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Explained: How India’s farm mechanisation is moving beyond tractors

The market for farm machinery — such as rotovators — is what’s growing in India

Written by Harish Damodaran Follow
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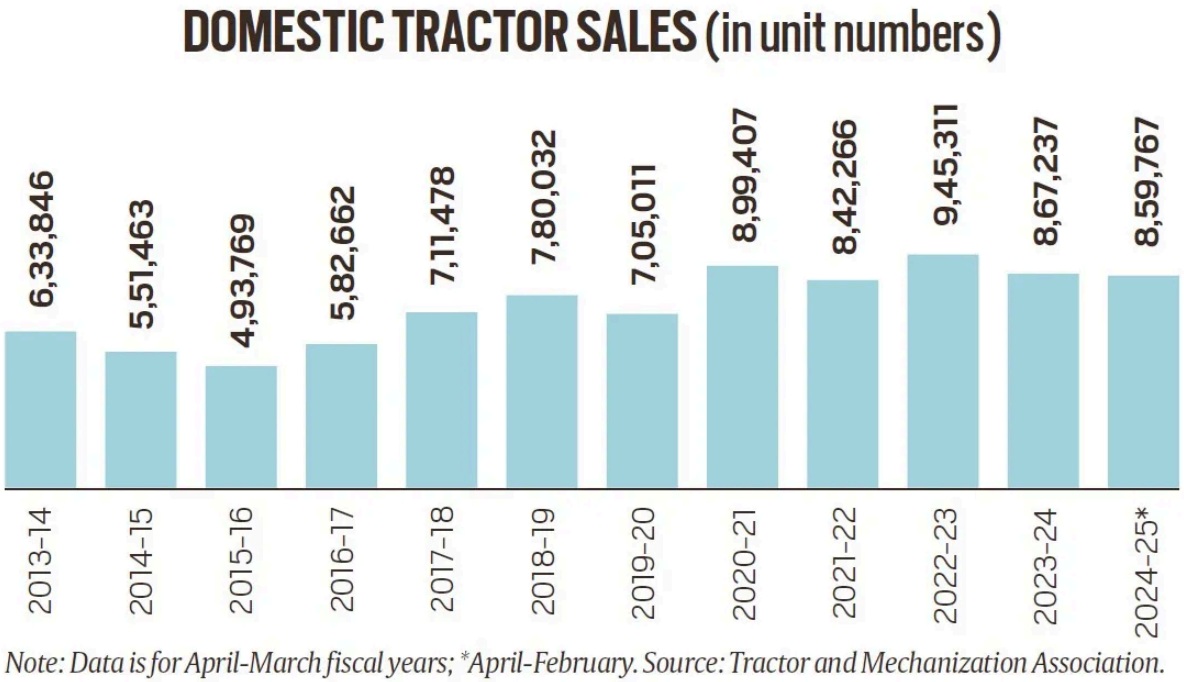
A combine harvester being assembled at Mahindra & Mahindra's farm machinery plant in Pithampur, Madhya Pradesh (Express/Harish Damodaran)

The tractor basically replaced the bullock to pull farm implements – be it the plough (for opening and loosening the soil to bury weeds and previous crop residues), harrow and cultivator (for breaking the clods formed from ploughing and smoothening the soil surface to create a fine seedbed) or drill (for uniform seed sowing) – and carts for transportation.

With tractors, the farmer had a power output source to drag or lift much heavier field implements and loads. A pair of bullocks can generate an average 1 horsepower (hp) for farm operations, whereas it is 41-50 hp for a majority of tractors sold in India.

Not just tractors

India's tractor market is about 9 lakh units per year, with sales rising from 2020-21 (see chart). In value terms – a 45 hp tractor costs roughly Rs 7 lakh for the farmer – that comes to over Rs 60,000 crore.



*Note: Data is for April-March fiscal years; *April-February. Source: Tractor and Mechanization Association.*

But farm mechanisation isn't just about tractors. Tractors simply generate motive power from their diesel engine and are ultimately as good as the equipment attached to them.

Bullock-drawn ploughs can largely do primary tillage and work to depths of 4-6 inches. A tractor-powered rotavator can replace the plough, harrow and cultivator, performing primary and secondary tillage operations in a single pass. Also, it can dig up to 8-

12 inches for breaking up the hard compacted layers below the top soil, to allow better aeration, water infiltration and deeper root penetration.

The market for farm machinery is what's growing in India. "Volume-wise, its growth is now twice that of tractors," says Rajat Gupta, founder of Tractor Junction, a digital marketplace for tractors and farm equipment.

Rotavators alone today are a 200,000-units market worth Rs 2,000 crore annually. Leading companies/brands are the Rajkot (Gujarat)-based Tirth Agro Technology (which sells 75,000-80,000 units under Shaktiman brand), M&M (44,000-45,000), International Tractors/Sonalika (37,000-40,000), Maschio Gaspardo (21,000-24,000), Beri Udyog/Fieldking (8,500-9,500) and TAFE/AgriStar (5,500-6,500).

A Rs 10,000-crore market and growing

Farm machinery includes tractor-mounted implements (tillage tools, crop protection chemical sprayers, balers, loaders, trolleys and laser land levellers) as well as self-propelled harvester combines, rice transplanters and cane harvesters.

Anusha Kothandaraman, who heads Mahindra & Mahindra's (M&M) farm machinery and precision farming business, reckons the size of India's agri machinery market, excluding tractors, at upwards of Rs 10,000 crore: "It is split 60-40% between organised and unorganised sector players".

Globally, the market for farm machinery, at approximately $100 billion, is above the $60 billion of tractors. In India, it's the other way: Tractors at Rs 60,000 crore and farm machinery at Rs 10,000 crore. "So, there's scope for growth and catching up," she adds.

While rotavators and subsoilers enable deep tilling to exploit the fertility and nutrient potential of the lower soil layers – making more effective use of the farmer's tractor – harvesters and transplanters address the increasing agricultural labour shortages.

The market for self-propelled wheel-moving harvester combines is some 8,000 units annually, worth Rs 2,000 crore at an average of Rs 25 lakh/machine. The big two players with nearly 50% share are Kartar Agro Industries and Manku Agro Tech (Vishal brand). There are others too from Punjab – Malkit AgroTech, Preet Agro, New Gurdeep Agro and Guru Nanak Agriculture Engineering Works (Balkar) – apart from the likes of M&M and John Deere.

Besides wheel-type combines that harvest multiple crops – cereals, pulses and oilseeds – there are crawler track combines designed for harvesting paddy in wetlands and muddy fields. Their market – these machines move on rubber tracks in fields, while lugged on road by commercial vehicles – is an estimated 7,000 units (Rs 1,750 crore at Rs 25 lakh each) and dominated by Chinese (GAM and Lovol) and Japanese (Kubota and Yanmar) firms.

Combine harvesting is also done by machines powered by tractors that are mounted on top, with volumes of 3,000-3,500/year (Rs 300-350 crore at Rs 10 lakh each). The main players here are John Deere and the Punjab-based Dasmesh, Balkar, Gahir Agro and KS Agrotech (Greengold).

From tractors to machines

Harvesting an acre of wheat takes 5-7 labourers working a whole day. The harvested crop has to further be tied into bundles and taken for threshing (separating the grain from straw), requiring extra labour and an additional day. The total cost: Rs 5,000 or more.

A combine can harvest, thresh, clean and deliver an acre of grain to the farmer's tractor trolley in 25-30 minutes. The operator charges Rs 2,000-3,000 per acre. Not surprising that a host of crops across states are increasingly being mechanically rather than manually harvested.

The same goes for transplanting of paddy seedlings, where the use of machines is growing particularly in the southern states. Rice transplanters are an estimated 3,000-units market that include both walk-behind (2,750 units costing Rs 3 lakh each) and

ride-on (250 at Rs 10 lakh/unit) machines. The major sellers are Kubota, M&M, Kaira (China) and Yanmar.

The growing demand for mechanisation is leading to even big tractor concerns establishing and expanding their presence in the farm machinery space.

M&M, India's top tractor maker, has a dedicated farm equipment plant at Pithampur in Madhya Pradesh's Dhar district. The Rs 100-crore plant, commissioned on 23.7 acres in end-2021, has a production capacity of 1,200 harvesters and 3,300 rice transplanters per year. It has facilities for fabrication (of chassis, cutter bar, trailer, feeder and grain tank from sheet metal), in-house painting and assembling of these machines. M&M also has a rotavator factory at Nabha in Punjab.

A different model

The tractor is a versatile machine. Its motive power can be deployed for most agricultural operations as well for haulage and other non-field purposes.

This isn't so with sugarcane harvesters, combines or Happy/Super Seeders that have only crop- or operation-specific application. "There is farmer demand for these machines, but individual affordability is an issue," points out Kothandaraman.

That's where custom hiring comes in.

Raju Solanki, a 15-acre farmer from Khanota village in MP's Agar Malwa district, has purchased a 'Swaraj 8200' wheel combine harvester for Rs 26 lakh. He has put in Rs 1 lakh and availed a State Bank of India loan at 9% interest for the balance. After a 3% interest subvention under the Centre's Agriculture Infrastructure Fund scheme, he effectively pays 6%.

Solanki has so far harvested 200 acres of wheat this season, including 50 acres in Khanota and the rest in other villages of Agar Malwa and Mandsaur district. The 23-year-old is taking his machine next to Kota in Rajasthan and hopes to do 600-700 acres over the entire 45-day harvesting season.

At Rs 2,000/acre, Solanki will gross Rs 12-14 lakh from 600-700 acres. “I cover 2-2.5 acres and burn 6-6.5 litres of diesel per hour. After paying Rs 75,000 plus Rs 75/acre commission to the foreman and driver, and all other expenses, I still make decent money,” he notes. Solanki plans to do another 300 acres of soyabean harvesting in the ensuing season from September.

This model – of individual owner-operators undertaking harvesting or transplanting in the fields of many farmers – may be a more sustainable route for agricultural mechanisation.

Harish Damodaran Follow

Harish Damodaran is National Rural Affairs & Agriculture Editor of The Indian Express. A journalist with over 33 years of experience in agri-business and macroeconomic policy reporting and analysis, he has previously worked with the Press Trust of India (1991-94) and The Hindu Busin ***... Read More***

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