

# Agricultural Mechanization in Bangladesh and India

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Agricultural Mechanization in Bangladesh- The Future



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# Pre-view

- S.Asia has seen rapid mechanization of power-intensive operations despite stamp-size plots
- Enabled by vibrant machine rental markets
  - **Almost entirely informal & spontaneous; scope for higher capacity utilization**
- However, mechanization of control-intensive operations and adoption of CA machines is still very slow
- Not clear if capital subsidy on machines is the solution



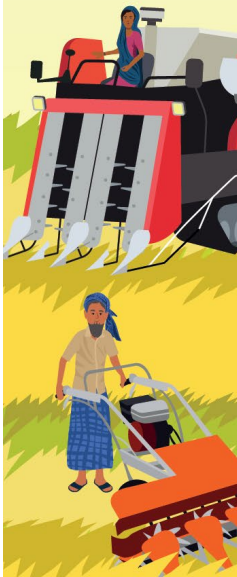
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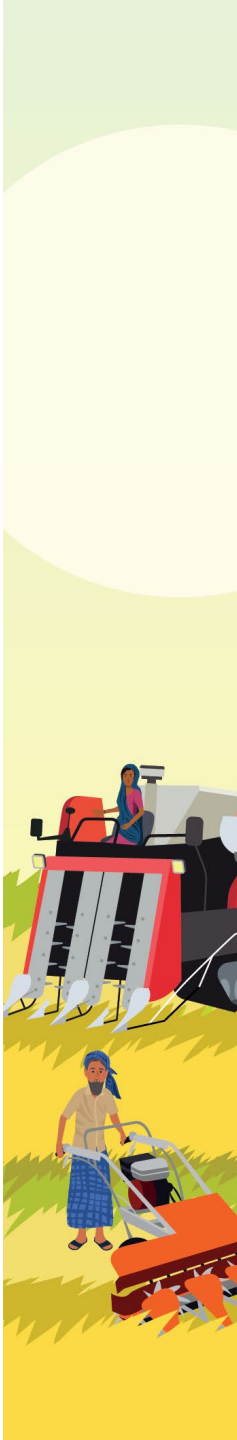
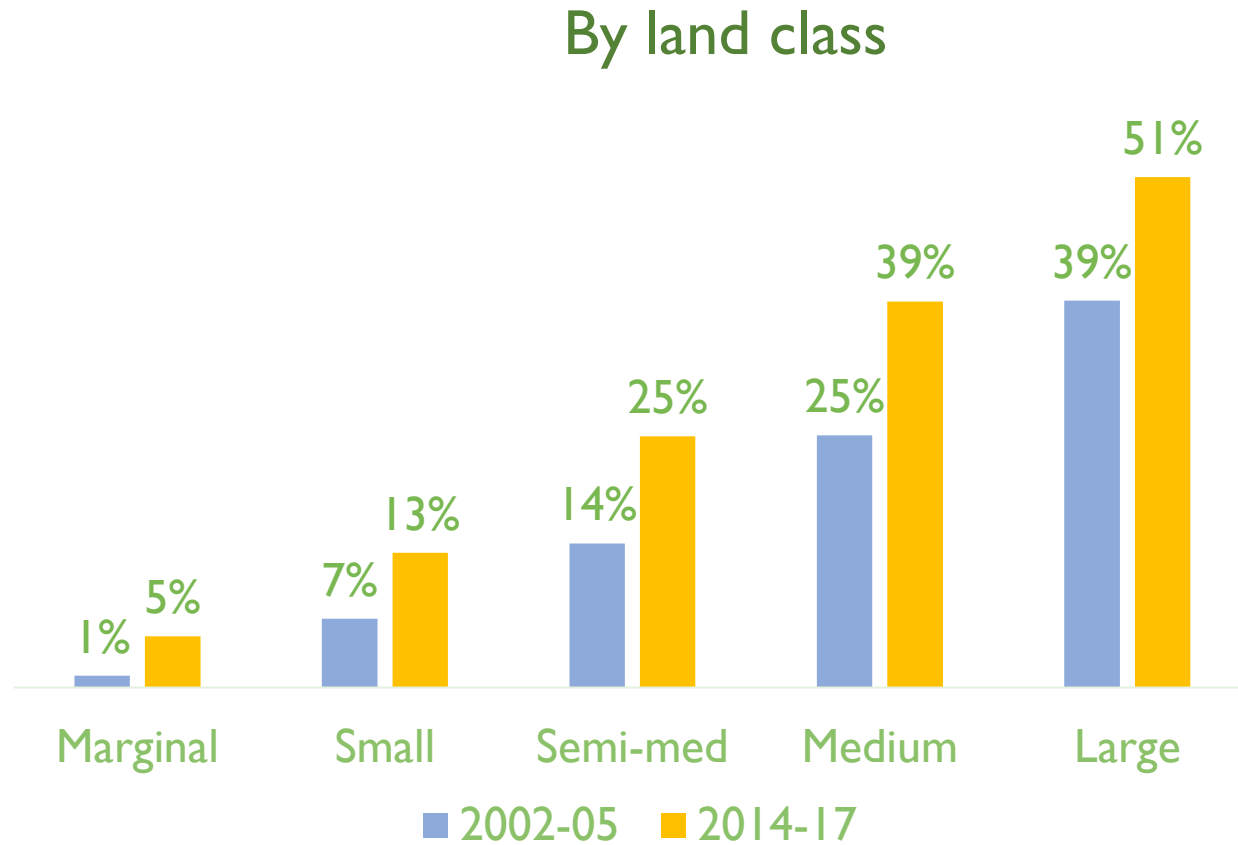
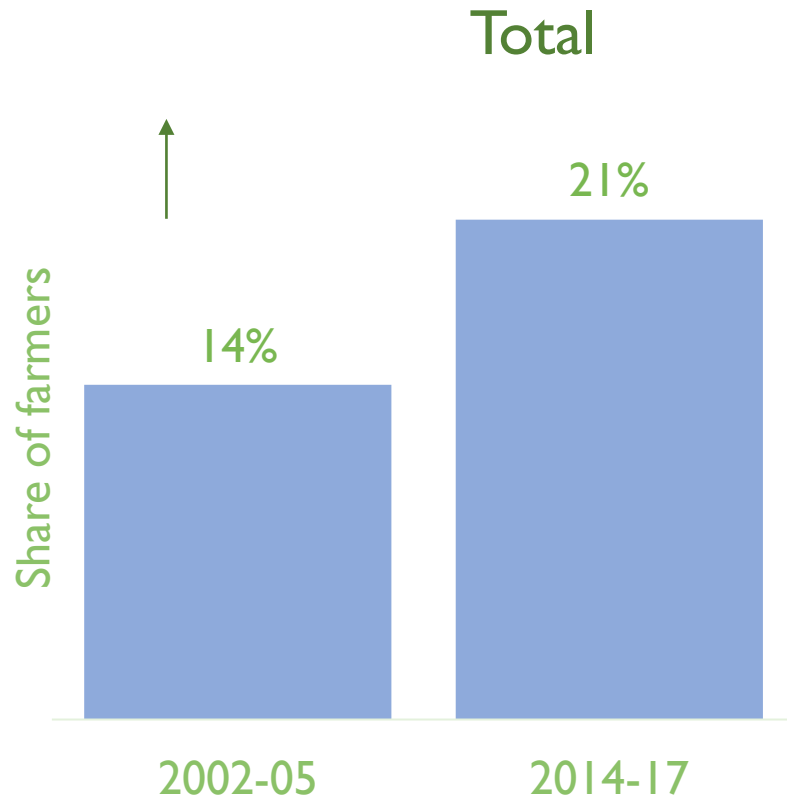
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Machines	Own			Rented		
	Bihar	West Bengal	Bangladesh	Bihar	West Bengal	Bangladesh
Tractor	92	21	3	2315 (96.2%)	1498 (99%)	246 (99%)
Power tiller	12	32	120	0	657 (95%)	1769 (94%)
Thresher	43	17	0	2190 (98%)	399 (96%)	0
Rotavator	8	0	0	641 (99%)	0	6
Straw reaper	0	0	0	0	0	0
Seed drill	0	1	0	1	0	0
Combined harvester	0	0	0	0	30 (100%)	0
Laser land leveller	0	0	0	0	0	0
Paddy transplanter	0	0	0	0	0	0

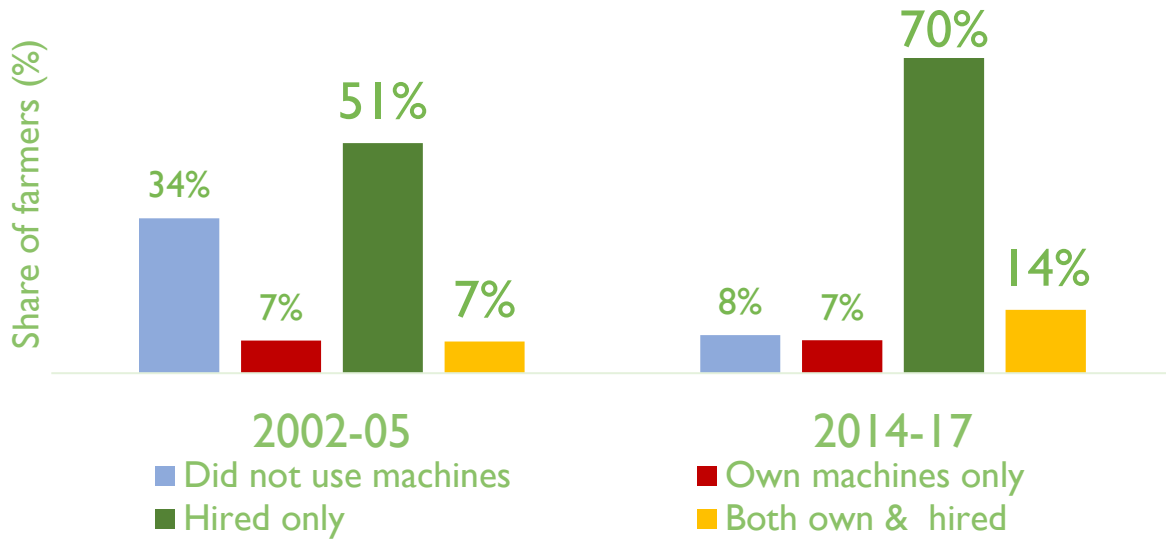


# Who owns farm machines in India?

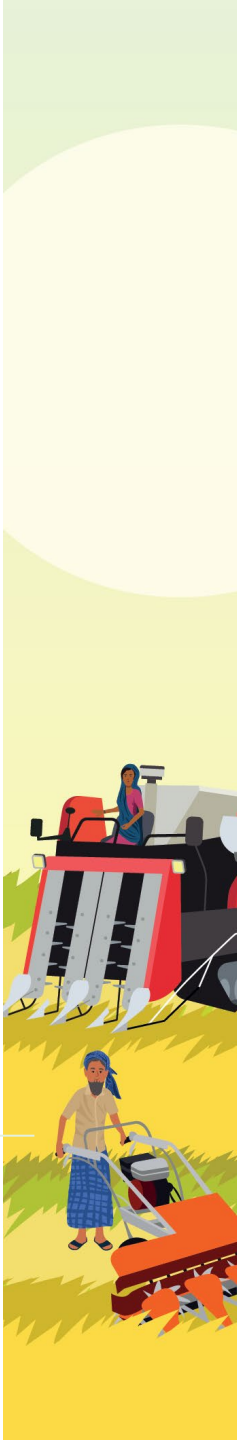
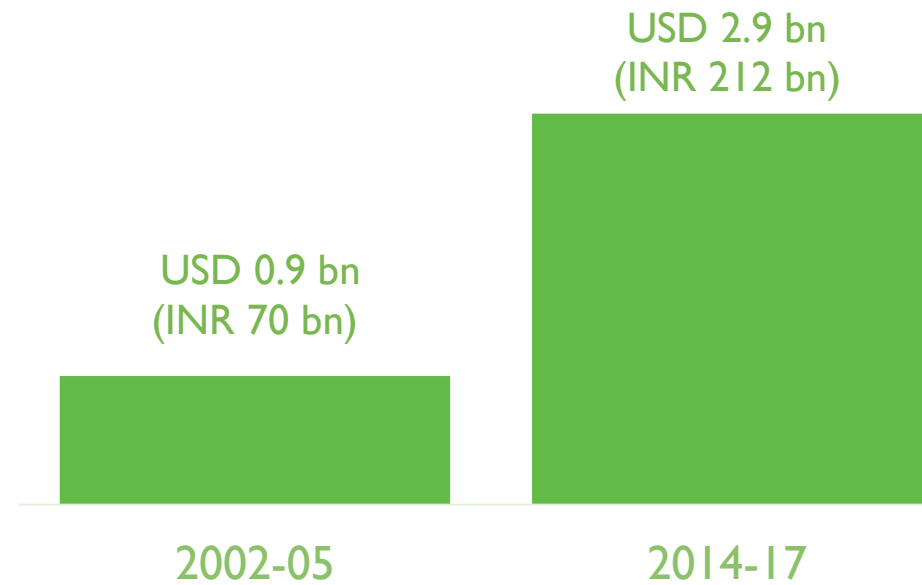


# Machine use in paddy in India: 2002 to 2017

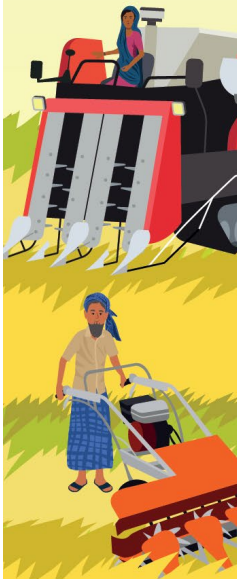
Source of machine use



Size of machine rental markets in India



- Most farmers in our region cannot and should not buy machines
- Machine rental markets have been critical to mechanization of ag. operations
  - >80-95% of all farmers in S.Asia rent at least one machine from other farmers
- **But are machine rental markets becoming more competitive?**
  - **We do not know!**
    - Evidence of under-utilization of scarce capital embedded in machines
    - Transfer of rents from sub-marginal farmers to the large farmers who also own machines may reinforce existing inequalities in land ownership





# Some barriers to more competitive & efficient rental markets (apart from high capital costs)



1. Information asymmetry



2. Transaction costs



3. Social norms



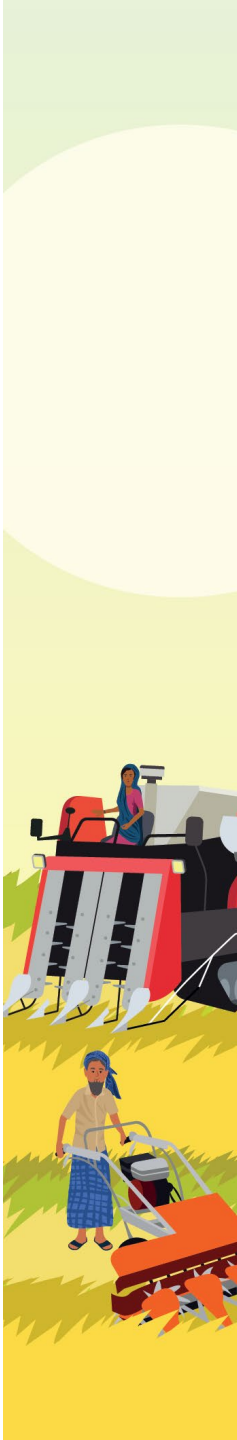
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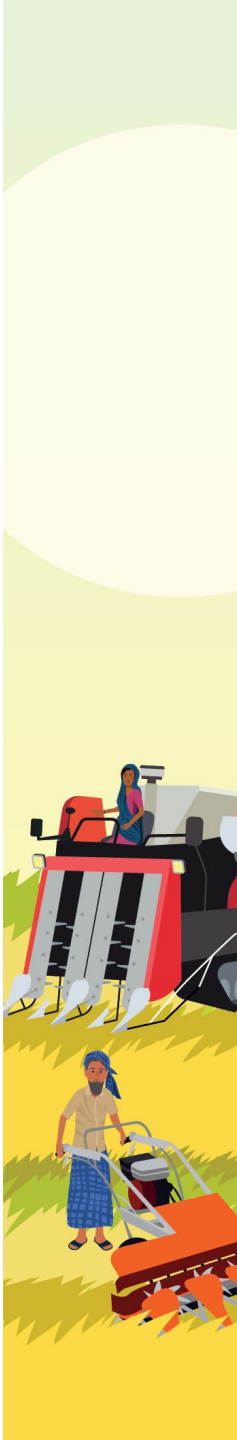
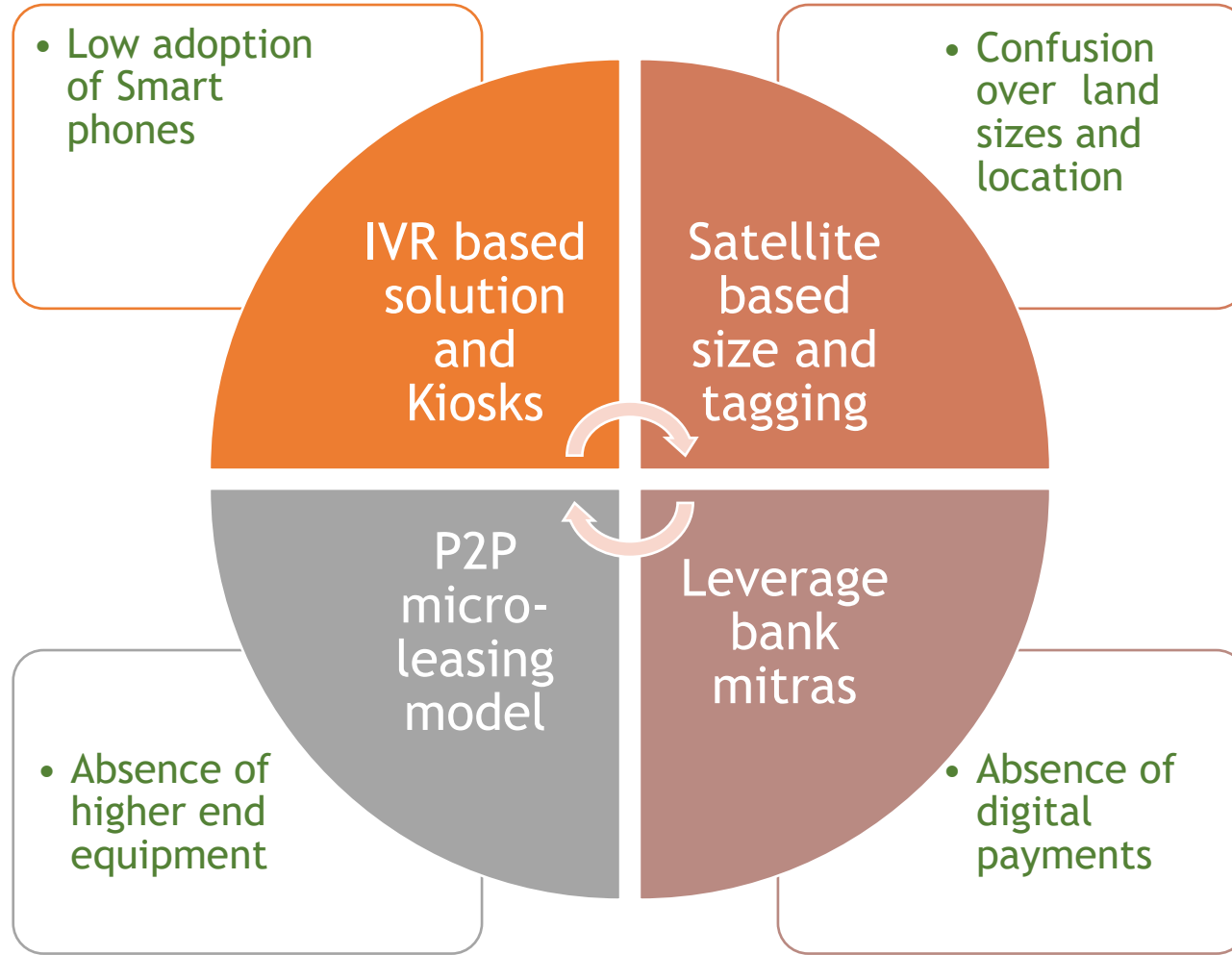
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# Can technology help?

- What about new business models like Uber?





# Different Models of Custom Hiring Services for Agricultural Equipment

Individual farmer led  
...(a).....(b)....

Farmers group or cooperative purchased machineries

Implement Traders' led  
CHSC-AM

NGO (non-profit group) supported AMS

CHSC-AM set up under PPP mode

Start-up firms, with app based coordinated-  
CHSC-AM

# Role of public policies in agricultural mechanization



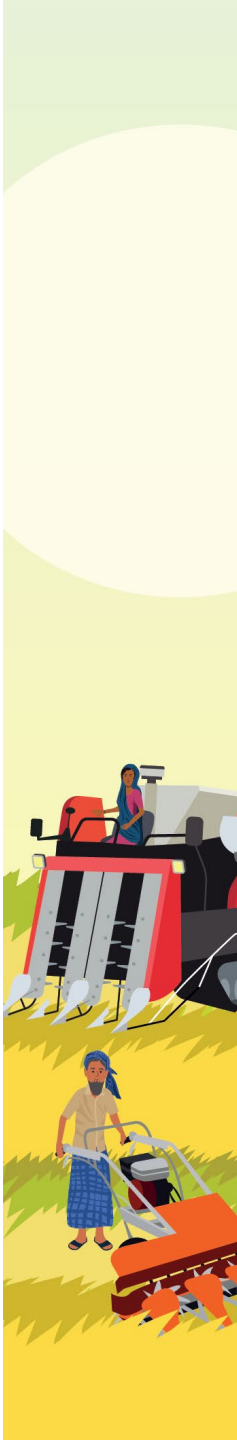
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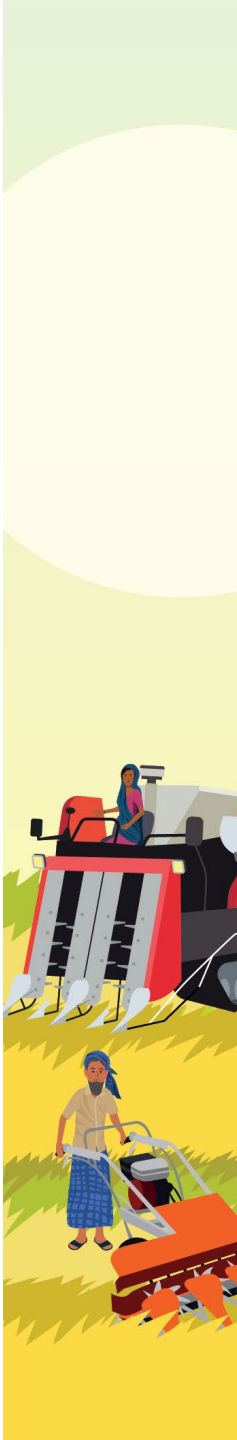
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- Mechanization policy in S.Asia should focus on
  - Creating more competitive machine rental markets
    - Connected to higher capacity utilization of machines
- Equity in ownership of machines is much less important
  - Not a pre-requisite for competitive rental markets
  - **Worth testing if near landless or landless farmers rent machine services more aggressively**





## 5 types of policies matter

Capital subsidy on agricultural equipment

Credit policies for financing capex on equipment

Trade policies

Quality regulations

Extension policies



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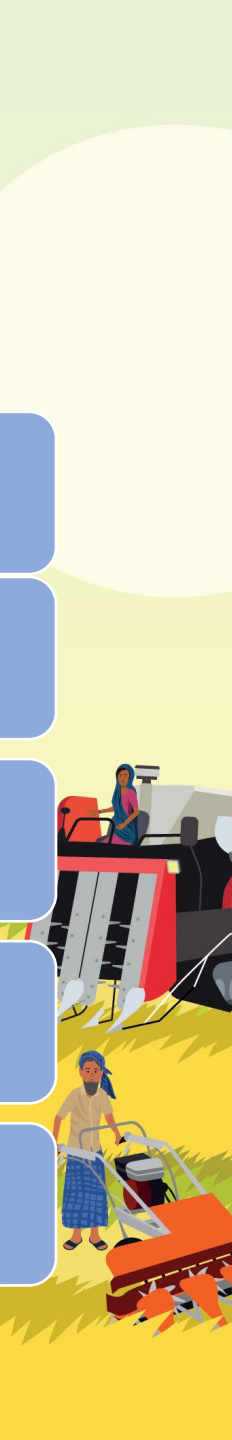
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# Let's focus on capital subsidies on machines

- No obvious justification for subsidizing non-CA machines
  - No positive externalities
- No subsidy, open imports, and low regulatory barriers in Bangladesh have worked much better than India's or Nepal's strategy
- 20+ years of capital subsidies on CA tools has not led to adoption in India
  - High capital cost does not seem to be the main barrier to adoption/use of CA in S.Asia



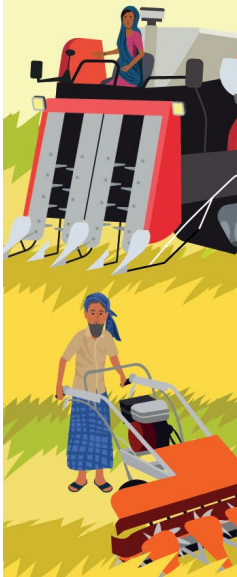
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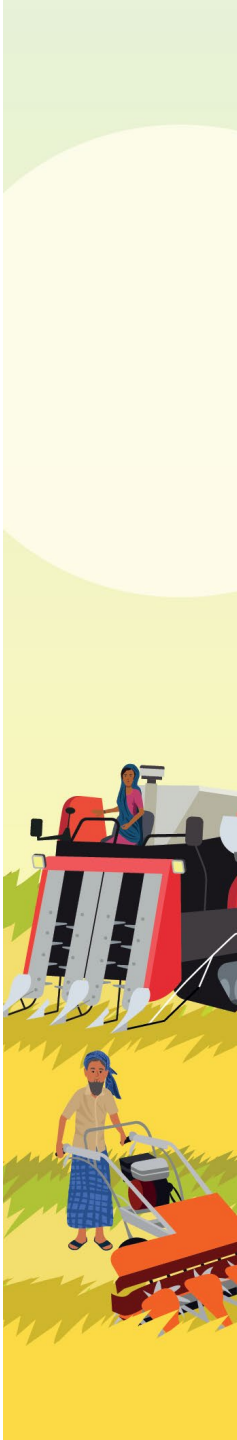
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# Awareness & exposure to CA equipment is low even after 25 years of promotion

Technology	% who had heard of it	% who had seen it working
Rotovator	23.2	16.2
Combined Harvester	20.1	2.5
ZT drill	15.0	1.8
Rice transplanter	2.1	0.1
Laser land leveller	2.0	0.7
Drum Seeder	1.2	0.1

N = 1464



# What might work?

Shift from only capital subsidy to incentive for 1<sup>st</sup> use of CA tools

Investments in skill building of machine operators

Rising cost of land preparation due to recent spike in fuel costs offers greater incentive for farmers to adopt ZT



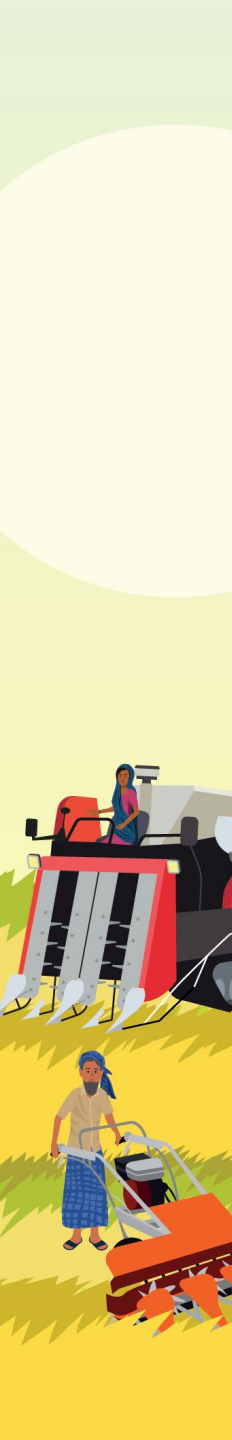
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# THANK YOU



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