



# Multi-Country Study on Developing Rural Piped Water Markets through the Domestic Private Sector

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THE WORLD BANK



# Highlights

- By 2025, the market for rural piped water in the study countries can be ten times larger, generating a potential turnover of USD 90 million/year
- The policies and practices of governments is a key determinant of whether local water firms profit as businesses
- ...and this is important because profitable firms tend to invest more and are more likely to see the poor as a target client
- Rural poor customers are sensitive to the relationship between price and value and so will need a compelling level of service
- Lowering barriers for firms to invest in harder-to-reach markets is critical for realizing the market potential

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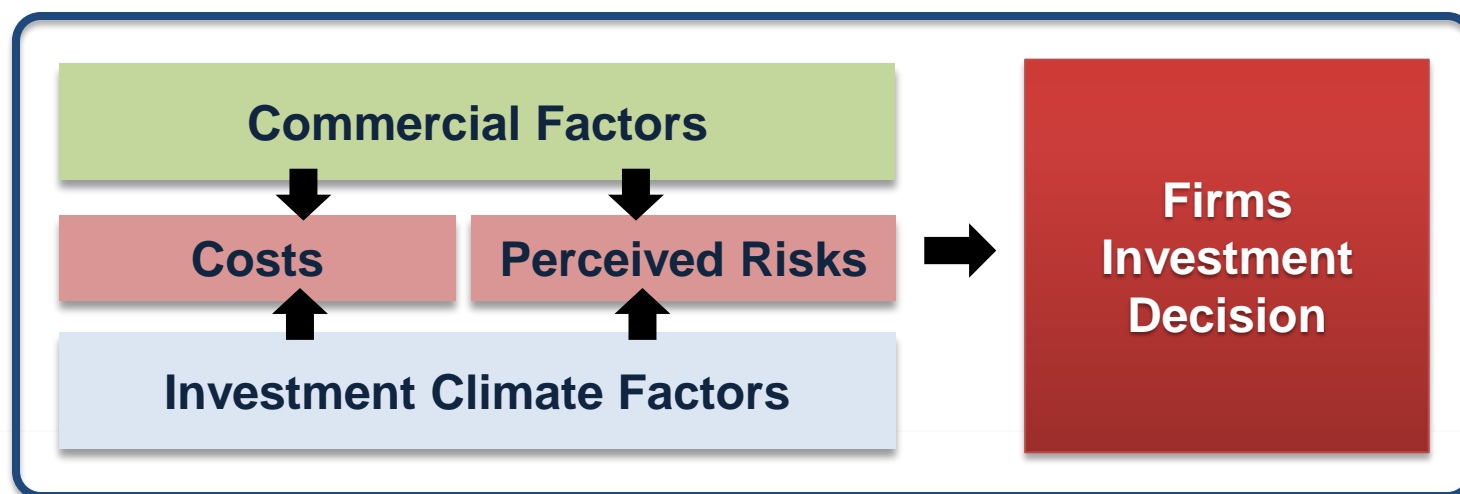
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# The Study

We set out to understand what constrains private supply to the poor

## Questions:

1. 'Is investment constrained by low market potential and a lack of demand?'
2. or, 'Are firms not viable and their business models poorly adapted to take advantage of the market opportunity?'
3. and, 'How does investment climate affect the costs and perceived risks of firms?'



# Method

Case focus: rural growth markets, different policy approaches in Bangladesh, Benin & Cambodia

## Instruments Employed

- Customer focus groups (1,100 pax)
- Enterprise surveys (89 firms)
- Supply chain reviews
- Country policy & regulatory analysis

## Model Aspects

BGD	Investment	Majority public financing (government or NGO), cost share by private/NGO (20-30%)
	Operator	Mostly, NGO or Community Organizations, Some private firms
	Systems	Deep well water, mostly private connections, production metering only
	Charging	Flat fees
BEN	Investment	Fully public financing
	Operator	Private entities
	Systems	Deep well water, mostly standpipes, production & consumption metering
	Charging	Volumetric
CAM	Investment	Fully private financing
	Operator	Private entities
	Systems	Surface water, mostly private connections, production & consumption metering
	Charging	Volumetric

# Market Potential

Present market supplied by the private sector is large & projected to increase

## Country Specific Market Drivers

- ❑ BGD: Water Quality Issues
- ❑ BEN: Public Investment in Systems for Lease
- ❑ CAM: Demand, Service Gap

In 3 study countries  
projected revenues  
in current systems  
will expand to  
**\$90 million annually**  
by 2025



120 piped water schemes , 30% of total, privately operated: approx. 500,000 people



In addition to 200,000 using 75 piped schemes , + 60 M supplied through hand pump supply chains

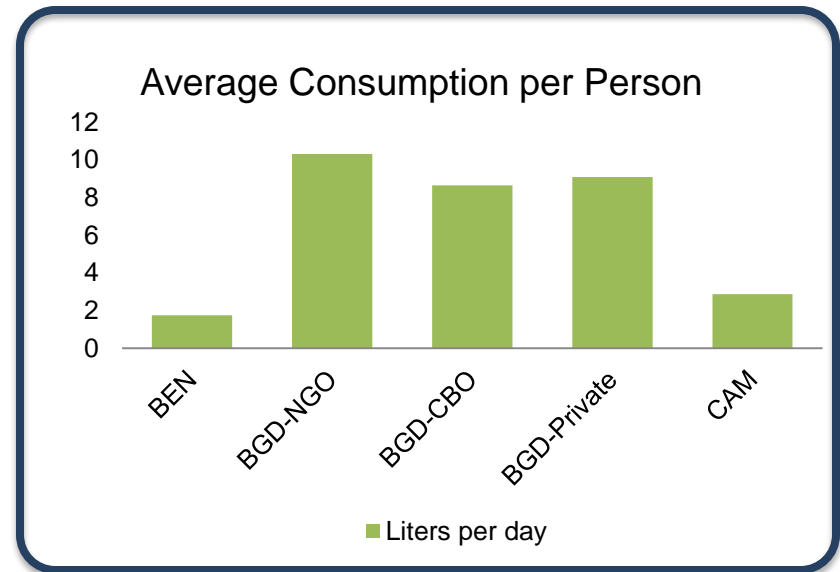


1.4 M people rely on 370 piped schemes: outside Phnom Penh, private operators provide 60% of piped connections

# Demand

## Poor customers are actively making decisions about value and price

- Consumption is constricted by high price in BEN & to lesser degree in CAM
- The poor are expressed their budget constraints during the FGDs



	HH income poor \$	Item	Cost per HH \$	% of average cost to income	% of high cost to income
BGD	62	Connection Fee	17 to 50	27%	80%
		Monthly Charge	1.5 to 2.5	2.4%	4%
BEN	173	Connection Fee	160 to 729	115%	421%
		per m3 @ 40 lpcd per month	0.60 to 1.20 5.70 to 11.80	5.6%	6.8%
CAM	101	Connection Fee	20 to 50	33%	49%
		per m3 @ 40 lpcd per month	0.40 to 1.00 2.8 to 6.6	4%	6.6%

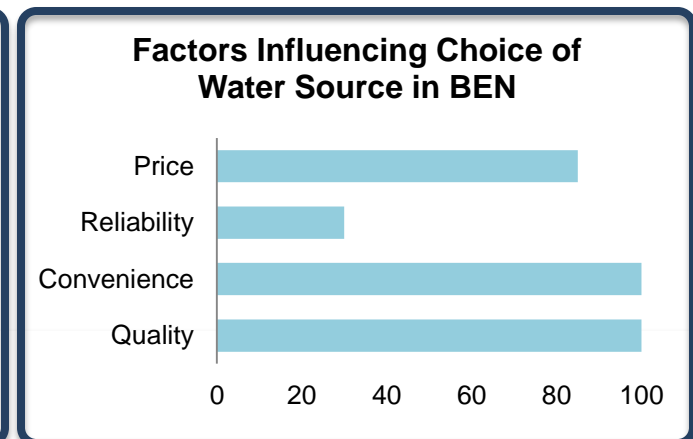
# Demand

The sensitivity of poor customers to the relationship between price and value is expressed very strongly in their practice of substituting sources of water

Conjunctive Water Use Practice		Effect
BGD	52% use both hand pump and piped water even in arsenic areas; only 32% use the piped supply exclusively In saline regions, conjunctive use goes down	Competition from other sources; health benefits not achieved
BEN	92% use the system, but all supplement with other sources	Competition from other free sources; low consumptions from system; low revenues
CAM	Rain water harvesting widely practiced	Pronounced seasonal dip in revenues during rainy season

Feedback from customers suggests that firms need a compelling level of service to encourage customers to use their water

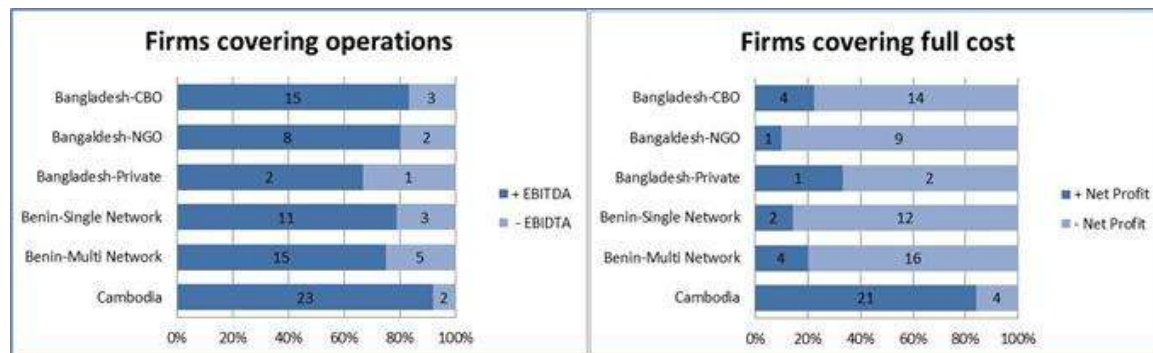
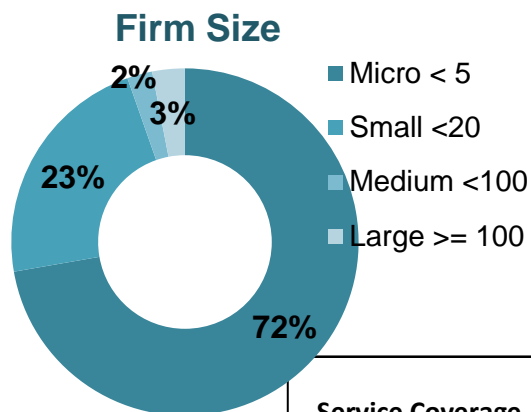
BGD Focus Groups Discuss Preferences			
Only piped water supply (PWS)		Only hand pump tubewell (HTW)	
<b>PWS more convenient</b>	72%	High tariff	53%
<b>HTWs are unsafe</b>	64%	Low service quality in PWS	29%
No water in dry seasons	33%	Connection disconnected	24%
HTWs out of operations	26%	PWS irregular supply	23%
<b>HTWs location far</b>	24%	<b>HTW convenient</b>	10%
<b>HTW water taste bad</b>	18%		





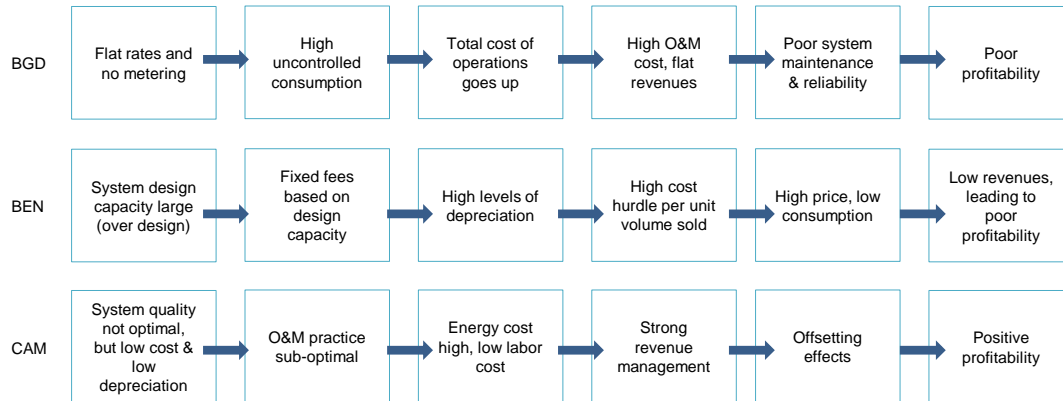
# Firm Business Model

Rural piped water is the business of small firms that have capital & basic business skills, but struggle to maintain a reliable level of service that can ‘wow’ the customers



		<i>Bangladesh</i>	<i>Benin</i>	<i>Cambodia</i>
<b>Service Coverage</b>				
Number of villages served	no	3	4	6
Number of residents served	no	1 504	8023	2403
Number of private connections	no	196	24	490
Number of shared connections	no	18	14	0
Average no. of residents per connection	no	7	216	5
Average network length	km	7	14	9
<b>Revenues</b>				
Average water sold	m <sup>3</sup> /year	62 376 <sup>a</sup>	11 506	40 026
Average annual turn over	\$	5 200	10 700	22 200
Revenue per m <sup>3</sup> sold	\$	0.08	0.9	0.5

# Firm Business Model



Firm profitability is underpinned by 'cost-revenue' structure that is determined by government policy and practice

## Cost & Revenues

- How revenues are generated
- How tariff and pricing is decided
- How asset is optimization

Indicator		Bangladesh	Benin	Cambodia
<b>Volume</b>				
Water sold/resident	m <sup>3</sup>	41.5	1.4	16.6
<b>Construction Costs</b>				
Minimum	\$	7 000	98 000	8 000
Maximum	\$	220 000	960 000	340 000
Average*	\$	109 000	260 000	70 000
Construction cost /km pipe*	\$	16 000	20 000	14 000
Estimate average annual depreciation	\$	3 182	9 500	3 000
<b>Operating Cost</b>				
Cost/km of pipe	\$	512	631	1643
Cost/ resident served	¢	240	113	362
Energy cost/ m <sup>3</sup> water produced	¢	2	18	16
Variable cost/ m <sup>3</sup> water sold	¢	9	57 <sup>a</sup>	25
<b>Revenues</b>				
Tariff/ m <sup>3</sup> water sold	\$	0.10	1.03	0.60
Revenue per m3 sold	\$	0.08	0.9	0.5
Ave water sold	m3/yr	62 377	11 506	40 026
Ave annual turn over	\$	5 200	10 700	22 200

This is important because profitable firms tended to invest more

## Factors correlated with profit

- House connections
- No. of residents served
- BEN: Service to poor
- BGD: Negative correlation to age of scheme
- Profit motive

## No correlation found

- Integrating with sanitation
- Multi-network

The correlated factors suggest that to increase profitability there is need to invest in:

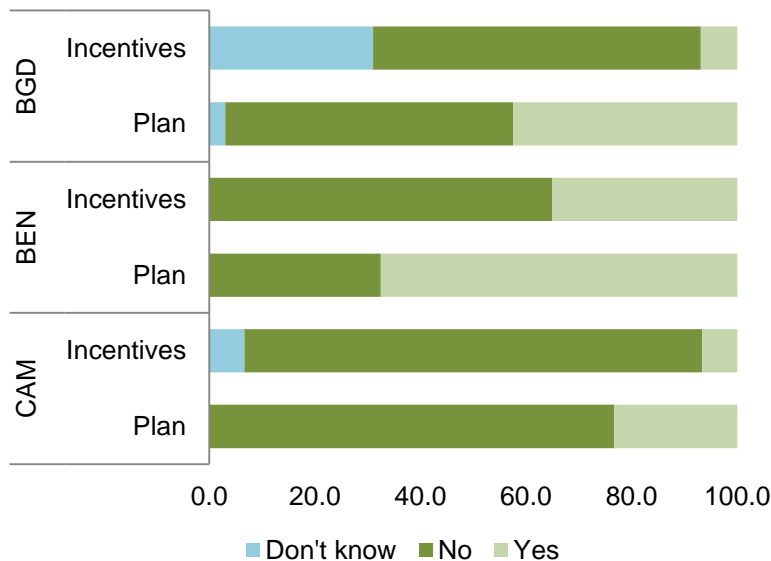
- House connections
- System expansion (even to the poor)
- Rehabilitation of old networks

# Firm Business Model

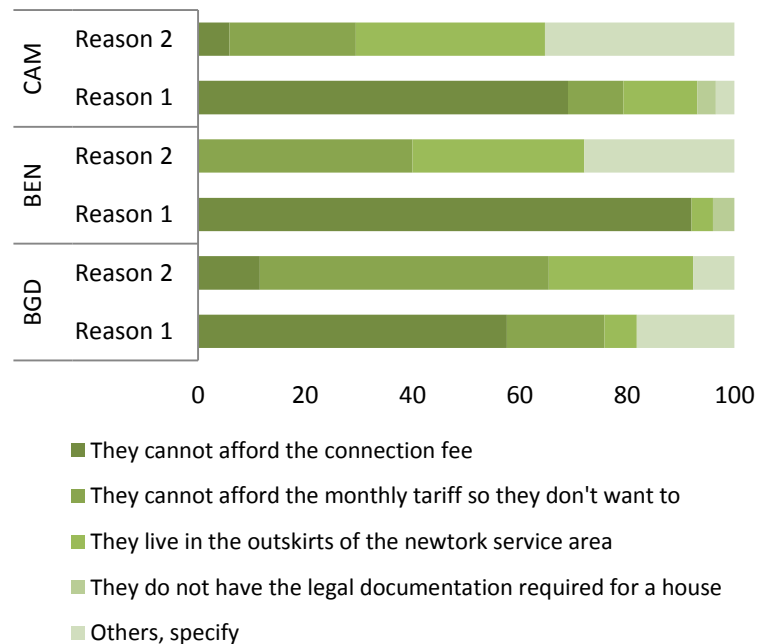
## Attitudes to Investing

Few are willing to invest, believing costs are beyond the reach of the poor and no incentives exist to serve these 'harder' markets

### Firms Plan to Invest and See Incentive



### Reasons why they don't target the poor



# Investment Climate

## Public Policies

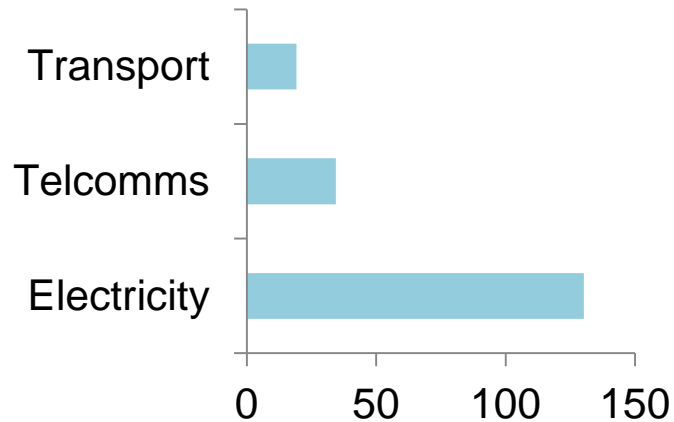
In addition, firms face many uncertainties in the current environment

	BGD	BEN	CAM
Priority for urban investment	Yes	Yes	Yes
Government specify inputs for construction	To an extent	Yes	
Reliance on local, informal dispute resolution	Yes	Yes	Yes
Bureaucratic costs are high	No permits required	Yes besides fee of USD 400-600, firm registration could take 2-3 months  Lease procurement could take 12 months	Yes, besides formal license fee, informal fees can be 10- to 20x price
Permits/license do not protect monopoly rights	Yes	Yes	Yes
Land ownership is 'required' investment			Yes
Performance obligations & tariff setting unclear	Yes	Yes	Yes
Ownership of assets unclear	Yes		
Duration of permit/contract is short		Yes	Yes

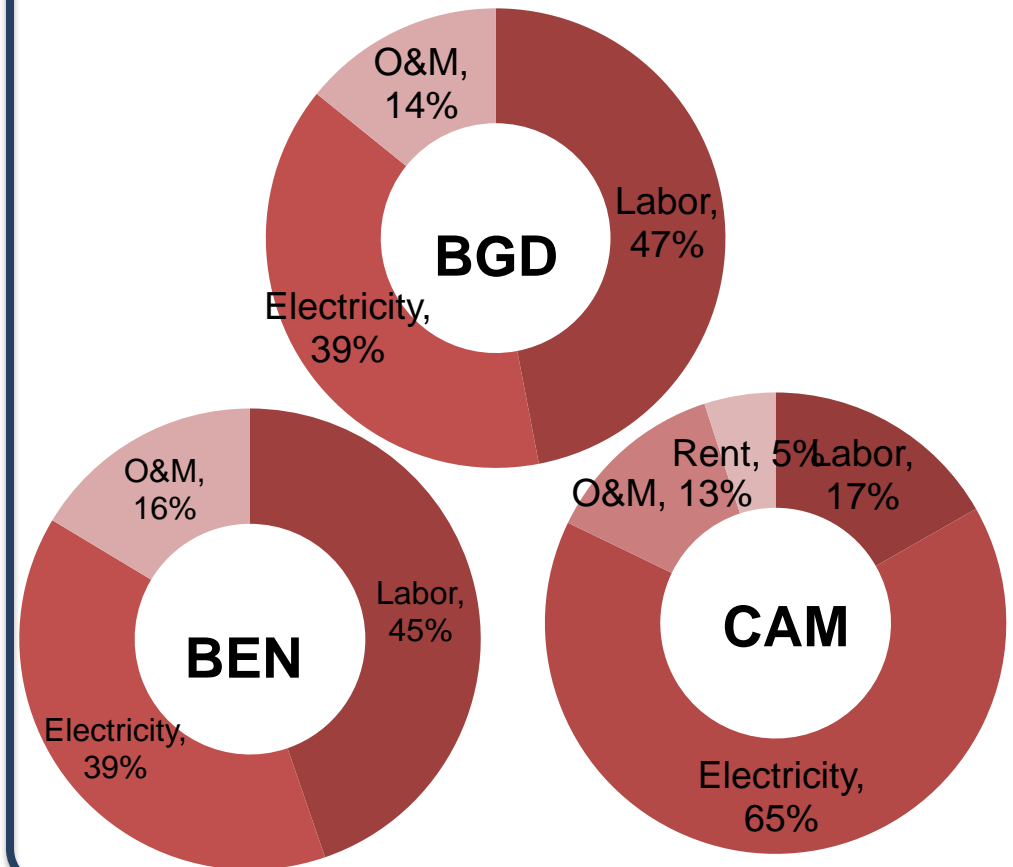
## Infrastructure

Regarding infrastructure services, power unreliability was singled out as a key obstacle

**No. of mention as moderate to severe obstacle**



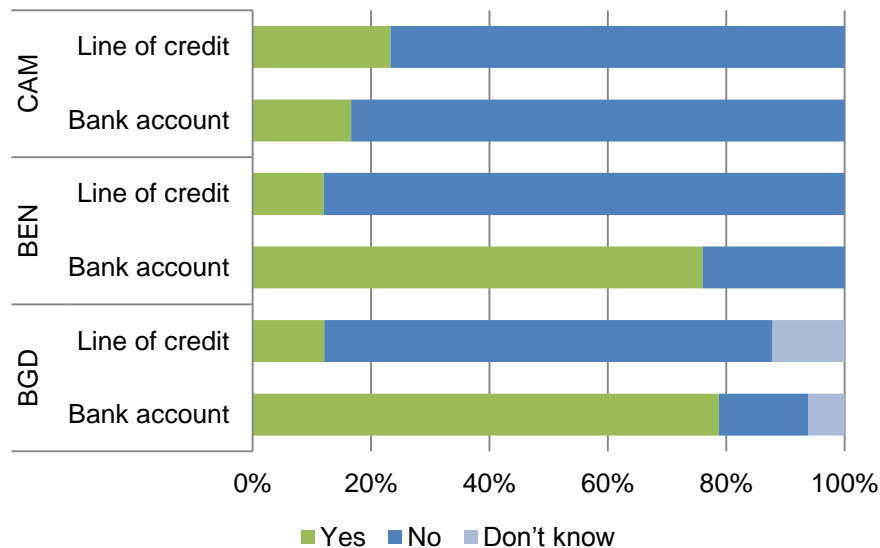
### Energy Costs are Large Components of Operation



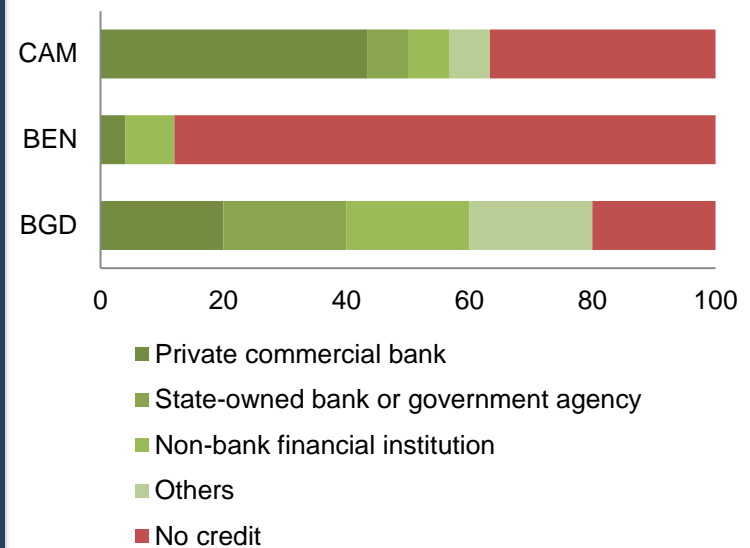
## Access to Finance

Low financial inclusion among firms will tend to limit ability to invest

**Financial Inclusion**



**Sources of credit for investment**



Credit is not usually available, and if it was, comes with onerous real estate mortgage requirements