Table S1 Commercial precision feeding systems for cattle farming.

Motion form	Country and company	Model	Technical features	Reference
Rail-guided	Trioliet B.V. (Netherlands)	Triomatic HP2300	The suspension system automatically adjusts its height, avoids obstacles, and achieves infinitely variable speed control for bidirectional feeding on both sides.	[163]
	Trioliet B.V. (Netherlands)	Triomatic WP2300	The wheeled support mobility can handle slopes up to 5% and thresholds of 5 cm.	[164]
	Rovibec AgriSolutions Inc. (Canada)	Rover MVR	The system can autonomously load, mix, and distribute feed without any human intervention.	[165]
	Rovibec AgriSolutions Inc. (Canada)	ROV	The feed bin is divided into 8 sections of varying sizes, capable of storing 8 different types of grains or mineral supplements, with a maximum storage capacity of 1000 kg.	[166]
	Rovibec AgriSolutions Inc. (Canada)	DEC SR	The backend allows for setting different feeding curves and feed formulations, meeting the free feeding needs of up to 300 dairy cows.	[167]
	Rovibec AgriSolutions Inc. (Canada)	DEC HDR	It is suitable for farms with all types of road conditions, autonomously managing, preparing, and distributing total mixed rations (TMR).	[168]
	Hetwin Automation Systems GmbH (Austria)	ARAMIS II	Europe's first feeding robot for automatically supplying concentrates, hay, and silage, capable of performing five tasks: weighing, cutting, mixing, dosing, and delivery.	[169]
	Hetwin Automation Systems GmbH (Austria)	ATHOS	Primarily designed for small to medium-sized farms, equipped with a premixing device and cutting system.	[170]
Self-propelled	Lely Holding S.A.R.L. (Netherlands)	Vector	It features a function to measure feed height at the fence, helping to decide whether additional feed is needed.	[171]
	Goke Livestock Technology Co., Ltd. (China)	-	It is equipped with integrated navigation and self-mapping capabilities, enabling automatic adjustment of feed formulations based on the nutritional needs of the animals.	[172]
	BlueWay Agricultural Robotics Co., Ltd. (China)	TMR precision feeding system	Real-time monitoring of the feeding, mixing, and spreading operations to reduce human error.	[173]
	Hetwin Automation	ARANOM	Uses ground magnetic induction sensors as reference points for autonomous	[174]

	Systems GmbH (Austria)		movement, capable of performing four operations: weighing, mixing, feeding, and pushing.	
	Schauer Agritech GmbH (Austria)	TRANSFEED ROVER	A turning radius of 1.5 meters, occupying a small walking area; integrated with a variable-speed vertical mixer and cutter.	[175]
	DeLaval International AB (Sweden)	OptiDuo	Feed can be scientifically distributed based on the different growth stages of the cattle.	[176]
	KUHN S.A. (France)	Aura	It is equipped with an advanced navigation system, capable of autonomously mixing feed, feeding, and independently retrieving silage and roughage.	[177]

Table S2 Commercial precision feeding systems in pig farming.

Feeding form	Country and company	Model	Technical features	Reference
Intelligent feeding stations	Goke Livestock Technology Co., Ltd. (China)	-	Feeding capacity of 60-70 sows per unit, with a sow identification system to reduce the likelihood of repeat visits to the feeding station.	[178]
	Osborne Industries Inc. (United States)	Team	Suitable for the feeding system of pregnant sows and group housing. It uses IoT technology to precisely control the sows' feed intake, ensuring more accurate feeding.	[179]
	JYGA Technologies Inc. (Canada)	Gestal 3G	Includes the Gestal 3G pregnant sow group feeding system and the Gestal F2 lactating sow automatic feeding system.	[180]
	CAMAC Huafeng Technology Co., Ltd. (China)	ZWZ50C	Integrates three modules: precise feeding, intelligent separation, and pen body. The innovative design features dual-side entry, allowing both the feeding and separation zones to share a single feeder.	-
	Schauer Agritech GmbH (Austria)	Compident VII	Ensures safe and orderly feeding using a buffer zone at the exit area and an acceleration sensor during departure.	[181]
	Nedap Livestock Management B.V. (Netherlands)	Nedap Velos	Composed of an automatic single precision feeder, an automatic estrus monitor, and an automatic separator, adopting group feeding for sows.	[182]
Feeders	Muyuan Food Co., Ltd. (China)	-	Automatically collects data on feed and water intake, adjusting the feeding formula based on the growth curve of the herd, providing precise feeding;	[183]

		integrates water and feed to reduce dust.	
Qingdao Big Herdsman Machinery Co., Ltd. (China)	Intelligent feeding system for sows at all stages	Binds each sow and enables intelligent data analysis through fast NFC communication.	[184]
Schauer Agritech GmbH (Austria)	MIO	The computer-controlled dry feed system offers personalized and on-demand feeding, with options for free or fixed feeding. It automatically adjusts according to the feeding curve, and the SmartControl app facilitates easy management.	[185]
JYGA Technologies Inc. (Canada)	SOLO	It features multiple daily, continuous, and precise feeding capabilities, and uses Wi-Fi wireless communication technology to connect with mobile management software.	[186]
Big Dutchman International GmbH. (Germany)	Callmatic 2	Features a modular design suitable for various farms, with additional feed additive bins and a control system for training replacement sows.	[187]