



# **S3IDF's Perspectives on the Clean Energy Future: Focus on 21<sup>st</sup> Century Interlocking Crises**

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Part II

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**S3IDF™**

# Interlocking Crises of the 21<sup>st</sup> Century



## Food Security:

- land rights, productivity increases, loss reduction, advanced warning, insurance, value chains

## Water Security:

- Drinking water, Irrigation, process needs: water rights, efficient use, loss reduction, re-treatment

## Employment Security:

- Rapid shifts in sectoral and geographic distribution of employment, labor market information failures, weak educational systems, flexibility, female labor force participation

## Physical Security of Persons and Assets:

- Weak policing and judiciary; Voluntary and forced migration and social adjustments: breakdown of traditional social protection

**ALL require a fabric of activities with electricity and electricity-enabled technologies**

**Systemic interactions: Provision of security, water, electricity, telecom, can affect infrastructure and institutional performance**

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*Demography is destiny; technology is the train*

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***Small scale public private partnership Investment multiple services (Water purification and Agricultural product processing) Facility and business run by local women (after training).***

# Elaborations on the Interlocking Crises of the 21<sup>st</sup> Century

## Demographic juggernaut

- Migration, Aging, Family Size, Dependency Ratios, Race/region/religion shifts

## Resilience: Natural shocks, economic shocks, wars

- Of food, energy, water, communications, transport – i.e., engineered systems
- Deterioration of ecosystems – water, land, air
- Backlog of infrastructure needs, persistent shortages, bottlenecks
- haphazard expansion of built habitat; frayed or non-existent social protection
- Conflict over water use priorities and cross-border flows
- Waste and pollutant emissions

## Human capital imperatives

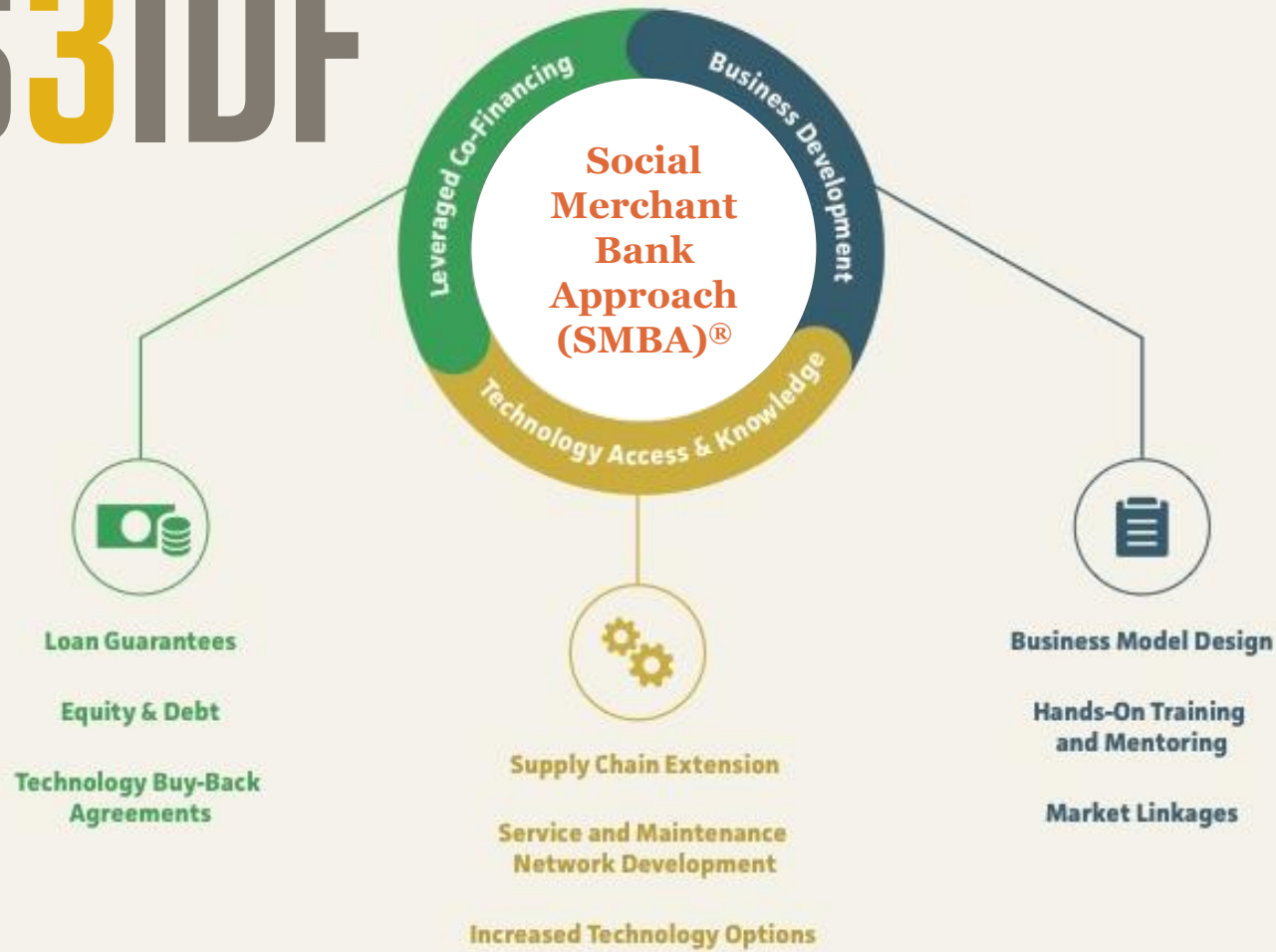
- Backlog of health care, education needs
- In the face of insecure, dehumanizing employment and livelihoods prospects
- Skill development for local economic planning and self-employment



*Food Product Organization Processing Center (PC) - A colony of landless women close to the PC are engaged to peel the areca nut as it is their indigenous skill.*



# S3IDF™



## Investment Criteria

- Pro-Poor
- Financially Viable
- Highly Replicable
- Environmentally Responsible
- Entrepreneur-Driven
- In Need of Market Integration



# Questions Regarding the Energy, Food, Water, and Resilience Nexus – for whom and for what



*Electric Fence for saving the crop.*

- What do we mean by “energy”, “food” or “water”? Electricity, land produce, and cooling water for thermal power plants?
- For the ~ half of the population that is not protected against routine climate variability, leave alone manmade global change, what has “clean energy” done for their resilience?
- Climate and resilience are all about water. Vulnerabilities of the poor are not just storms, floods, sea level rise and droughts but food and livelihoods security and local environmental quality.

# Reflections from the Frontier

## “Clean energy” supply revolution has bypassed the poor

- Cleaner, healthier, productive energy requires investments on the demand side

## The poor suffer the climate, no matter what

- Resilience is central to inclusive green growth

## Globally, gathering storms of interlocking crises

- Huge backlog of unmet demands at or near the Bottom of the Pyramid
  - Improved food and water quality, security; nutrition and health care; education and employment
- Security and improvement of livelihoods demands local focus

## S3IDF’s small-scale explicitly pro-poor or analogous interventions

- are knowledge and skill-intensive, with high upfront costs BUT
- THERE IS NO ALTERNATIVE; resentment is bubbling

## New thinking required from philanthropic and development capital

- High long-term cost of neglecting the poor
- Human capital – skills, institutions, social services – development central to resilience to climate, and addressing the interlocking crisis

\* See Addendum re S3IDF and its Social Merchant Bank Approach (SMBA®)



*Pico Hydro Electricity  
Generating Systems  
in western  
Karnataka state in  
southwest India  
(one of many).*

# Key Messages & Lessons

## Energy transition for the 21<sup>st</sup> Century are different

- “Last mile” or “Bottom of the Pyramid” populations
- Low absorptive capacities, high human and social benefits
- To achieve rapid impact, need to invest on the user side

## We all need to rethink and set new goals

- Cleaner, healthier, more productive energy use
- Addressing local vulnerabilities and risks
- Effectively using local capacity, knowledge, and capital

## Need to address the multiple financing challenges

- Simply not enough development and philanthropic capital to address the crisis and allow leveraging to access local commercial capital
- Not enough blended capital structures by DFI’s and major players
- The sad reality of how “Impact Investing” has evolved
- Better strategy and tactics for allocation and implementation of all the climate funds

## Need new analytic structures to supplement “Earlier” Economic versus Financial Investment calculus

- Not just ad hoc approaches
- Can we “Shadow Price” the extras for resilience, risk avoidance components in a new calculus



**Food production entity stock storage facility for organic fruits and veggies segregated to be sent to vendors**

# Messages & Lessons from S3IDF's Clean Energy and Development Projects Design and Implementation

## *Bottom-up pro-poor project design and technology modernization faces serious barriers*

### **Human capital binding constraint, not only financial capital**

- Because we can prepare bankable private sector projects
- Knowledge- and skill-intensive *initially*

### **High cost of information for project design and justification**

- Need “actionable intelligence”, not just survey statistics

### **Local delivery chains for equipment and information crucial**

### **Energy supplies alone do not galvanize development**

- Or do much for climate vulnerability exc. timely weather warnings
- Fads of demanding “results” without valid theories of change hinder project justification and design
- Need new analytics and calculus – metrics of long-term outcomes, and opportunity costs of land, water and labor



***Upgrading Traditional Water Mills in Nepal  
(Mills provide multiple services depending on linked technology)  
An example of water mill with processing machinery. Photo  
Courtesy of Ian Taylor, ADB.***



# Lessons & Messages from S3IDF's Clean Energy and other Projects - Continued



*Improved Stoves for silk reeling, which is just one of multiple projects focused on the Silk Value Chain in Karnataka, India.*

- Land and water rights, use policies, regional and physical planning, and “Design Basis” of built habitat key to resilience
- Systemic institutional lethargy, resistance to change, and capacity constraints in governments and philanthropic/development finance
- “Big Boys” know how to capture value opportunities in bundling infrastructure services and moving toward telecom-based services, but “clean energy” actors are unable to bridge the knowledge gaps to apply the “Big Boys” paradigm to grassroots

Knowledge financing and capacity gaps result and perpetuate poverty. BUT There Is No Alternative but to work for the betterment of the poor.

**NOT JUST GREEN GROWTH, BUT INCLUSIVE GREEN GROWTH**

# Comments on History :

## From Rio '92 to SDGs/Paris Agreement 2016



*An opening ceremony for a rasoi ghar (common kitchen) using biogas energy in rural India.*

### **Manufacturing CO2 emissions outsourced to poor countries**

- Scenarios, always uncertain, have altered radically

### **Poor suffer the climate, whether not it changes..**

- More people died in Himalayan floods than in Hurricane Sandy
- Top half of global population has been climate proofed in terms of their access to infrastructure and protection of energy, food, and water supplies; income generation and asset insurance

### **..whether or not their electricity supply is carbon-free**

- User investment in efficient productive use of electricity is key to livelihood improvements
- Combined with public investments in infrastructure and institutions
- “Clean energy” is “Big energy” and has largely bypassed the poor in terms of modern energy access or impact

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**Unequal development cannot be sustainable.  
Poor are central to Sustainable Development Goals for 2030**

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# Directions for New Thinking

## From global to local, and pro-poor

### Investments on the user side – “Cleaner, healthier, productive energy”, not just “clean energy”

- Resilience for the weakest depends on transformation potential of modern energy and information
- Human and financial capital accumulation
  - Anything and everything needs skilled humans and finance

### Critical role of built habitat and infrastructure

### Usefulness of the S3IDF Social Merchant Banking Approach and/or Analogous Initiatives

- For infrastructure service expansion at or near the Bottom of the Poor, “inclusive market systems” paradigm – efficient transformation of the productive potential
- Leveraging Development and philanthropic capital
- Bankable user investments in the ecosystems of energy poverty can only happen with a blend of financial instruments and based on local knowledge, skills, supply chains, and equity



A boy does his homework by light from an LED lantern supplied by an entrepreneur S3IDF assisted

# Directions for New Thinking - Continued

- Need to invest in gathering more local knowledge
- Urban/rural infrastructure and agriculture need massive investment and careful regional planning (Cities can grow food and fuel)
- Physical/Regional planning of the built habitat and green surroundings can serve the humans and the environment
- Change the silo mentality and organizational structure of DFI's Actions
- Implement "Hybrid" sovereign and non-sovereign operations
- Implement local small investment public and private partnerships

## Pay-Per-Use Hospital Cook Shop

A Complex Multi-Partner Public Private Partnership Clean Cooking Facility Investment At Osmania General Hospital, Hyderabad India.



**The kitchen provides a clean, safe environment for poor families visiting patients to prepare meals. Previously, food was either cooked on open fires or purchased at prohibitive costs.**

# Some Micro Examples for Macro Changes (Application to multiple specific context)

*All include co-benefits in energy, food, water nexus and local environment*

## **Electricity self-generation or small grids (pico/micro PV, hydro, wind)**

- Electricity enabled drip irrigation
- Multifunction, solar or other drivers of electric agricultural machinery: pumps, grinders, micro-chillers...
- “Rooftop” PV and distributed generation generally
- Key is smart controllers and energy/information management
- Great changes likely as storage gets much cheaper and “smart” grids and appliances improve
- Threats of automation displacing human employment have to be countered with “smart” and innovative labor force

## **Direct thermal energy demands in food, industry, and water**

- Solid fuels are not “dirty” per se; fuel cycles and appliances can easily reach “modern”, “cleaner” and “clean enough” status.
- Solar thermal and biogas

- Climate resilient agriculture: resilient crops, saline agriculture
- Waste management and recycling
- Biogas: Wide deployment, multiple feed stock
- Community cooking based institutions: eg. health clinics and where no household kitchens
- Agricultural modernization stages: technology use then species improvement
- Water supply, treatment recycling

*Technology list above is very illustrative.*



# **Addendum**

**Extra Slides for  
Additional Information  
on  
S3IDF, the SMBA®  
And  
Other Material**

# History & Perspectives of S3IDF and the SMBA

## Founders Experience:

- 70+ countries and collective 200+ years in the infrastructure and development finance space

## Challenge:

- Existing weaknesses in dominant development paradigms in reaching the poor
  - In particular, shortcomings in organizations, technologies/materials, investment types and sizes, intersecting synergies etc.

## S3IDF Solution:

- Design and implementation of our alternative paradigm – the Social Merchant Bank Approach (SMBA)

## S3IDF's Two Mission Objectives

- To employ its **results-driven, enterprise-centric SMBA<sup>SM</sup>** in southern India to build its portfolio of explicitly pro-poor, pro-environment small-scale “deals” - infrastructure and related productive-use investments (e.g. grain mills). **Current portfolio has 190 deals.**
- To achieve **greater and broader impact**, based on its lessons & experience, to **proselytize, disseminate and transfer its approach**. Thus others may leverage philanthropic and development capital to facilitate local commercial capital co-financing for small, explicitly pro-poor investments and use development capital (local and international) more effectively. Dissemination work done in a number of countries in Asia and East Africa. Plans for transfer and application done in Nepal and Sri Lanka and scheduled for Cambodia.



*One of the really incredible entrepreneurs that it has been our pleasure to support and continue to support as she overcomes adversities and expands her business.*

## Reflection – 15 Years of SMBA

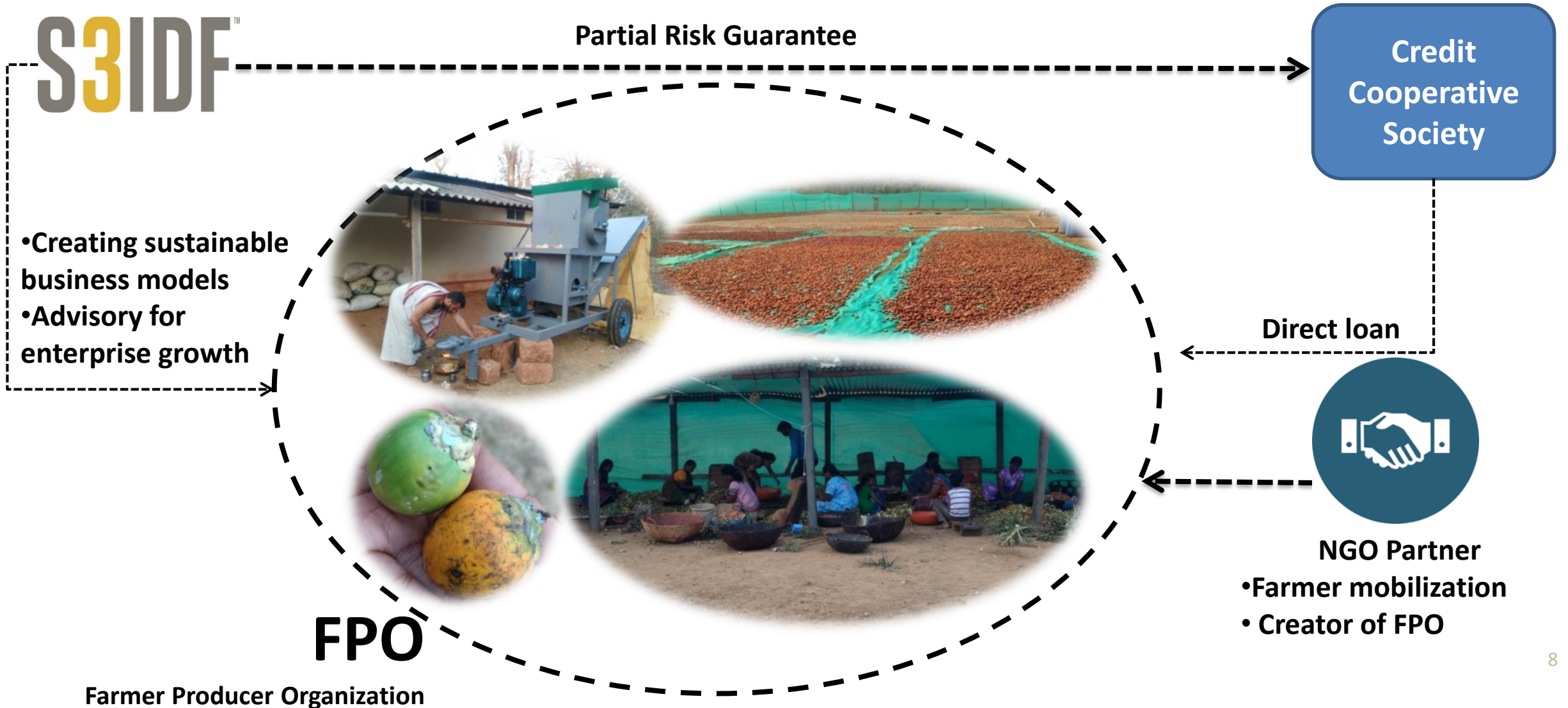
### Application:

- Still not enough development capital (DC) to finance pro-poor infrastructure access & productive use investments
  - International/national, including carbon capital, philanthropy, impact investment
- “Development Boom” has bypassed the poor in many parts of the world ➔ the future poses greater requirements for donors & governments to meet poverty & productivity challenges
  - Demographics ➔ donors, governments and others need to move faster, better & innovate much more
  - Climate change these players must innovate much more
  - Development finance players and paradigms are evolving but changes must accelerate with greater innovation
    - Changing individual development professionals’ mindsets is challenging but quite feasible; changing development institutions’ paradigms is much more difficult but must accelerate
    - This need for change and more innovation

now must include all the climate fund bringing Know-how, business model, and financial innovation common to large infrastructure projects to small-scale project that address the challenges of providing infrastructure services for the poor

# SMBA<sup>®</sup> in Action: An Example

*In Areca nut project in Sirsi, Uttarkannada, S3IDF leveraged finances from the local cooperative, extended technology and business development support to help the FPO increase revenue, generate employment and provide critical services locally.*





# Application of the SMBA: Who Benefits and How?

**SMBA can be applied across various geographies, sectors and with particular foci (e.g. women owned clean energy enterprise)**

- Some economies of scale can be captured, but not critical to SMBA applications
- With use of multiple fund/facility windows, priorities of particular donor/investors can be respected and integrated into SMBA implementation

**SMBA is a “win-win” for all parties involved with the small-scale enterprise-centric investments**

**Donors and investors (including any government entities) can be more confident in the efficiency and effectiveness of the use of their donations or investments and the impacts achieved**

- SMBA incorporates intermediation with tight procedures that have explicit criteria
- Pre-investment procedures are detailed and rigorous
- Donor and investor funds are leveraged to facilitate local bank and other financial institution (FI) co-financing through de-risking mechanisms (e.g. partial risk guarantees on loans)

**Entities providing know-how, technology and/or business support services for the investment**

- Will be paid fair prices for their services and have the possibility of being preferred suppliers
- SMBA includes the possibility of investing in such entities
- SMBA implementation will grow their market



Meeting with salt producers in Kyar Inn village in Ngaputaw township, a township of Patheingyi District in the Ayeyarwady Division of Myanmar.

# Application of the SMBA: Who Benefits and How?...Continued



*Napali participants at a project meeting*

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***Bottom Line: SMBA implementation is not rocket science, just hard work to achieve poverty alleviation in a “win-win” manner***

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## **Beneficiaries – clients, employees, and even owners of the investments**

- In all cases, incomes will increase
- If clients (customers): the fees/tariffs for services will be non-exploitive and will reflect their “ability-to-pay” post investment implementation
- If owners (ultimately in BOT and other schemes): asset ownership will grow significantly when the bank/FI debt has been paid

## **Local Banks or other FIs providing co-financing for the SMBA fostered investments**

- Their risk will be mitigated, but they should have at least some exposure through their “business-as-usual” practices
- They will be able to charge their standard terms paid for such investments taking note of the risk mitigation
- They will make profits if they are efficiently operated
- Their market will grow both in numbers and in new classes of clients (many, if not all, of the poor beneficiaries will become customers for other forms of financial services)

# Levels of Financial Sustainability and Subsidy Needs at the Small Project/Investment Level

## Infrastructure service provider types have different financial criteria

- Multinationals' Return on Equity (RoE) targets low 8-12% and high 25% (some above), most in middle; Regional corporations' targets likely high end, except if for self supply
- NGOs, CBOs, GP municipalities may accept very low RoE targets

## Sustainability, problems and levels of cost recovery

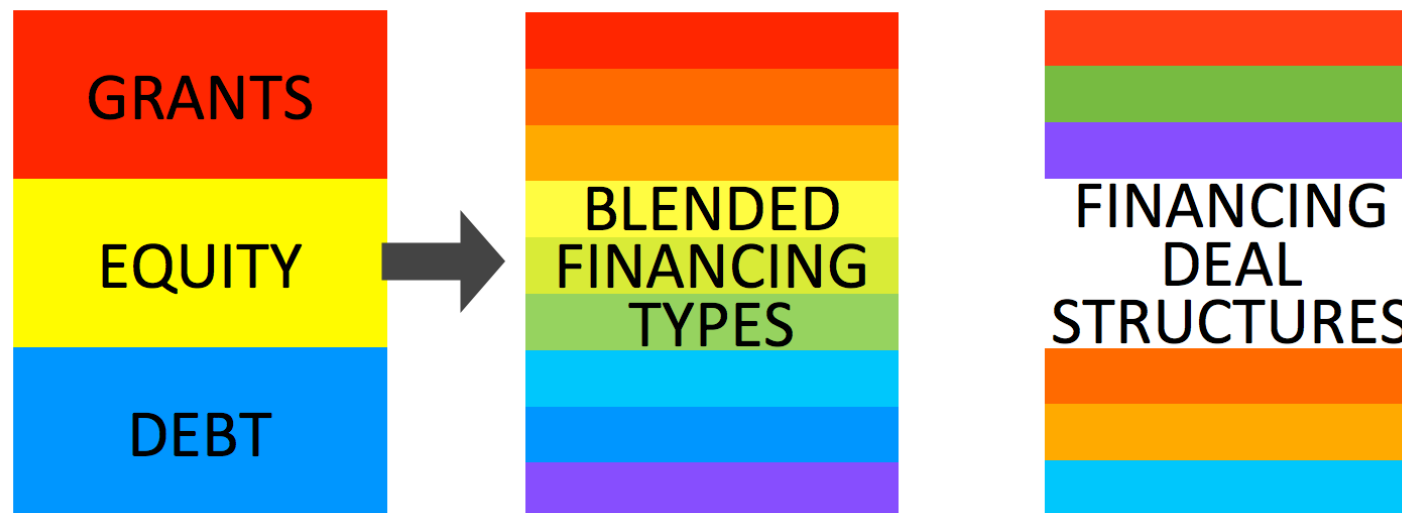
- Hard Investment Costs: includes costs of all equipment, construction, etc. to “put project into implementation” and on an operating basis, all the capital financing costs (e.g. debt and equity charges) and OM&R
- Soft Investment Costs: includes investment or enterprise-specific pre-investment costs (a special challenge). In larger infrastructure projects these costs are normally capitalized into the investment costs, effectively becoming part of the “hard” costs in the financial structure of the project
- Other Soft Costs: More programmatic – helping develop players including upstream players, government/ regulators, organizing community groups, etc.
- The Challenge: Small pro-poor projects do not allow full capitalization of soft costs into the financial cost of the project. Also, it requires considerable time and experience to learn the range of possible soft cost recover/capitalization (next slide)
  - Maximum sustainability – covers all hard and soft cost
  - Conventional sustainability – all hard and soft investment costs
  - Partial sustainability – All OM & R and some capital costs (financing and RoE)
  - OM & R sustainability – no capital costs covered
  - Non-sustainable
- Meeting the Challenge: S<sup>3</sup>IDF's SMBA aims for conventional sustainability less soft investment costs (sometimes partial coverage) and raises grant monies to cover other costs. We address trade-off of increasing efforts (and therefore soft costs) for certain partner collaborations and for accessing government/other support programs that may lessen revolving fund requirements. We are innovating with fees and deal structuring to capture some producer surplus while keeping deal viable and pro-poor.

# Need for a Spectrum of Financing Types

Investing for impact requires use of a “spectrum” of financing types with the “blend” of these financing types differing with the investment phases (pre-investment, implementation, operation)

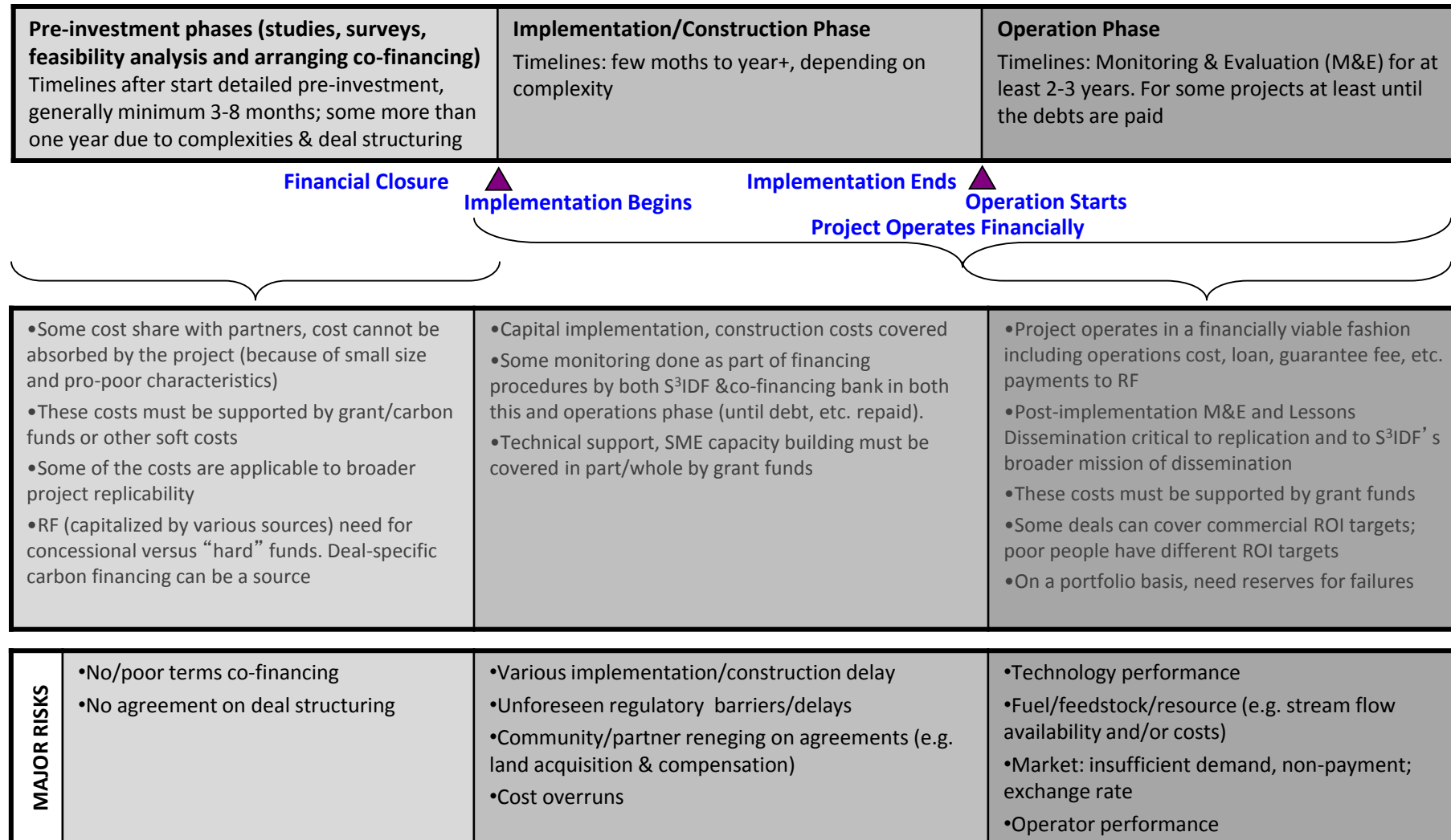
**Investing for explicitly pro-poor impact is not rocket science; it is just hard work**

- Move from “risk-return” to “risk-return-impact” calculus with strong emphasis on impact
- Critical to note “color of money” and move from just “primary color financing money” to a spectrum (or rainbow) of colors
- Often need to blend the “colors” and little/no role for impact investors if truly pro-poor unless absolutely impact first
- Blend will vary depending on the different phases in the investment cycle



# SMBA<sup>®</sup> Project Investment Cycle

## The Investment Cycle & the Need for Grant, Carbon, Concessional Funds (based on S3IDF's & Partners' experience)



■ Implementation Monitoring and Evaluation Support    ■ Post Implementation Monitoring and Evaluation Lessons, Dissemination    ▲ Start of Phase

# Perspectives on “New” Technology & Supply Chains

## Incremental vs. Transformational Technology

- Incremental: improved efficiency lighting, ovens, pumps, etc
- Transformational: submersible electric pumps

## Supply Chain Issues – How “know-how” intensive from choice through operations

- What are the sales, service and continuing input requirements (e.g. diesel, lubricants, electricity)?
- How easily can/will existing supply chains work?
- Or will new chains be required; as is the case of bio fuel (biogas, SVO)



**Solar home lighting systems for tribal households in hilly regions of Tamil Nadu; they received assistance in securing bank financing**

# Technology, Supply Chains & Complementary Institutional and Regulatory Developments

**Technology and materials evolutions along with know-how require commercial supply chains. Some examples of important evolutions:**

- Polyethylene pipe; reinforced rubber hose/tubes
- Submersible lower cost pumps
- Water, energy end-use equipment (e.g. low cost carbon filters, compact fluorescents, LED's)
- Micro-turbines (hydro e.g. Peltrics)
- PV systems of multiple types and sizes including advanced controllers for multiple applications
- Low cost "customized" solid state controls, Smart & pre-paid meter (manage demand, lower commercial costs)
- Small LPG cylinders, combinations with burners
- Condominial Sewer Systems
- Packaged co-generation
- Micro-turbines (gas)
- Gas system "hot" taps
- Small-scale ultraviolet & other water treatment
- High performance biogas plants
- Various on site waste water treatment
- Advanced small scale gasification/pyrolysis systems
- Various new biogas design & materials

## **Complementary institutional and regulatory developments**

- Easing of licensing and sub-franchise constraints; tolerance of illegal/unlicensed providers
- Creation and active work by trade associations
- Organizational: Leasing, management contracts, sales or other "off-loading" of small/rural systems to local players
- Various creative collaborations between the big boys (local or international) and local small players

# S3IDF Project Examples and Categories

## Energy-Dependent Businesses

### Solar Photovoltaic

Solar photovoltaic (PV) panels capture the sun's rays and turn them into usable energy that can be stored in batteries or used directly. S3IDF pairs solar PV with a variety of technologies, including:

- Grain and spice grinders and processors
- Reverse osmosis drinking water purification systems
- Small refrigeration and fan-based cooling systems for agricultural products and medical vaccines
- Mobile charging and telecommunication access
- Small CFL and LED Lighting systems for silkworm rearing



### Biogas & LPG

Biogas is produced from agricultural waste, manure, plant material, sewage, and food waste and can be used as a clean burning fuel source or to generate electricity. The biogas systems also produce a safe organic fertilizer that can increase agricultural productivity. Liquefied petroleum gas (LPG) is another cleaner burning gaseous fuel. S3IDF pairs biogas and LPG with a variety of technologies, including:

- Cooking stove units for both domestic and commercial use in hospitals
- Generators to power small appliances and machines



# S3IDF Project Examples & Categories - Continued

## Energy-Dependent Businesses - Continued

### Small-scale Hydropower

Small-scale hydropower systems use flowing water in streams or rivers to produce electricity or mechanical energy. Electricity can be stored in batteries or used immediately. S3IDF focuses on smaller systems, especially pico- and micro-hydro systems, and on a variety of technologies, including:

- Biodegradable plant-based dinnerware/serviceware fabrication machines
- Seed and plant oil extractors
- Grain grinders and rice hullers
- Village-level electrification systems



### Electrical Grid

When the electrical grid is available and reliable, S3IDF helps entrepreneurs connect to it. We also create hybrid systems that combine grid power and energy from renewable sources. Grid-connected or grid-hybrid businesses supported by S3IDF use a variety of technologies, including:

- Energy-efficient computerized sewing machines
- Batteries for off-grid lighting applications
- Computer mainframes in schools

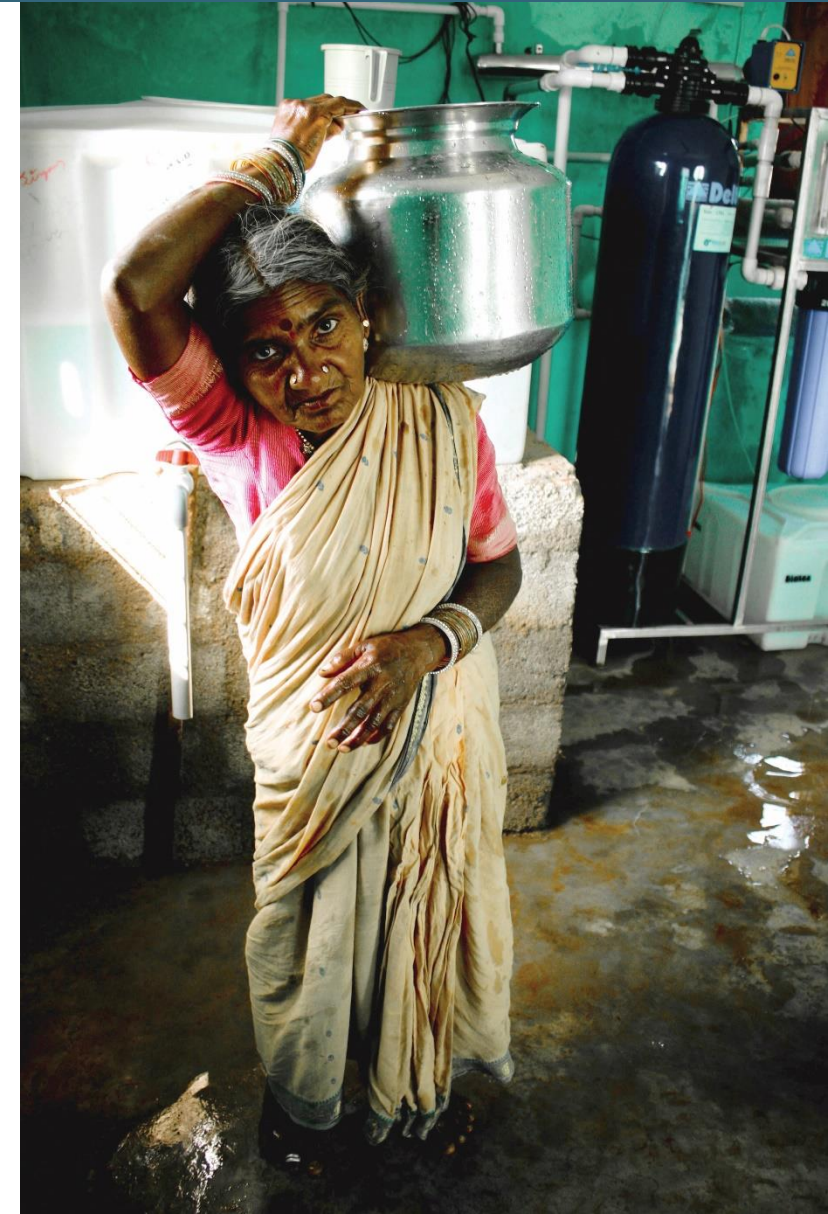
# S3IDF Project Examples & Categories - Continued

## Water and Sanitation Businesses

### Water & Sanitation

Access to clean drinking water and sanitation facilities help to reduce disease, which can enable people to be more productive, and reduce negative environmental impacts. S3IDF supports businesses that:

- Distribute and service household fluoride-removing water filters
- Support Various drinking water and sanitation (toilet facility) projects
- Operate reverse osmosis drinking water purification systems for villages



# S3IDF Project Examples & Categories - Continued

## Transportation-Aided Businesses

### Trucks, Autorickshaws, Motorcycles

Small trucks, autorickshaws, and motorcycles enable businesses to deliver goods and services to customers and to pick up critical inputs and materials for their businesses. S3IDF-supported businesses use mechanized transportation to:

- Service household water filters that remove fluoride contamination
- Collect dry waste from commercial and residential buildings to sort, recycle, and sell
- Deliver pay-per-use batteries to street vendors to power evening lighting
- Pick up milk from villages to sell to a centralized milk processing facility

### Animal-Driven Carts & Human-Powered Vehicles

In rural areas, animal-driven modes of transportation, such as bullock carts, often are the most economical and practical choices. Human-powered vehicles, such as three-wheeled cycles, can offer reliable transport in urban settings. S3IDF-supported businesses use these modes of transport to:

- Transport agricultural produce to market
- Shuttle people to and from villages and towns and within cities
- Make local deliveries and pick up stock and inventory



# S3IDF Project Examples & Categories - Continued

## Waste Management Businesses

### Waste Management

Bangalore's waste management systems is inadequate at its core, with disjointed service quality and increasing waste. In this system, almost all the activities are undertaken by poor informal workers and informal entities who are often "exploited by the system". Together with partners, S3IDF is tackling aspects of this system by working closely with informal waste enterprises to:

- Aid with physical and social security by deepening the engagement with the municipality
- Support various investments (e.g. collection trucks and sorting equipment) and businesses in the dry waste, collection, storage, separation, and value capture chain
- Complementing the investment support with financial inclusion (banking relationships), business mentorship and technology know-how and access
- Provide access to a stabilized plastics market through collaboration with brands and manufacturers



# S3IDF Project Examples & Categories - Continued

## Production and Value Chain Businesses

### Production and Value Chain:

#### Agriculture, NTFP, Coastal SME Products

S3IDF experience includes in a wide variety of pro-poor investment and capacity building other support interventions in value chains of agriculture, non-timber forest products (NTFP) and coastal small and medium enterprise produced products

These include interventions in various points of the value chain: production (e.g. pumping, irrigation, plowing )and various post-production value addition (drying, de-husking, ginning, oil seed pressing)

- - Both within the farm/enterprise system value addition (e.g. oil seed pressing) and sometimes further storage and marketing steps
- -These interventions are sometimes at the farm/household level, but almost always with established partner groups (cooperatives, farmer production organization and/or others (e.g. service for hire small businesses). But only rarely has S3IDF and partners tried the social organizational effort of establishing such groups
- -Of particular priority is our focus on interventions that: a) further resilience of such value chains at a local level whether the initiative has its origins at local regional, public or private initiatives; b) have co-benefits for aiding in specific eco-system conservation; the later, c) often benefiting very deprived groups such as tribal. . These are the case of our support our projects which focus support for players in the millet, and NTFP value chains and NTFP in Karnataka





# Thank You!

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