Financing agri-SMEs in Bangladesh: the case of machinery service providers

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Summary

1 **Agricultural wages have risen and most field tasks are now done by machines, nearly all of them rented.**

Real farm wages rose 30% in 2011–18. In boro rice, 98% of tillage and 88% of threshing was mechanized by 2018 and harvesting reached 20% by 2023

2 **Machinery service providers supply these services. They are agri-SMEs, and they earn more than most rural businesses.**

Capital of Tk 1–32 lakh per machine. A tractor serves 285 farms a year and earns Tk 4.9 lakh; a harvester 170 farms and Tk 3.2 lakh. ~Tk 2,000 crore of machines are sold a year.

3 **They are also the most credit-rationed group in HIES, and banks finance 2–7% of machine purchases. Some credit rules exclude them.**

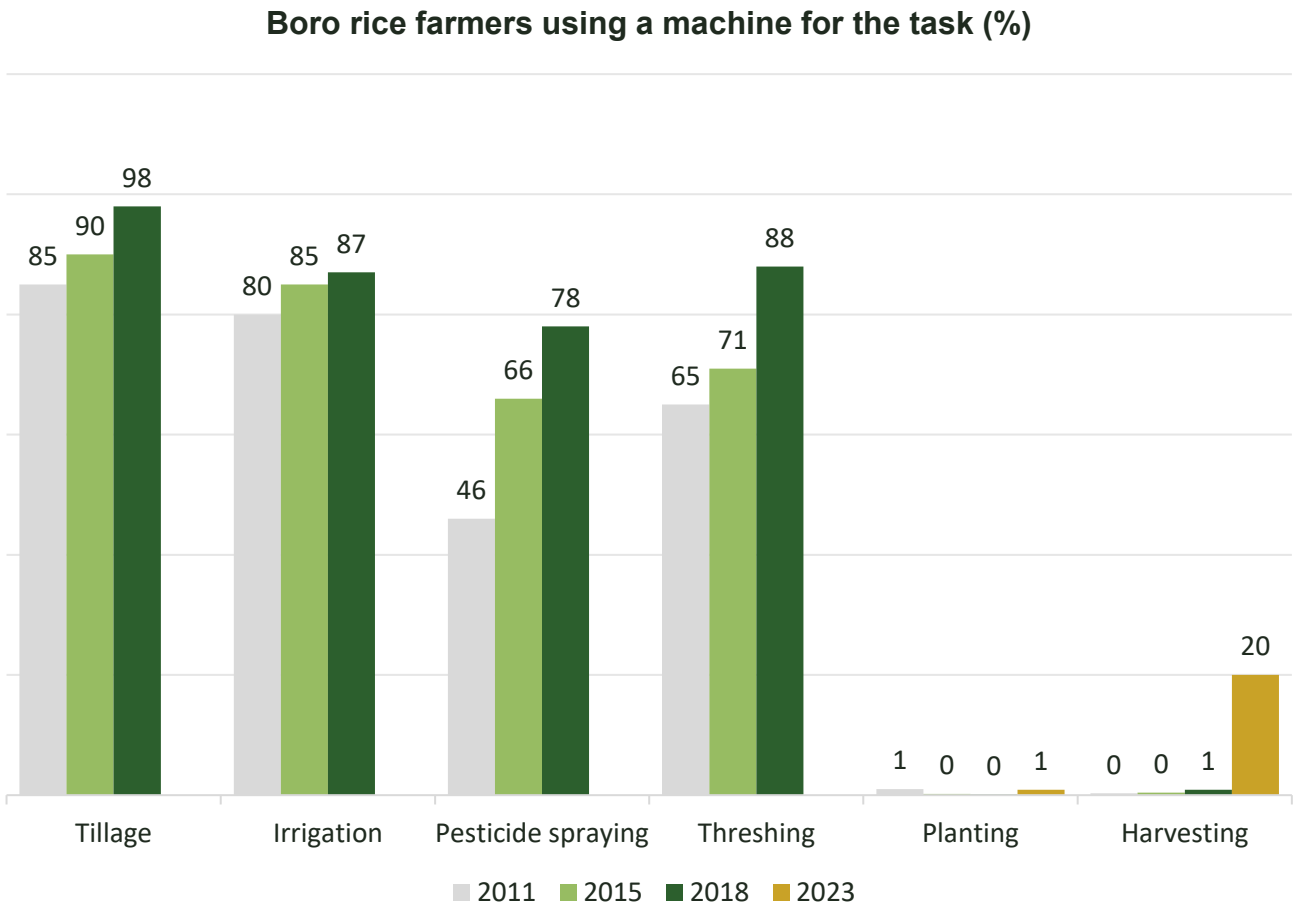
53% of machine-rental borrowers wanted more credit at the same rate in 2022. The own-use rule, the 3-year transfer ban on subsidized machines and an 18-month refinance tenor – all of these can be improved upon

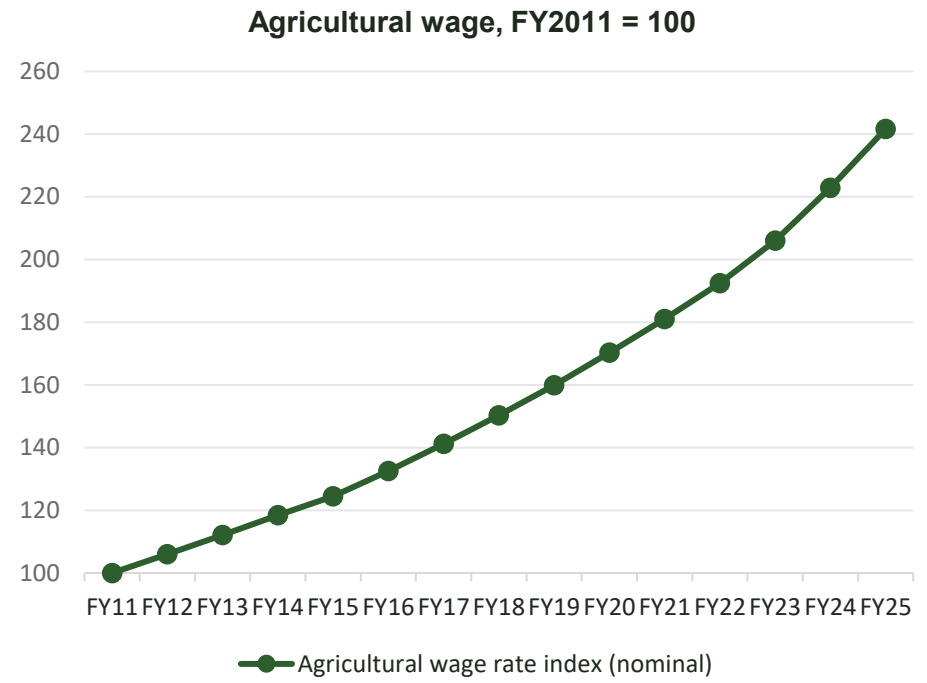
4 **Dealers supply the credit instead: 57% of a harvester's price**

5 **The fixes are amendments to instruments that already exist, not new products.**

Wages and agricultural mechanization, 2011–2023

Machine use rose in every task as agricultural wages rose; nominal wages have grown 2.4-fold since 2011, and 30% in real terms to 2018



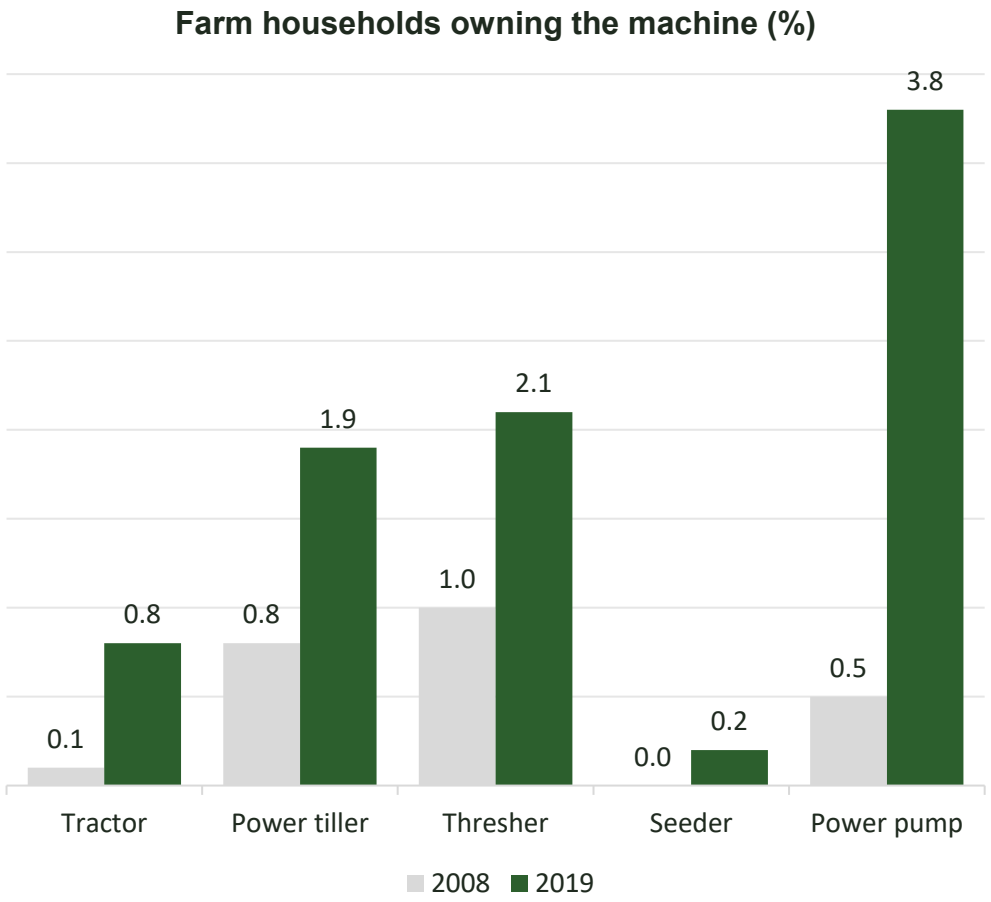


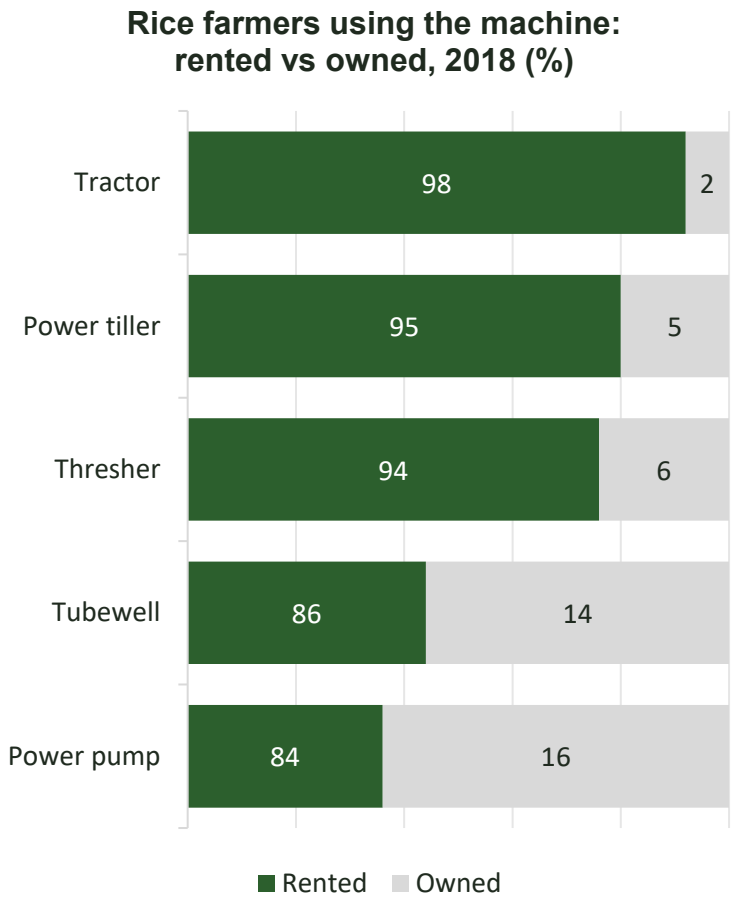
Household surveys record larger real gains: agricultural wages rose 30% in real terms between 2011 and 2018 in the BIHS panel (Karim et al. 2024), and the rural day wage in HIES rose from Tk 325 in 2016 to Tk 500 in 2022. The BBS wage index covers low-paid occupations; FY2021 is interpolated.

Sources: BIHS 2011/12, 2015, 2018/19 and SPIA-BIHS 2024, boro rice farmers (IFPRI Policy Report 2025); BBS wage rate index (agriculture, base 2010-11) and consumer price index, fiscal-year averages; Karim et al. (2024); HIES 2016 and 2022.

Machine use is rented, not owned

Under 2% of farm households own a tractor or tiller; 95–98% of the machines rice farmers use are rented; 0.73 million households earn income from renting machines out





0.73 m

households earned income from renting out a farm machine in 2022, up from 0.63 million in 2016

Tk 31,600

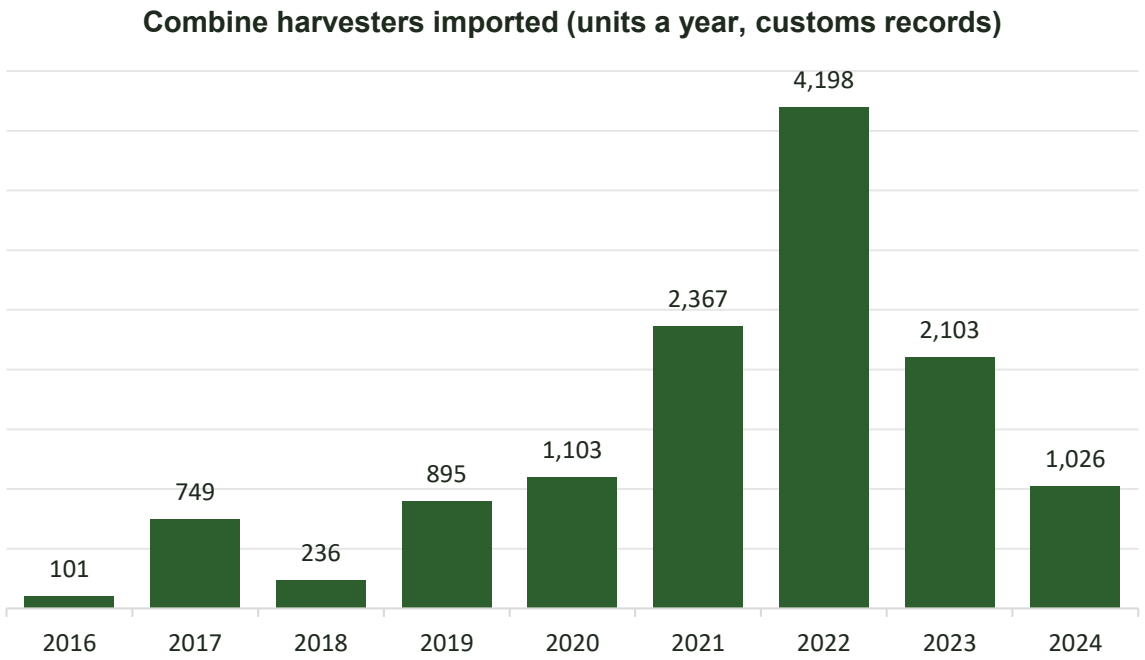
median rental income a year; machines worth Tk 65,000 (2022); most own a tiller or a thresher

In our survey one tractor serves 285 farms a year, one combine harvester 170, one tiller 70 (medians)

Sources: Agriculture Census 2008 and 2019; BIHS 2018/19 (rice farmers, conditional on use); HIES 2016 and 2022, weighted; IFPRI survey of machinery service providers for farms served.

The machinery market: imports and subsidy allocations

Roughly Tk 2,000 crore of machines a year; most tractors and nearly all harvesters are bought on dealer instalments



Machine	Units a year	Price	Sales a year	Bought on credit
Power tillers	40–50,000	Tk 1.1 lakh	Tk 320–470 crore	2%
Tractors	7–9,000	Tk 16 lakh	about Tk 1,300 crore	67%
Combine harvesters	1–4,000	Tk 32 lakh	Tk 330–1,300 crore	97%

33,053
machines subsidised in FY2021–23; 8,912 harvesters took 84% of the Tk 1,894 crore

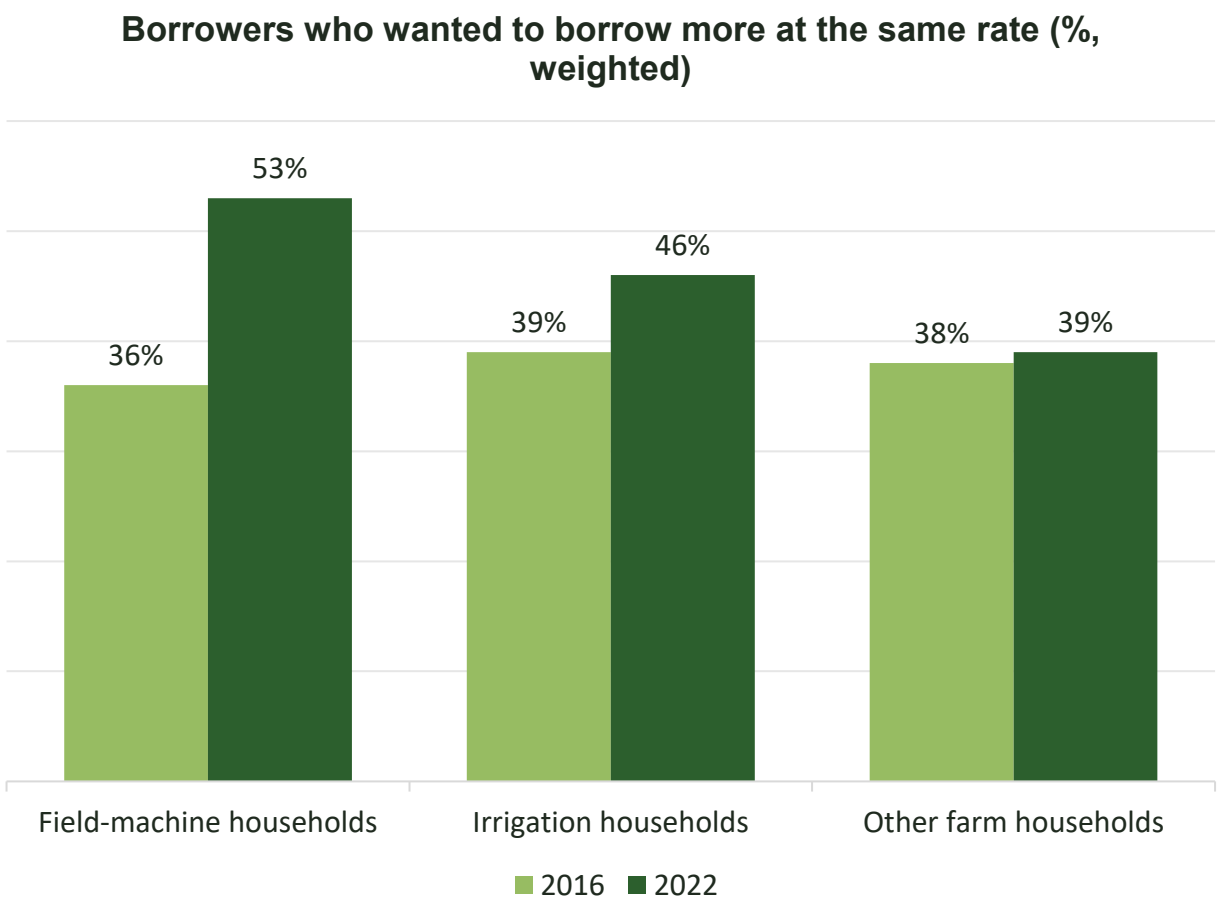
8,590 ≈ 8,912
harvesters imported and subsidised in the same three years

- **Harvester imports** rose from under 1,000 a year to 4,200 in 2022 and fell to 1,000 in 2024 as the Phase 3 subsidy program came to an end; 95% come from China
- **Tractors** are the larger market and receive no subsidy: 7,000–9,000 a year, 98% from India, two-thirds sold on dealer instalments
- **Power tillers** are bought for cash: 40–50,000 a year at about a lakh each
- **Banks** finance 2–7% of machine purchases; the credit policy allocates 2% of its Tk 60,000 crore target, Tk 1,200 crore, to irrigation and machinery

Sources: NBR customs records 2010–2025 (combine harvesters: units with an assessed value of Tk 5 lakh or more); UN Comtrade for tractors; DAE allocation records FY2021–23; survey medians for prices and credit shares; Bangladesh Bank credit policy FY2026-27.

Credit rationing among machine-rental households, HIES 2016 and 2022

Over half of their borrowers wanted more credit at the same rate in 2022; the median loan is a twentieth of a tractor



Machine-rental households, 2022	Median
MFI loan (109 loans)	Tk 50,000
Bank loan (22 loans)	Tk 81,000
Extra amount wanted (borrowers wanting more)	Tk 80,000
Loan term, MFI and bank	12 months
Stated MFI rate (flat)	13% a year

- **Any loan 46%; bank 6.5%; MFI 38%** (field-machine households, 2022)
- **In 2016** machine-rental borrowers were no more rationed than other farmers
- **A machine costs Tk 1–32 lakh;** the typical loan is a twentieth of a tractor, repaid in twelve months

Source: HIES 2016 and 2022 (BBS), weighted; authors' calculations. Rationing = answered yes to 'would you have liked to borrow more at the same rate'. 74 machine-rental borrowers in 2022; loan medians are among loans from that source.

Seven machines: prices, use, margins and financing

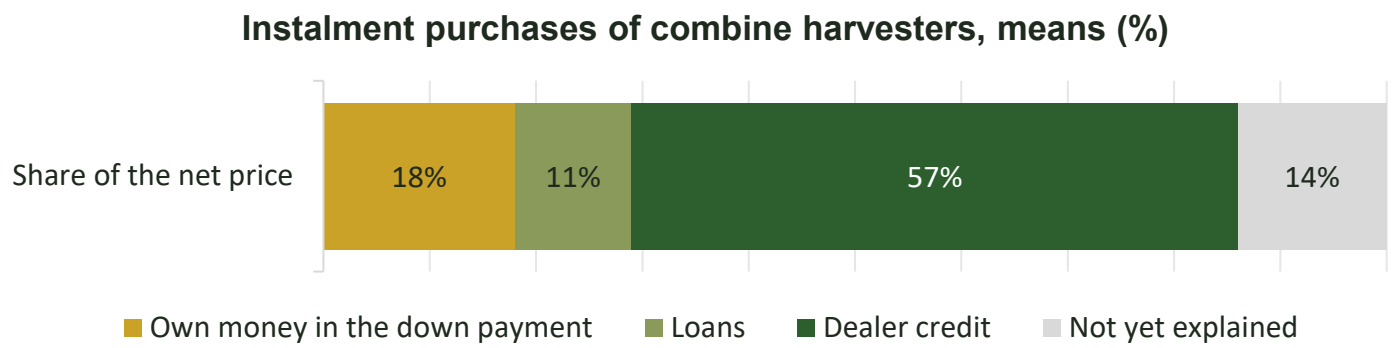
979 providers, 1,107 machines; medians over machines with a revenue record; financing as a share of all machines of the type

	Combine harvester	Tractor	Power tiller	Seeder	Thresher	Maize sheller	Transplanter / reaper
Machines (sample size)	400	109	178	100	153	110	57
Price net of subsidy	Tk 17.95 lakh	Tk 16 lakh	Tk 1.1 lakh	Tk 0.9 lakh	Tk 1.15 lakh	Tk 1.3 lakh	Tk 1.2 lakh
Subsidised	97%	0%	2%	98%	28%	16%	74%
Days of service a year	55	90	56	62	50	57	18
Gross margin a year	Tk 3.2 lakh	Tk 4.9 lakh	Tk 1.2 lakh	Tk 1.2 lakh	Tk 0.85 lakh	Tk 0.7 lakh	Tk 0.5 lakh
Margin as % of net price	**19%**	**30%**	**116%**	**129%**	**66%**	**76%**	**48%**
Machines with a loss last year	**14%**	**6%**	**4%**	**2%**	**7%**	**3%**	**2%**
Revenue earned in the Boro/Rabi season	73%	45%	49%	49%	62%	64%	57%
How the purchase was paid for (% of machines; a loan can come from more than one source)							
Dealer instalments	96%	65%	2%	2%	7%	4%	5%
Loan from a bank	**6%**	**3%**	**0%**	**2%**	**1%**	**1%**	**2%**
Loan from an MFI or NGO	26%	31%	1%	4%	5%	8%	5%
Loan from friends, relatives or a money lender	38%	16%	2%	1%	2%	4%	2%
Own money only	4%	33%	96%	93%	89%	86%	90%

Source: IFPRI survey of machinery service providers, December 2024 – January 2025 (979 providers; unweighted; combine harvesters and other machines shown separately). Gross margin = service revenue − fuel, labour, transport, mechanic, broker fees and repairs; before depreciation, interest and own labour; revenue and costs trimmed at the 5th and 95th percentiles within machine type. Loan sources were asked for instalment purchases; for cash purchases, a household machinery loan taken in the purchase year or the year before.

Financing of a combine harvester purchase

The dealer carries well over half of the net price; the owner's own money is about a fifth



Source of loans to buy, % of CH owners	
Friends and relatives	32%
MFI or NGO	27%
Moneylender	8%
Bank	5%

Tk 4 lakh
down payment (median); half of buyers borrowed part of it

18 months
allowed to pay the dealer (median)

49%
had fully paid the dealer at interview

37%
report that the dealer charges interest or a late fee

60%
of CH owners borrowed to buy, a lower bound

5%
of CH owners used a bank loan to buy

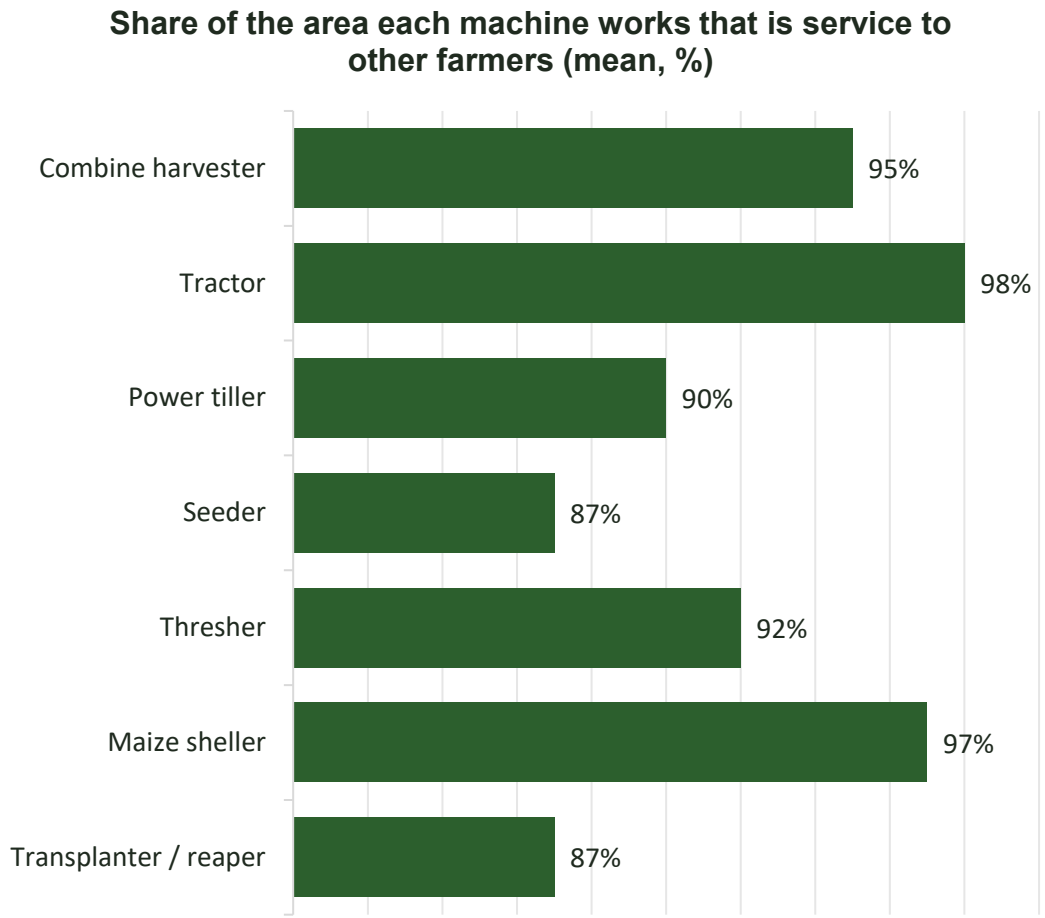
Interest rates: bank machine loans cost about 18% a year in effective terms, MFI loans 26%, moneylenders 74%; 41% of loans from relatives are interest-free.

Why the shares do not sum to 100: the three parts are reported separately and leave 14% of the net price unexplained. Finance was recorded for one harvester per owner; 20% own two or more.

Source: IFPRI survey of machinery service providers, December 2024 – January 2025 (979 providers; unweighted; combine harvesters and other machines shown separately).

Four rules that keep bank credit from service providers

Each applies to most of the sector; the text is from the FY2026-27 credit policy



1. Own use (§3.4.1, §3.4.5)

A machine bought 'solely to rent out on others' land or for commercial purposes' is not agricultural credit; §3.4.5 admits owners who farm and also rent out

87–98% of the area worked is other farmers' land; providers operate about an acre

2. No transfer for 3 years (subsidy rules)

A subsidised machine cannot be transferred for 3 years, so no lender can take a lien; moving it out of the upazila needs DAE permission

27% of CHs are registered in another person's name

3. One machine of a type (§3.4.5)

No borrower may get a loan for more than one machine of the same type; the loan may not exceed the market price

CH owners own 2.4 machines on average; 20% own two or more harvesters

4. No long-tenor product (§4.2.2, §2.2)

The June 2026 Tk 10,000 crore scheme names machinery but lends for 18 months including 3 months' grace, Tk 20 lakh at 8%; BBADCF the same 18 months; SMAP Tk 3.5 lakh

Payback on a harvester is 4.6 years at the median

Source: IFPRI survey of machinery service providers, December 2024 – January 2025 (979 providers; unweighted; combine harvesters and other machines shown separately). Source: Bangladesh Bank, Agricultural and Rural Credit Policy and Programme FY2026-27.

The eligibility rules, as written

Sections 3.4.1 and 3.4.5 of the FY2026-27 policy, and the survey facts they meet

§3.4.1 Irrigation and agricultural machinery

'Loans for irrigation and agricultural machinery at the user level shall count as agricultural credit. Loans for such machinery distributed solely to rent it out on others' land, or for commercial purposes, shall not count as agricultural credit.'

2% of the Tk 60,000 crore target, Tk 1,200 crore, is set aside for irrigation and machinery, to be lent on a priority basis.

§3.4.5 Machinery and transport

'Most small and marginal farmers cannot bear the cost of machinery alone … Banks therefore need not restrict machinery loans to the user level; they may lend, individually or in groups, to any person directly or indirectly involved in agriculture, so that they can buy machinery, use it on their own land and also use it on others' land for a fee, and repay the loan.'

'The loan may not exceed the market price of the machine. No borrower may receive a loan for more than one machine of the same type.'

What the rule assumes	What the survey shows	Change implied
The borrower farms, and rents the machine out on the side	87–98% of the area a machine works is other farmers' land; providers operate about 1 acre and own 0.4; 99% of machines mainly serve others	Admit machines used mainly on others' land, or create an agri-service category, so that a loan to a provider counts toward the agricultural target
One machine of a type per borrower	CH owners hold 2.4 machines on average; 20% own two or more harvesters	Drop the one-machine limit for service providers
The machine stays with the borrower	27% of harvesters are registered in another person's name; 6.5% of listed harvesters had been taken back by the company	A registered lien (2023 Act) in place of the subsidy's transfer ban

Source: Bangladesh Bank, Agricultural and Rural Credit Policy and Programme FY2026-27. Translation by the authors; the Bangla text governs.

Bangladesh's asset-finance programmes

Structure, record and lesson

Programme	Structure	Scale and record	Lesson
IDCOL solar home systems, 2003–19	Households paid about 15% down and repaid over 2–3 years to MFI partner organisations; IDCOL refinanced the partners at 6–9%	4.13 million systems through 56 partners, USD 696 million; collection about 96% for most of its life; wound down with grid expansion	An MFI channel can finance an asset at national scale when an apex refinances it
JICA SMAP through Bangladesh Bank, 2014–	A Tk 639 crore revolving fund lent to 11 MFIs at 5%, on-lent at 19% declining, up to Tk 3.5 lakh, for crops, farm machinery and livestock	Tk 5,806 crore to about one million farmers by June 2026; revolves to 2029	The Bangladesh Bank-to-MFI machinery channel exists; it lacks an asset-earmarked product and tenor
PKSF mechanisation pilot	Credit for sowing, transplanting, harvesting and threshing machines through partner organisations, with training and demonstrations	39 partners in 104 upazilas; Tk 5 crore disbursed through seven	The structure is right; the volume is small
Wave Foundation under PKSF's RMTP	A 40–45% grant plus a loan, after a first attempt without service or seasonal schedules had failed	About 350–400 machines; 100% recovery reported; needed dedicated staff and 3–4 years of support	Service and schedule decide repayment, not the subsidy
BRAC Bank tractor loans with Metal	The bank screened borrowers door to door; later the dealer's sales staff chose them	Worked while the bank screened; failed at scale when the vendor selected	The vendor should not pick the borrowers
ACI Motors' own hire purchase	Dealer credit from the importer's balance sheet, funded by bank loans	Tk 500 crore revolving book (ACI)	without regulation or refinancing
Shakti Foundation battery loans	Tk 100,000 over one year with a vendor that holds a remote lockout and a two-year warranty	Running in 2026 (project field notes)	An MFI can run a vendor-tied loan with a lock

Sources: IDCOL; Bangladesh Bank credit policy FY2026-27 (SMAP); PKSF Agriculture Unit; Wave Foundation, BRAC Bank and ACI Motors interviews, 2026.

Machinery finance in Myanmar, India, Thailand, Korea and China

Loans secured on the machine, with a guarantee or interest support rather than a price subsidy

Country, period	What was done	The enabling rule or support	Scale and performance
Myanmar, 2013–19	Banks offered hire purchase through machinery dealers, who vetted the buyer and stood as guarantor; twice-yearly instalments	Banks allowed to offer hire purchase (2013); land-use certificates pledgeable (2012); **in 2016 LIFT placed USD 18 m with Yoma Bank as a first-loss buffer, so deposits fell from 30% to 10% and tenors rose from 1 to 2.5–3 years**	**By 2017 bank hire purchase financed 98% of combine sales** in the Dry Zone and 62–68% of four-wheel tractors; 2016–18: USD 122 m, 4,000+ tractors, ~1,000 combines. After the 2021 coup, widespread repossessions
India	Tractors ~70–80% financed; **service providers with fleets count as farm credit**; the Agriculture Infrastructure Fund lends to custom hiring centres	Tractors registered as vehicles; RBI priority-sector directions (2025, Annex II) include 'custom service units'; AIF: 3% interest subvention up to Rs 2 crore for up to 7 years, guarantee fee paid by the state	AIF: Rs 84,202 crore sanctioned for 168,000 projects by March 2026, about 25,700 of them custom hiring centres; loan target doubled to Rs 2 lakh crore (Feb 2026); tractor lenders report **~95% collection**
Thailand	The manufacturer's own leasing arm (Siam Kubota Leasing, since 2006) sells tractors and combines on hire purchase	Registered machines; a captive lender that knows resale values	THB 67 bn outstanding, about 1% bad loans, 350,000 customers (2016); 750,000 contracts by 2026
Korea, 1967–2000s	Subsidy-and-loan packages through the agricultural cooperatives, more for group use	Subsidy fell from 60% to 10%; loans rose to 70–90% at 10%, then 4.5%, then 3%; 4–7 annual instalments after a grace year	1991–95: 23% subsidy, 54% loans, 23% own money
China, 2004–	30% purchase subsidy (35% in hills) applied for by phone, with 'one machine, one code' registration; leasing, guarantees and discounts promoted for service cooperatives	Registration as the precondition for subsidy, lease and lien	Subsidy 21.2 bn yuan in 2022

Sources: Belton et al. (IFPRI) and LIFT Forum 2019 on Myanmar; Reserve Bank of India and Press Information Bureau (India); The Nation, 2016, and company reports (Thailand); APRACA 2013 after Kim 2009 (Korea); World Bank 2023 (China).

The study was designed with the Ministry of Agriculture

A technical advisory committee convened by the ministry; five meetings in 2024 and 2025, three of them on design

5

meetings of the committee; three on scope and design, then on results

Scope

Sample across agro-ecological zones

Crops beyond rice

Owners, dealers, mechanics, importers

Design

Questionnaires reviewed module by module

Five district pairs by crop and subsidy rate

Bangladesh Bank shaped the finance module

Results

Findings discussed before publication

Subsidy, tariff and credit scenarios assigned

A national machine census requested

Who sat on the committee

Ministry of Agriculture, chair

Extension department; BARC, BARI, BRRI

Machinery manufacturers' association

Ministry of Commerce, for import rules

Bangladesh Bank, for credit

CIMMYT and IFPRI

A model for research with a regulator

The institution convenes; the committee reviews the design before fieldwork and the results before publication

Data access and field support by letter from the ministry

Each meeting ends with assignments for the researchers

The same arrangement could sit at Bangladesh Bank or PKSF for a machinery credit window

Source: minutes and records of the Technical Advisory Committee on agricultural mechanisation research, 2024 to 2025; Ministry of Agriculture letters, 2024 to 2026.

Next: digital payments across the input value chain

A two-year proof of concept with BRAC Bank, funded by the Gates Foundation, 2026–28

Why input markets stay in cash

1 **The sole digital adopter pays the cash-out fee.**

Input credit is settled in cash at every link; a retailer paid digitally still cashes out to pay the wholesaler.

2 **Each side waits for the other to move first.**

Only 8% of rural respondents chose digital over cash of the same value in our experiment.

3 **No transaction record, so no bank credit.**

The capital and refinancing exist; a way to verify the farmer does not.

What the project does

Farmers, retailers and wholesalers move together, on Bangla QR

Dealer networks as anchor; BRAC Bank opens the accounts

After six months of digital history, BRAC Bank lends against it

IFPRI measures, and reports to a Technical Advisory Committee at the Ministry

Implications for Farmers' Card initiative

50,000
farmers

1,500
input retailers

3–5
districts, Khulna and the coastal belt

Sources: IFPRI formative research in six districts; Ambler, Bakhtiar, Bloem and Uddin (2025), IFPRI Discussion Paper 2385; project design agreed with the Gates Foundation and BRAC Bank.

What we ask of the Ministry of Agriculture

A Technical Advisory Committee housed at the Ministry, on the model of the mechanization committee

1. Chair the Technical Advisory Committee

Bangladesh Bank, Finance, MRA, BRAC Bank, ACI, Syngenta and MFIs at the table

IFPRI brings the evidence each round

The mechanization TAC is the model

2. Bring DAE into the design

Farmer's Card registry: how a bank may verify a farmer against it

Upazila officers and field schools for onboarding and training

DAE's view on where to start

3. Questions for the committee

Digital transaction history in lending guidelines and refinancing

Fee treatment of farm payments under IIPS

VAT threshold for input retailers

Interoperability standards for agriculture

November 2026

Project starts

July 2027

IIPS goes live; lending begins

September 2028

Evidence for a national scale-up decision

Sources: project design agreed with the Gates Foundation and BRAC Bank; Bangladesh Bank IIPS timeline; IFPRI mechanization project Technical Advisory Committee records.

Conclusions

- **Mechanization runs on rented machines from about 0.73 million rural businesses.**

  Agricultural wages rose 30% in real terms in 2011–18; one tractor serves 285 farms a year.

- **These businesses earn more than most rural enterprises and are the most credit-rationed.**

  Tractors earn 30% on their price with 6% losses. Banks finance 2–7% of machines because the own-use rule, the transfer ban and the 18-month tenor exclude the sector.

- **Dealers supply the credit, without regulation.**

  57% of a harvester's price, secured by blank cheques

- **The instruments exist; they need tenor, a ceiling, a lien and a provider category.**

  The June 2026 scheme, SMAP, BBADCF, Sufolon and Agrosor; Myanmar, India, Thailand and Korea show the design; the 2023 Act allows the lien once its registry exists.

Thank you. mehrab.bakhtiar@cgiar.org



Backup slides

Backup: experimental evidence on asset-secured and seasonal loans

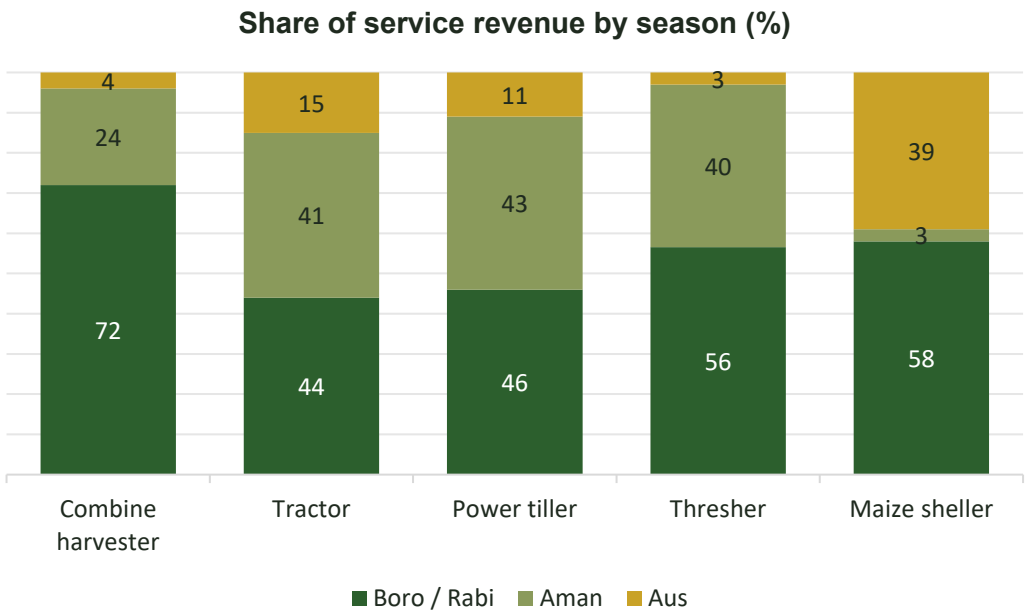
Studies behind each product feature proposed

Product feature	Study	Result	Where it enters the asks
The machine as security (hire purchase)	Bari, Malik, Meki, Quinn (2024, AER), Pakistan: an 18-month hire-purchase contract for an asset four times the usual loan, 10% down. Jack, Kremer, de Laat, Suri (2023, ReStud), Kenya: water-tank loans secured by the tank	Take-up 56% (Pakistan); from 2.4% to 42% (Kenya). Business assets +40%, profits +11%. Default about 4%; repossessions 0–0.7%	A machinery sub-window at Bangladesh Bank; an asset-backed line at PKSF
Borrowers prefer to pledge the new asset	Carney, Kremer, Lin, Rao (working paper), Kenya	Borrowers pay about 9% a month more for a loan secured on the new asset rather than on what they own, with no more default	A lien on the machine, not the land
Seasonal and flexible repayment	Battaglia, Gulesci, Madestam (2024, ReStud), BRAC Bangladesh: the right to skip two monthly instalments. Field et al. (2013, AER), India: a 2-month grace. Brune, Giné, Karlan (2022), Colombia	BRAC: assets +51%, profits +25%, default lower. India: profits up, default up. Colombia: no gain, slightly more default for first-time borrowers	MRA exception for seasonal and balloon schedules; flexibility for borrowers with a record
Timing of payments	Casaburi and Macchiavello (2019, AER); Burke, Bergquist, Miguel (2019, QJE), Kenya	Farmers give up income to be paid in lump sums; harvest-timed loans earned about 28%	Instalments after Boro and Aman
Remote disabling	Gertler, Green, Wolfram (2024, QJE), Uganda: loans secured by a lockable solar system	Default −19 points; two-thirds from effort to repay, one-third from who borrows. Industry PAYGo repayment averages about 72%	Rules for dealer lockouts: notice, no mid-season disabling
Collateral registries	Love, Martínez Pería, Singh (2016), 73 countries	Registries for movable assets raise firms' access to bank finance, most for small firms	Set up the 2023 Act's registry
Interest-rate caps	IMF (2021); Samreth and Aiba (2023) on Cambodia's 18% cap of 2017	Average loan size +45%; loans under USD 500 −48%; borrowers −3%; the poorest 5 points more likely to borrow informally	No request to raise the cap; schedules, a product and disclosure instead

Grade A evidence (randomised or quasi-experimental) unless stated; full references available from the authors.

Backup: seasonal cash flow and repayment timing

Monthly cash from the season-level accounts against three ways of paying the same annual amount; loan year from July



Source: IFPRI survey of machinery service providers, December 2024 – January 2025 (979 providers; unweighted; combine harvesters and other machines shown separately). Amount = 70% of net price over 3 years at 18%; the dealer's schedule gives the same picture.