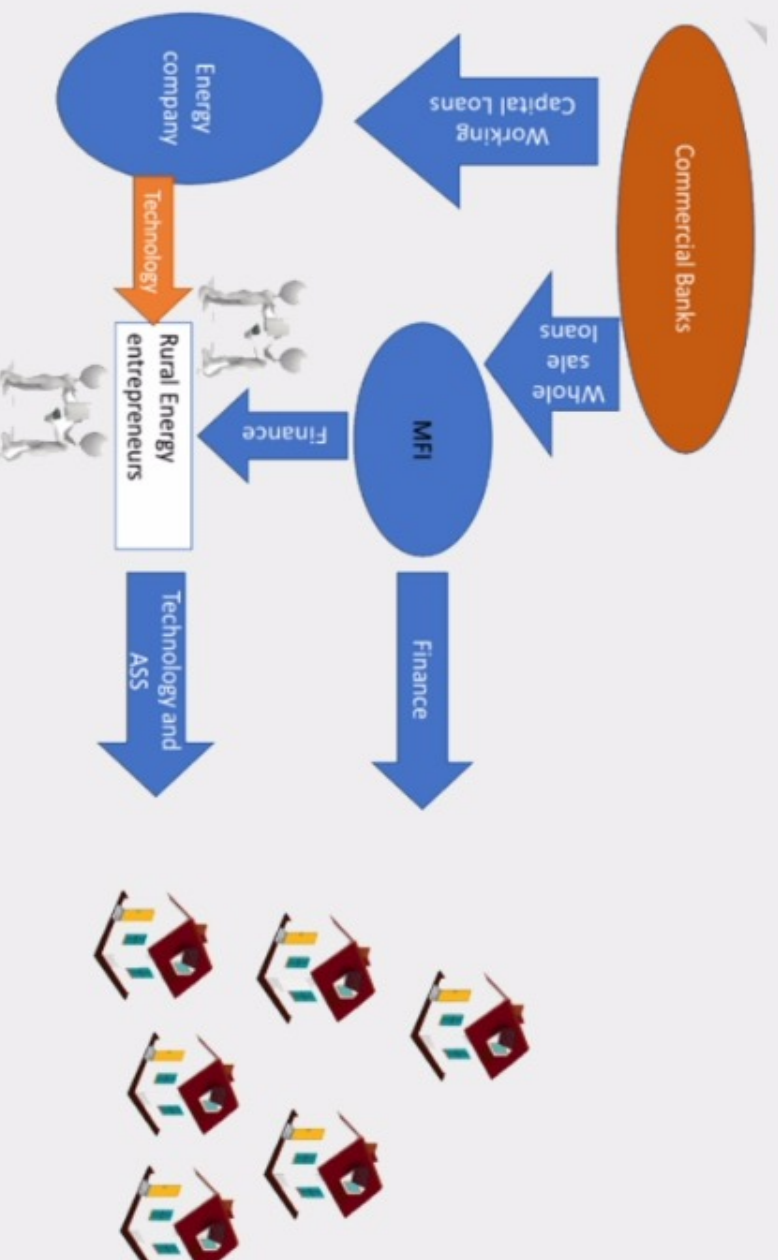


RURAL ENERGY ENTREPRENEURS MODEL

An MFI selects a few rural entrepreneurs to promote and sell portable cookstoves.

The rural entrepreneurs receive training on cookstove trade for their areas.

They work as retailers of the larger company in the center.



Use of Data in the PAYG Sector

Micah Melnyk

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Agenda

1

Sector Snapshot:
Data systems and data use
in the PAYG sector

2

Value of enhanced data
systems and use
for PAYG operators

3

Current and potential World
Bank and partners
programming on enhancing
data systems and use

Context - PAYG market growth

Pay-As-You-Go (PAYGO) sector is one of the fastest growing areas in the off-grid energy sectors in Africa. The PAYG model has successfully leveraged digital technologies to offer affordable lighting solutions to both urban and rural customers.

- Over 700,000 connections over the past five years.
- Nearly \$1 billion in capital raised between 2014-2016.

Over 80% of the market is concentrated in three countries: Kenya, Tanzania and Ethiopia.

- Nevertheless, Uganda's market presents a great opportunity for PAYG. There are now a number of number of PAYG providers providing services and growing customer bases.

The market is projected to grow by 6-8x between 2017 and 2020 (BNEF/Lighting Global 'Market Trends Report 2016').

Context - Key Challenges for PAYG



Limited Availability of Commercial Financing

- Despite sales growth, sector has not yet mobilized sufficient the levels of commercial capital
- Limited levels of engagement by financial institutions, limited financing products and high perception of risk among investors.

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Developing operational and financial performance characteristics of companies

- The sector is relatively young, with constantly evolving business models and performance characteristics.
- Despite increasing sales and customer base, few companies are profitable and there have been limited investment exits.

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Challenging Enabling Environments in Emerging Markets

- Governments continue to face many challenges in developing adequate enabling environments that would allow the sector to achieve high growth levels.

Sector Snapshot: How are companies currently using data?

The PAYG sector's data capacities is still at nascent stage. Data usage and capacities among companies varies significantly.

Data Collection

- Common ground on data collection is generally limited to transaction records.
- Data collection at customer intake shows the most variability across companies (short surveys, comprehensive essays, credit data).

Data Infrastructure

- Larger companies have comprehensive data management solutions (i.e. scalable distributed databases with APIs and BI software) in place.
- Smaller companies vary significantly (i.e. traditional SQL databases, Excel).

Data Analysis

- Wide variance of analytical use of data
- Operational functions (e.g. credit risk assessment, fraud detection) prioritized for analysis.
- Constraints on issues such as data software costs & human resources (data scientists on staff)

Recognizing the value of data

Companies and investors are recognizing the opportunity to use data to enable a stronger operational performance and mobilize investment capital into the sector.

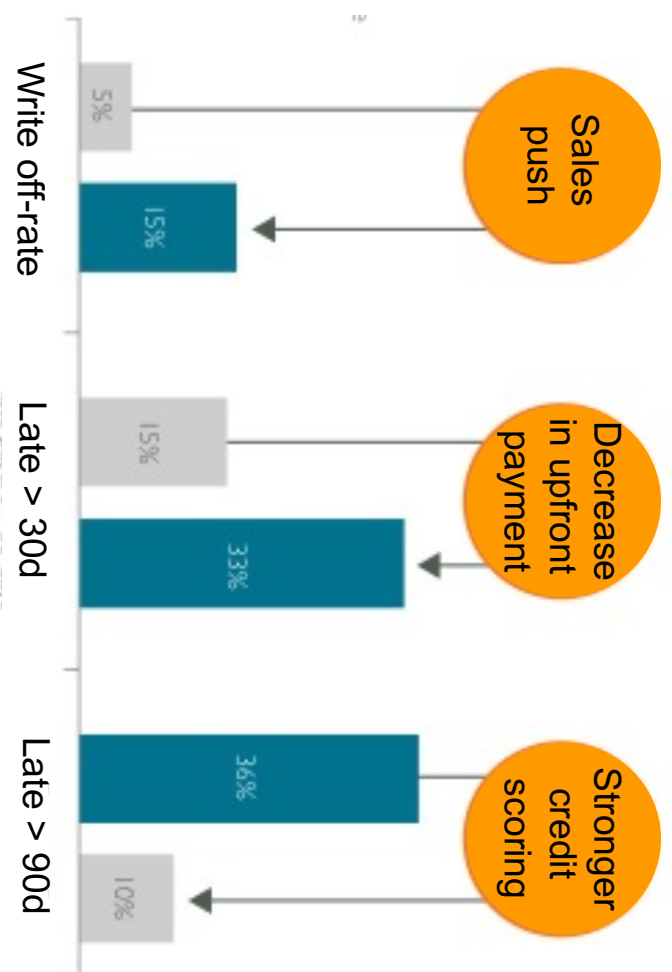
- **Strengthening operational performance:** Companies can use data to improve portfolio health, develop new products, and enable better financial decisions. Allows companies to understand impact of strategic decisions.

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Example:
**Credit portfolio
risk management**



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- **Strengthening operational performance:** Companies can use data to improve portfolio health, develop new products, and enable better financial decisions. Allows companies to understand impact of strategic decisions.
- **Facilitating access to finance:** Effectively communicate business performance, allowing investors to streamline their due diligence process and more easily assess investment opportunities.

World Bank and GOGLA efforts to enhance data use

The World Bank and Global Off-grid Lighting Association are working to enable greater use of data across the off-grid energy industry, to enhance operational performance of companies and facilitate greater investment into the sector.

- **Key Performance Indicators:** The World Bank, IFC and GOGLA established a KPI Framework for the PAYG sector (first launched in March 2017, revision in progress)
 - Creates a standard set of definitions among 13 key performance indicators.
 - Objective to enable common language and indicators between companies and investors
- **Companion Taxonomy of off-grid energy companies:** description/categorization of different strategic approaches and common business models (draft for consultation)
- **State of the Data report and Data Playbook:** collating current and best practices for developing and managing data collection systems, data management infrastructure and data usage, including illustrating how the data infrastructure can be used to report on KPIs (in development)

- **Operational application of KPIs:** beginning to work with market participants to utilize the KPIs, to determine ease of use and insights that can be drawn from data (in development)

Potential activities in Uganda regarding enhancing data use in PAYG

Operational support to PAYG companies

- Help companies understand how to build internal capacities to use data (types of software, human requirements, investment requirements, etc.)
- Examples: KPI Framework and Data Playbook

Capacity-building activities among Local Financial Institutions (LFIs) and Investors

- Guidance and trainings on how to analyze the PAYG sector and suggestions for how to leverage information derived from KPI reporting.
- Examples: PAYG Taxonomy and KPI Framework Training

Market intelligence tools & knowledge products for PAYG Sector

- Develop global knowledge products that help reduce first-mover costs of PAYG companies and strengthen the capacity of key stakeholders.
- Examples: State of the Data in the PAYG Sector, KPI Technical Guide.

Potential areas of feedback

Operational support to PAYG companies

- What types of assistance are required, if any, to build capability on i) internal data collection and data management systems, ii) external reporting on identified KPIs?

Capacity-building activities among Local Financial Institutions (LFIs) and Investors

- What types of assistance are required, if any, for LFIs to be able to utilize KPI data reporting to facilitate their investment decisions?

Market intelligence tools & knowledge products for PAYG Sector

- What market intelligence tools and knowledge products do you wish to have but do not have today? What Uganda-focused products would be useful?

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“the Sun”, Customers — from Enemy to Friend of — “the Farmer”, Ecosystem Development

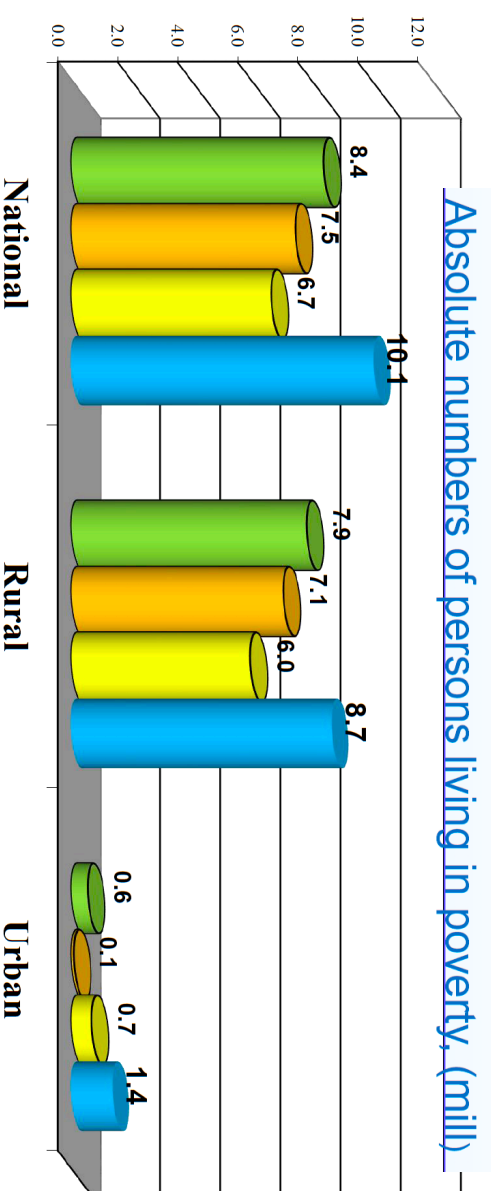
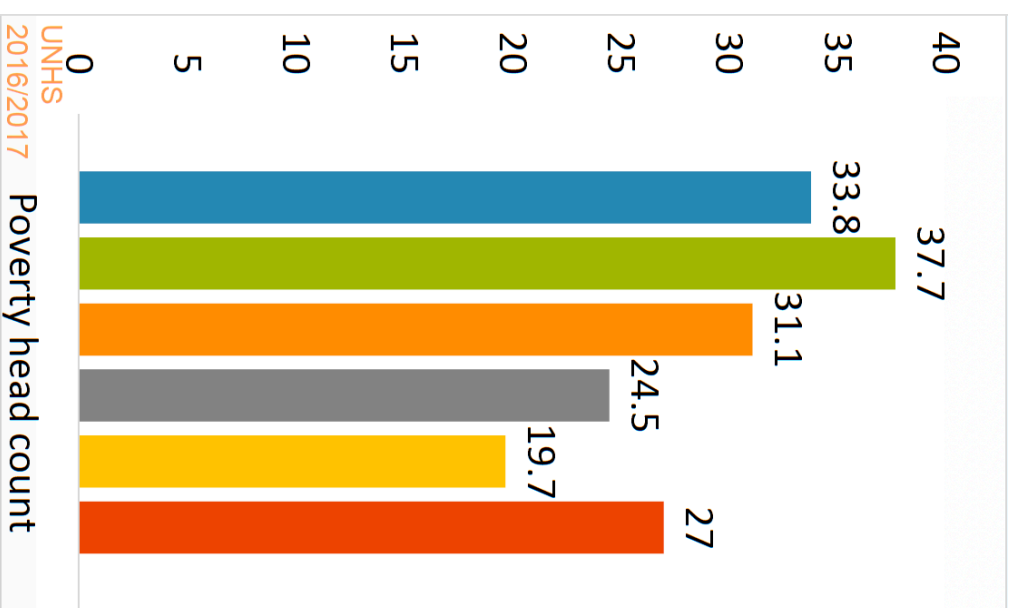
Kampala, Uganda
November 2017



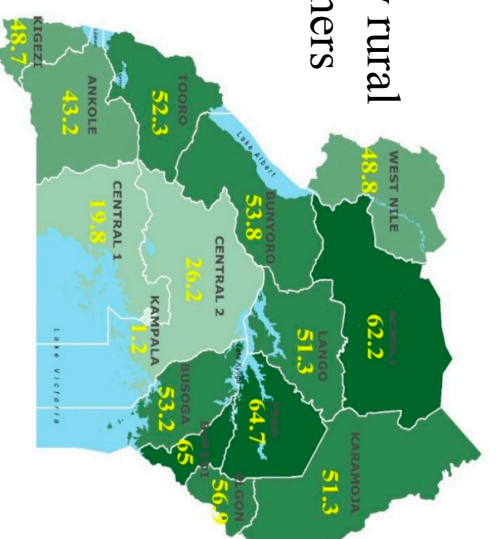
Household living conditions in Uganda have worsened between 2012 and 2017

Poverty increased to beyond 2009 levels

3.4M people slipped into poverty between 2012 and 2017



Poverty is mainly rural and among farmers



Household Living Conditions and Agriculture



MM4P

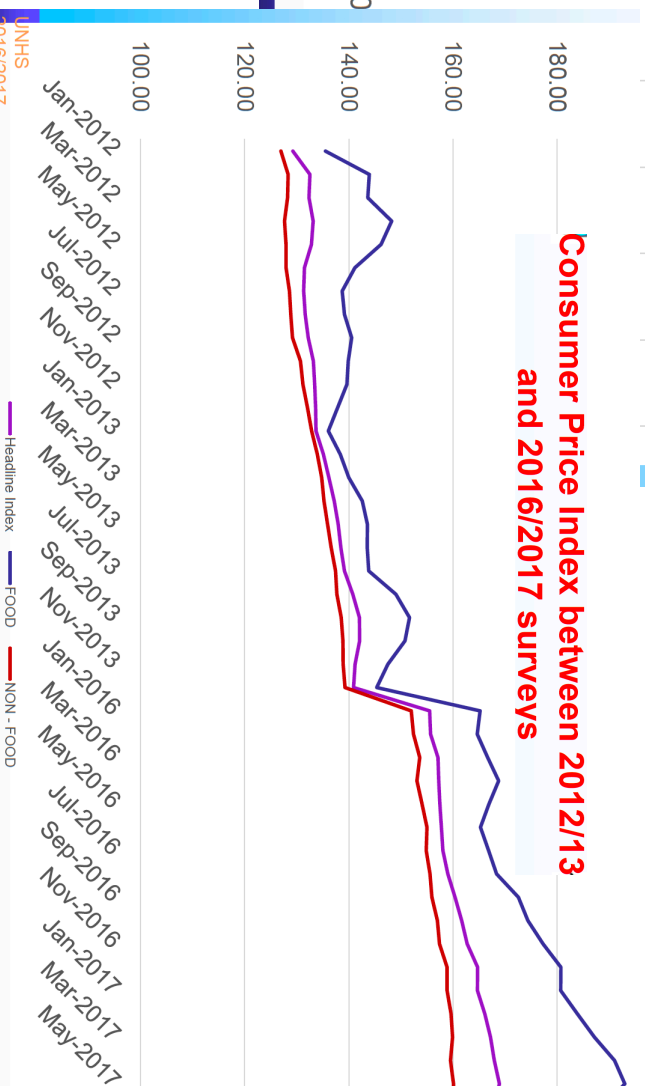
Community perception on why the worsening situation

Less than 2% of the agric hhs in 2015/16 UNPS used irrigation



The percentage poor among households headed by subsistence farmers increased from 20.3% to 38.2% between 2012/13 and 2016/17

Consumer Price Index between 2012/13 and 2016/2017 surveys



The Production challenge

Richard Cong, (Water for Agriculture, World Bank)

“The viability of rainfall is becoming increasingly compromised by climate change. The only way to lessen the effects of unreliable rainfall is by irrigation when need arises”,

The Daily Monitor Newspaper (July 16 2017)

“Uganda has suffered at least eight (8) droughts in the last 40 years, compared with only three (3) in 60 years leading up to 1970”.

The Daily Monitor (Feb 21, 2017)

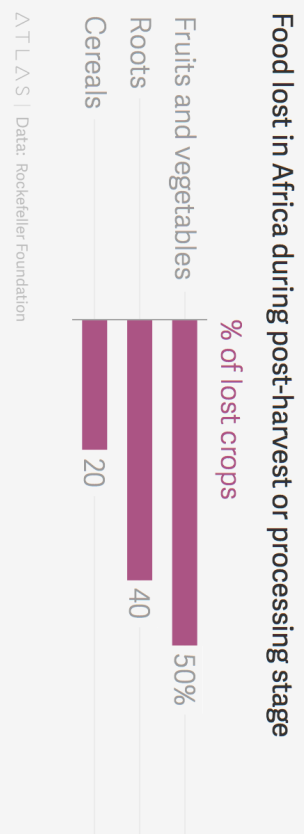
“More than 10 million Ugandans are struggling with hunger caused by prolonged droughts and out of this number 1.6 million people are generally in serious urgent need of food to escape death”.



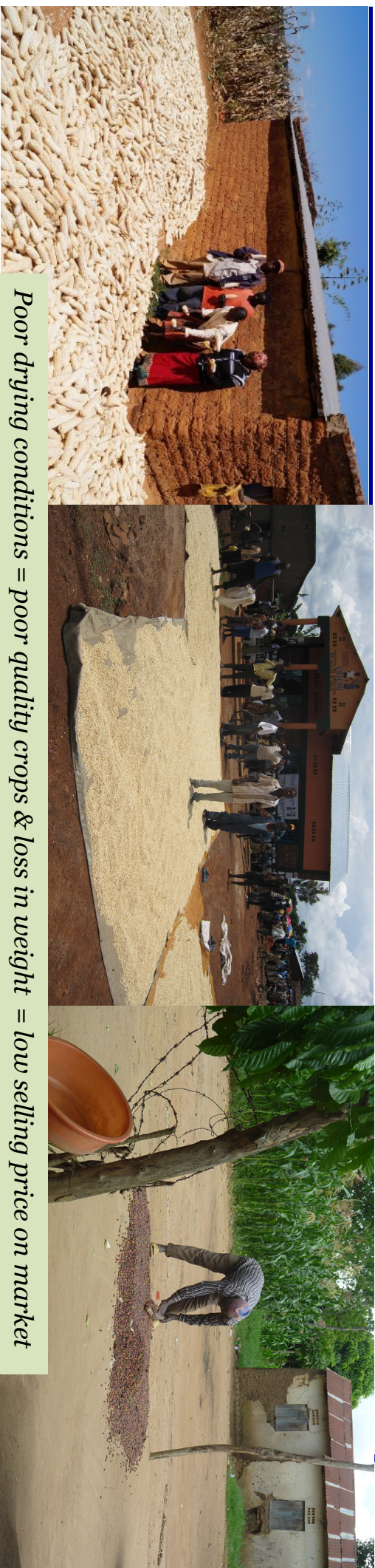
The Post harvest challenge (1)

The Rockefeller Foundation

Half of all the staple food in Africa is lost in the post-harvest stage or before they hit the market.



The post harvest challenge (2)

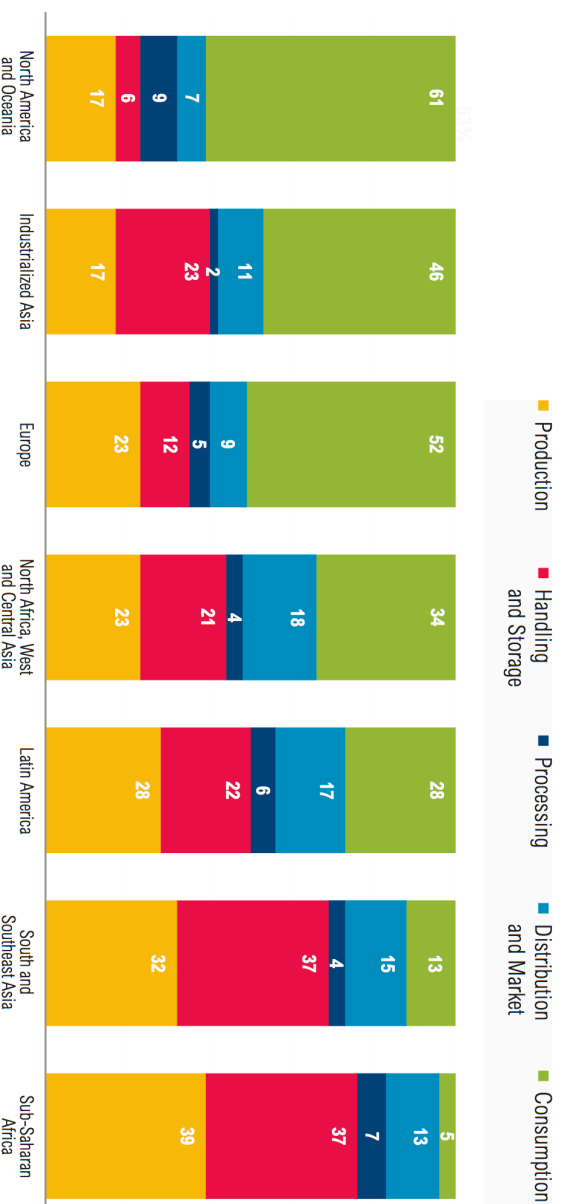


Poor drying conditions = poor quality crops & loss in weight = low selling price on market

Food loss is the unintended result of an agricultural process or technical limitation in storage, infrastructure, packaging, or marketing.

Processing by drying increases the value of crops, improves the shelf life, thus allowing you a longer marketing period for the produce

Figure 6 | Food Lost or Wasted By Region and Stage in Value Chain, 2009
(Percent of kcal lost and wasted)



A 50% reduction in PHL could guarantee food security; ensure sustainable rural economic growth in Africa (NEPAD)

Some relevant solar solutions for Agriculture



MM4P

Water pumping [Irrigation]

Photovoltaic (PV) water pumping systems may be the most cost-effective water pumping option in locations where there is no existing power line. When properly sized and installed, PV water pumps are very reliable and require little maintenance.

Crop and grain drying

Using the sun to dry crops and grain is one of the oldest and most widely used applications of solar energy. Solar dryers protect grain and fruits and vegetables, reduce losses, dry faster and more uniformly, and produce a better quality product than open-air methods.

Solar cooling

Lack of refrigeration is perhaps a one of the problems in rural areas. Without refrigeration, food-borne diseases spread more rapidly. Farmers also can't store their crops in hopes of getting a better price. Thus, the solar devices like this could help improve health and local economies.

Solar irrigation solutions



<https://futurepump.com>



Solar: Cooling solutions



<http://www.coldhubs.com>



<http://solarcoldbox.com>



<https://www.freshbox.co.ke>

Solar Crop drying solutions

