

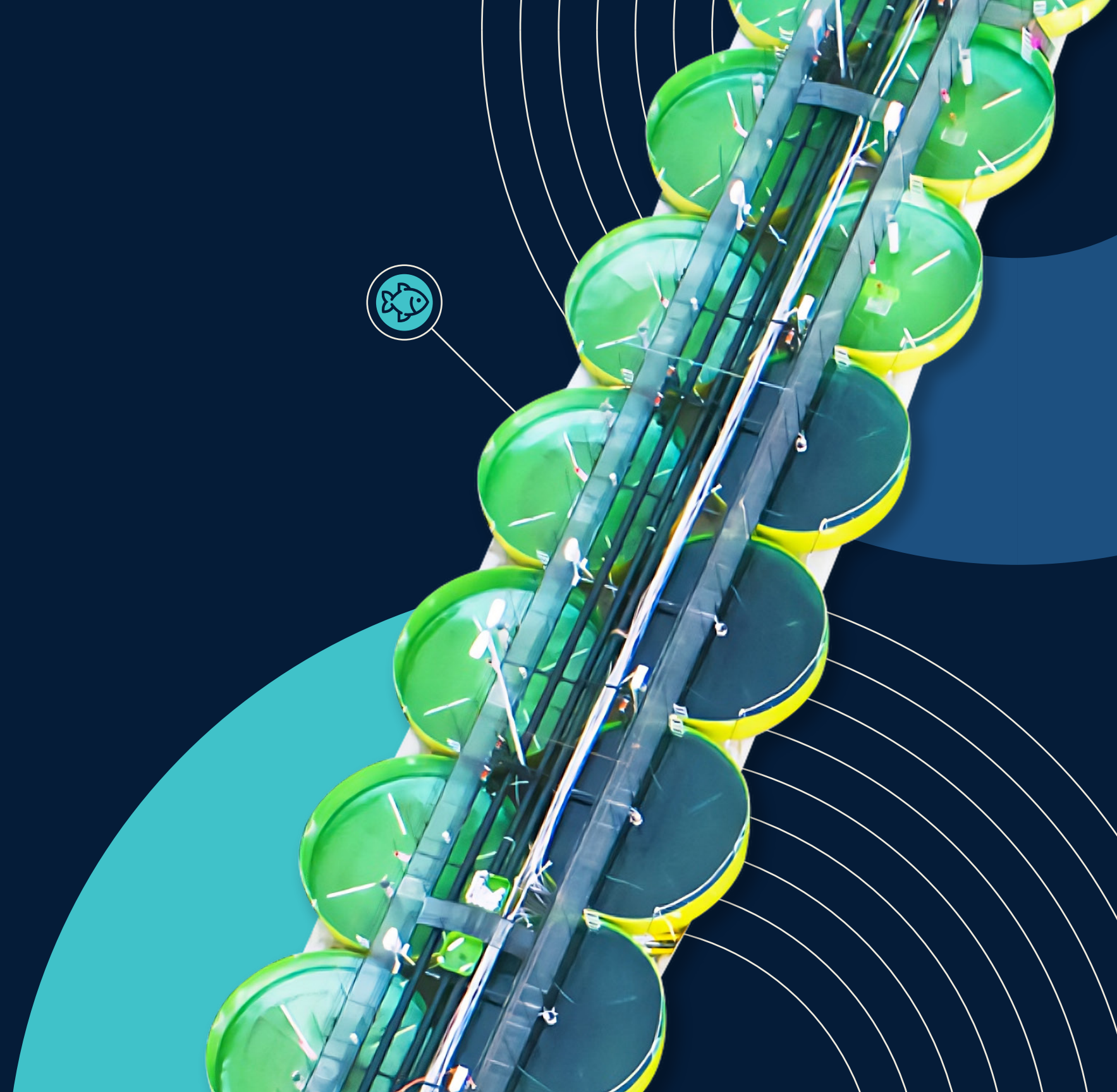


 EMERGING TECH RESEARCH

Agtech Report

VC trends and emerging opportunities

Q1
2023





Contents

Vertical overview

3

Q1 2023 timeline

5

Agtech landscape

6

Agtech VC ecosystem market map

7

VC activity

9

Emerging opportunities

25

Ag finance and insurance

26

Land-based aquaculture

28

Precision irrigation

31

Select company highlights

33

Nileworks

34


Agreena

36

What else would you like to see in this report?
Send your ideas to alex.frederick@pitchbook.com. We look forward to hearing from you.

Institutional Research Group

Analysis



Alex Frederick

Senior Analyst, Emerging Technology

alex.frederick@pitchbook.com

pbinstitutionalresearch@pitchbook.com

Data

TJ Mei

Data Analyst

Publishing

Report designed by **Drew Sanders** and **Chloe Ladwig**

Published on May 4, 2023

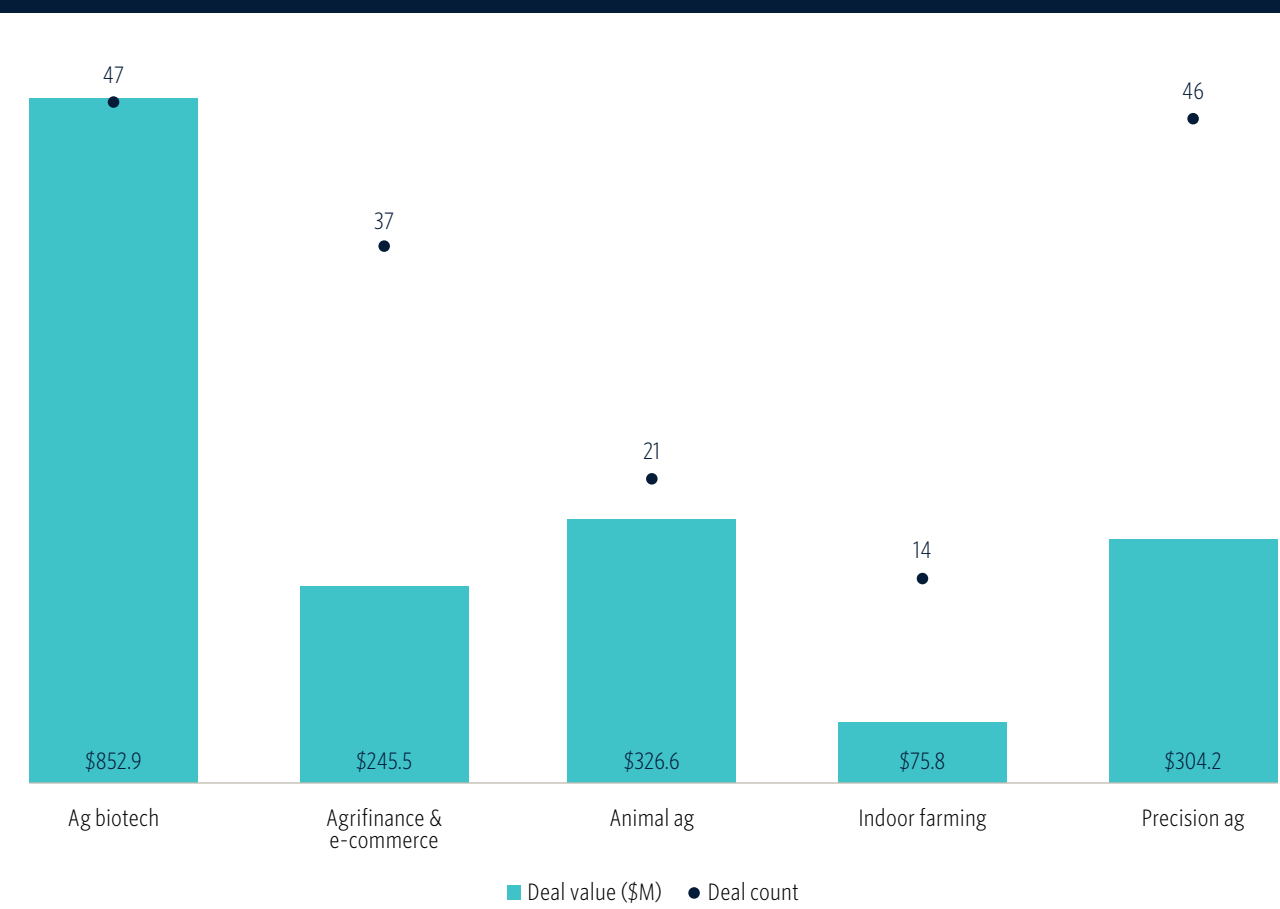


Vertical overview

Agricultural technologies (agtech) include technologies that aim to improve the efficiency, sustainability, and resilience of agriculture operations. These technologies can be classified into software, biotech inputs, and hardware. Software solutions include farm management systems, precision agriculture tools, and financial management tools. Biotech inputs such as genetically modified crops and biological pest control agents are becoming increasingly popular in the industry. Hardware innovations include wearable sensors, drones, autonomous vehicles, and large machinery.

The agtech sector faced significant challenges this quarter as investment deal counts declined by 39% compared with the previous quarter. The global economic slowdown and multiple banking crises impacted investor confidence, resulting in fewer funds being allocated to agtech startups. The frozen exit environment and elevated interest rates appear to be curtailing pre-IPO investment at the venture growth stage. Continued exit bottlenecks will delay capital from returning to investors and its reinvestment into agtech startups in the medium to long term.

Agtech VC deal activity by segment in Q1 2023*



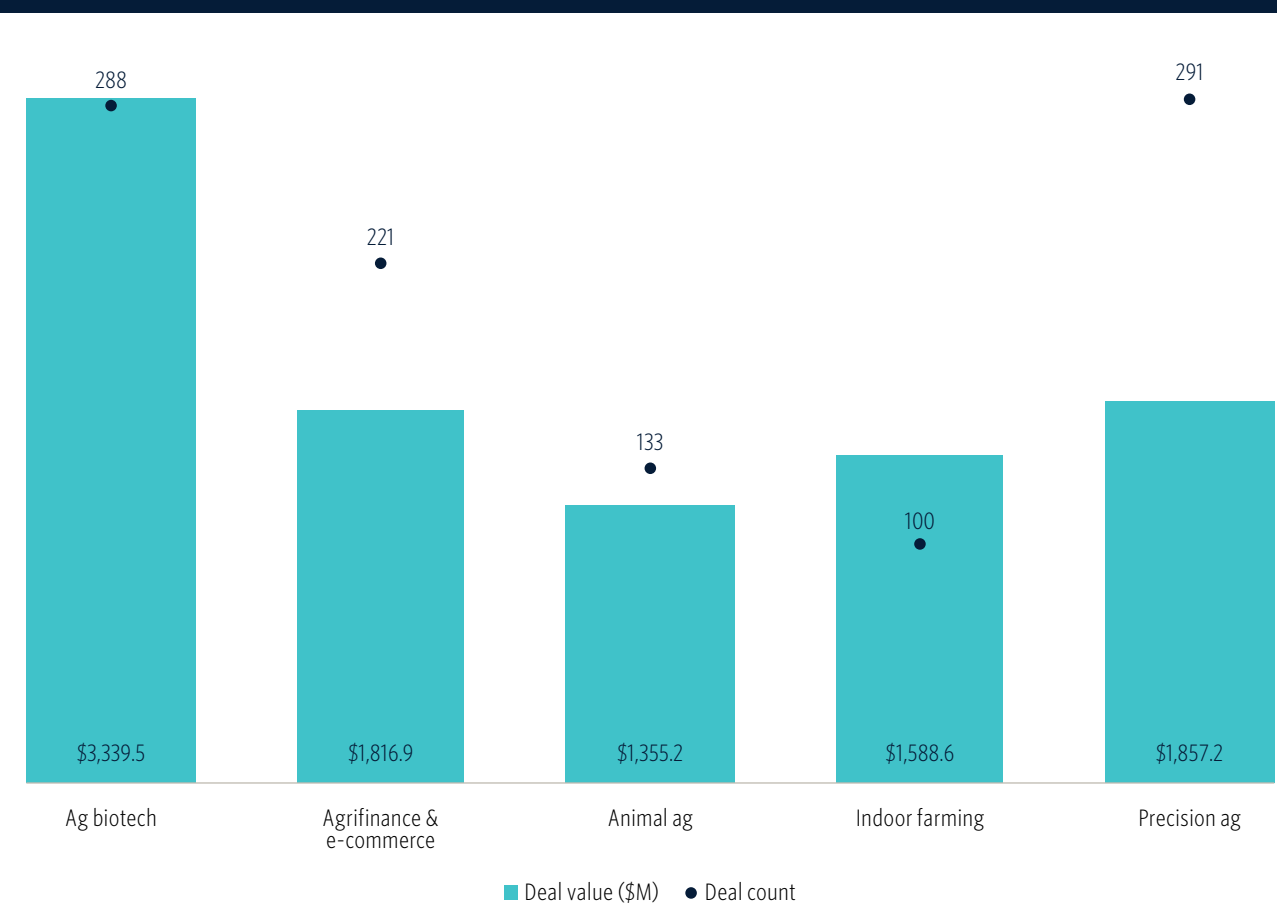
Source: PitchBook • Geography: Global • *As of March 31, 2023



VERTICAL OVERVIEW

Indoor farming is one segment that has fared particularly poorly due to the harsh funding environment. Indoor farming operators are facing significant challenges as they struggle to stay in business due to the capital-intensive nature of the industry. The high costs associated with indoor farming—such as lighting, heating, and ventilation systems—make it difficult for small-scale operations to compete with larger and more established players. Additionally, the high upfront costs and ongoing expenses of indoor farming operations, including the cost of maintaining a controlled environment, can quickly eat into profits. The lack of access to funding and financing options is also a major hurdle for indoor farming operators, making it difficult for them to expand their operations and compete with traditional farming methods. Since the beginning of 2023, we’ve logged five companies cease operations or file for bankruptcy, including [Kalera](#) and [Future Crops](#). Despite indoor farming aligning with key trends of food security, local, healthy, and environmentally friendly produce, we expect the capital-intensive nature of this industry will impede venture funding in the near term.

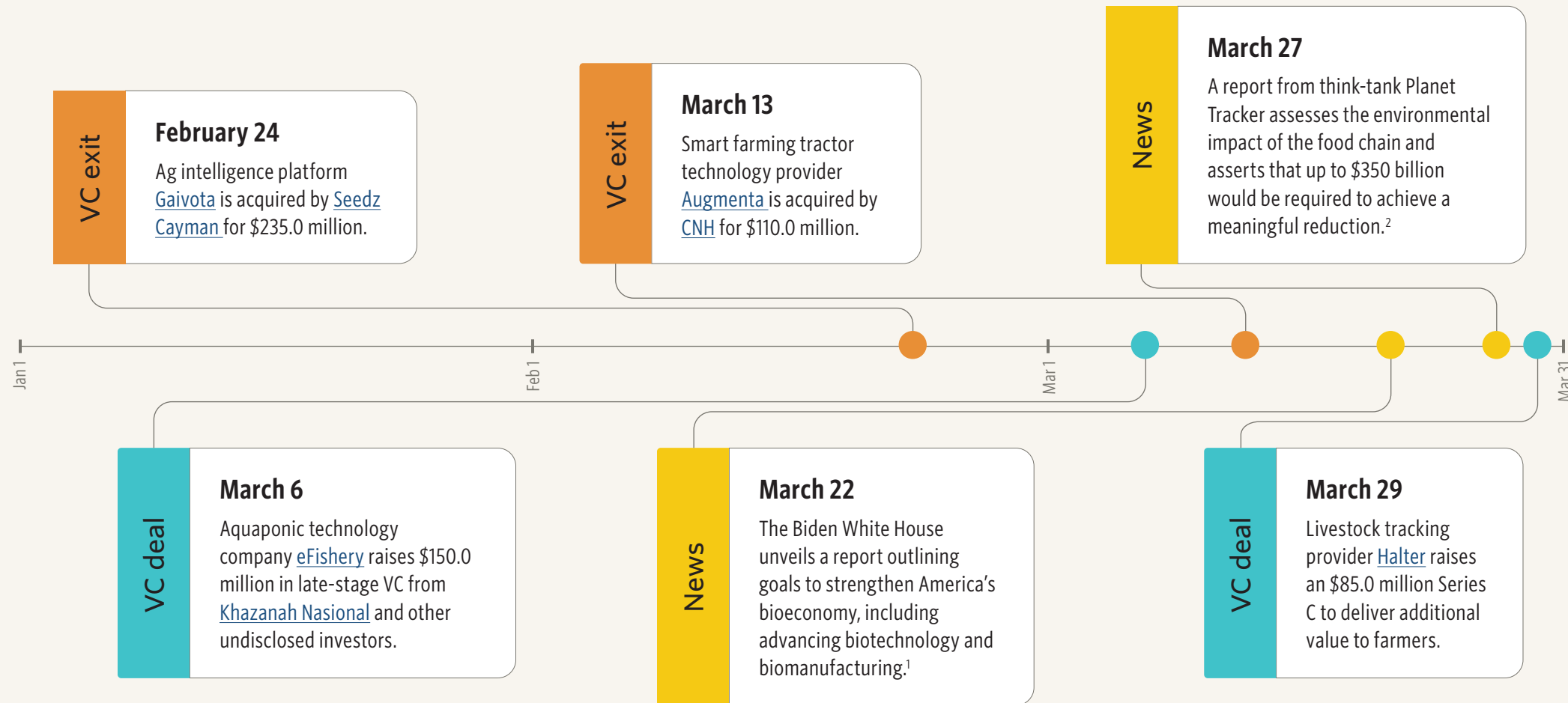
Trailing 12-month (TTM) agtech VC deal activity by segment*



Source: PitchBook • Geography: Global • *As of March 31, 2023



Q1 2023 timeline



1: "Fact Sheet: Biden-Harris Administration Announces New Bold Goals and Priorities to Advance American Biotechnology and Biomanufacturing," The White House, March 22, 2023.
2: "Financial Markets Roadmap for Transforming the Global Food System," Planet Tracker, Peter Elwin, et al., March 2023.

Q1 VC deal count summary

172
total deals

-39.0%
QoQ growth

\$1.9B
total VC raised

-10.3%
QoQ growth

TTM summary

1,055
total deals

-18.5%
YoY growth

\$10.0B
total VC raised

-32.1%
YoY growth



-
- This isometric illustration depicts a smart farm and laboratory environment. The scene is divided into several functional areas, each labeled with a number in a colored circle:
- Area 1 (Teal):** A laboratory workspace featuring a desk with a microscope, a laptop, and a stool.
 - Area 2 (Yellow):** A workstation with a laptop and a stool.
 - Area 3 (Orange):** A plant rack containing several potted plants.
 - Area 4 (Red):** A central area showing a drone, a tractor, and a field of crops.
 - Area 5 (Dark Red):** A control building with a radio tower on its roof.
- The illustration also includes various other elements such as a barn, a field, a tractor, a drone, a laptop, a microscope, a plant rack, and a field of crops.



Agtech VC ecosystem market map

Click to view the interactive market map on the PitchBook Platform.

Market map is a representative overview of venture-backed or growth-stage providers in each segment. Companies listed have received venture capital or other notable private investments.

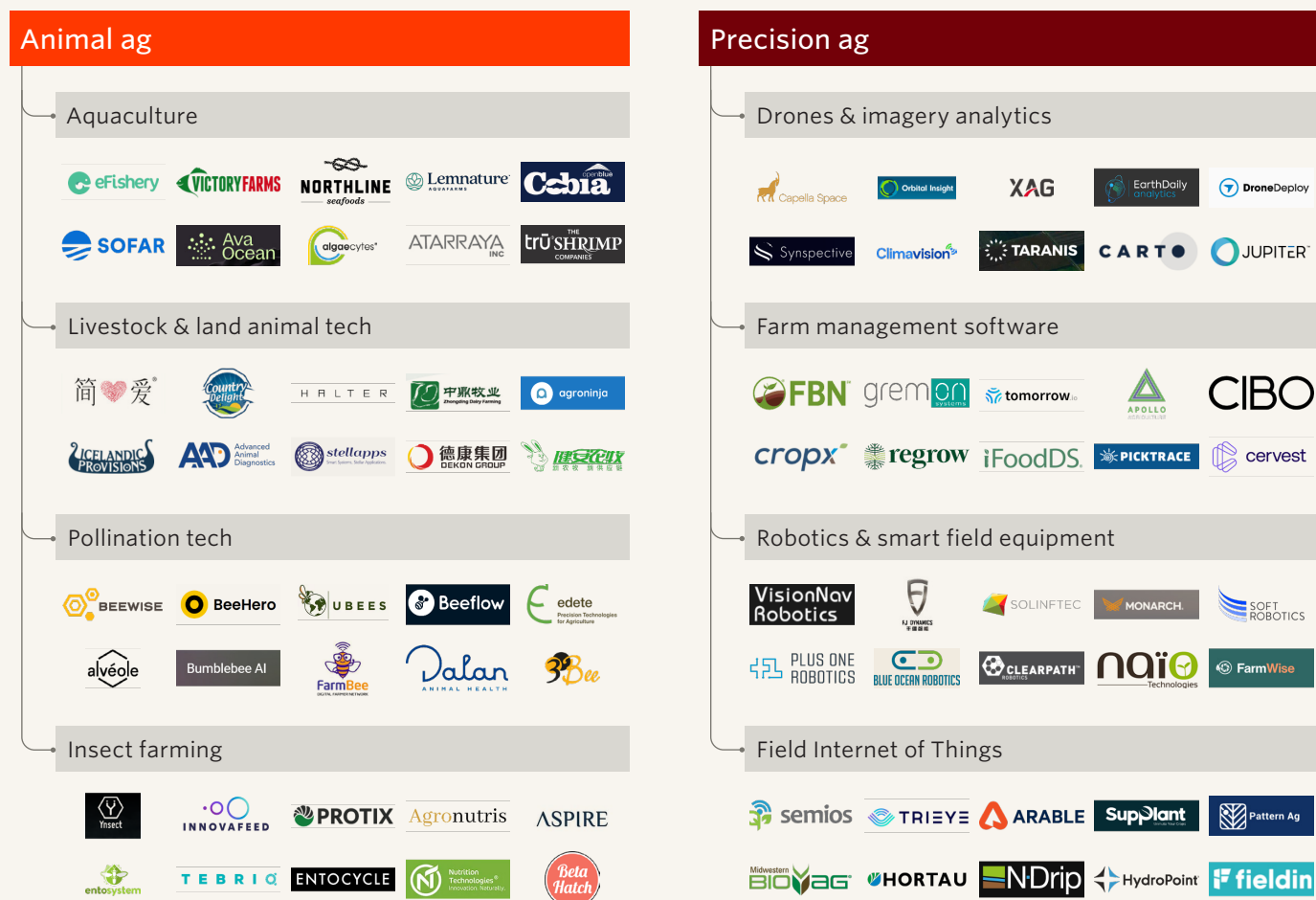




Agtech VC ecosystem market map

Click to view the interactive market map on the PitchBook Platform.

Market map is a representative overview of venture-backed or growth-stage providers in each segment. Companies listed have received venture capital or other notable private investments.





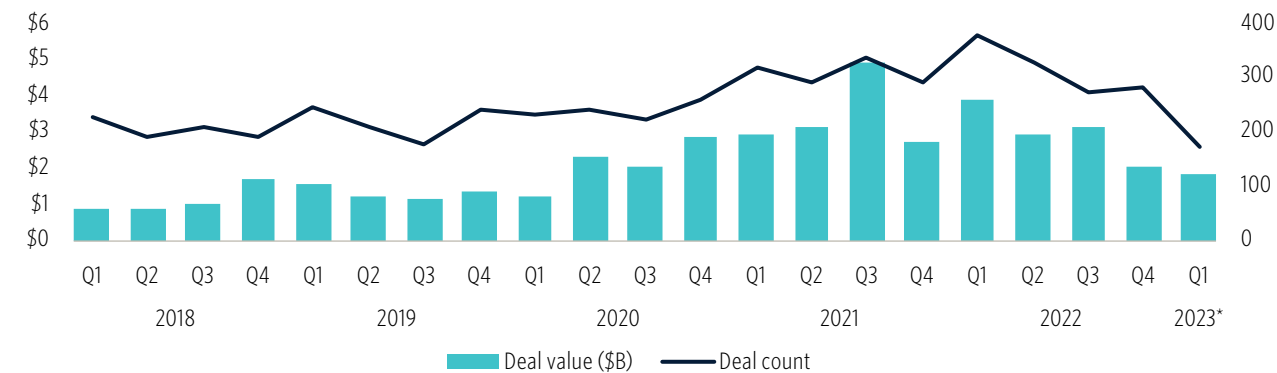
VC activity

The agtech industry's deal activity in Q1 2023 totaled \$1.9 billion across 172 deals, marking a decline from the previous quarter. The funding environment for agtech continued to be challenging, and banking woes worsened investor confidence. Despite this, notable deals were closed, including aquaculture technology provider [eFishery](#)'s \$150.0 million late-stage VC round and livestock tracking startup [Halter](#)'s \$85.0 million Series C.

During Q1 2023, agtech companies saw a median pre-money valuation of \$16.5 billion, a 19.8% increase from 2022. This rise defies our previous expectation of valuation declines due to market volatility. The upturn is likely a result of a substantial decrease in deal count during this period. It appears that riskier deals were postponed in Q1, while only those deals with greater investor confidence and higher valuations were finalized. In addition, median deal sizes increased by 33.4% during the same period. This suggests that investors are now focusing on fewer, larger deals that are considered lower risk.

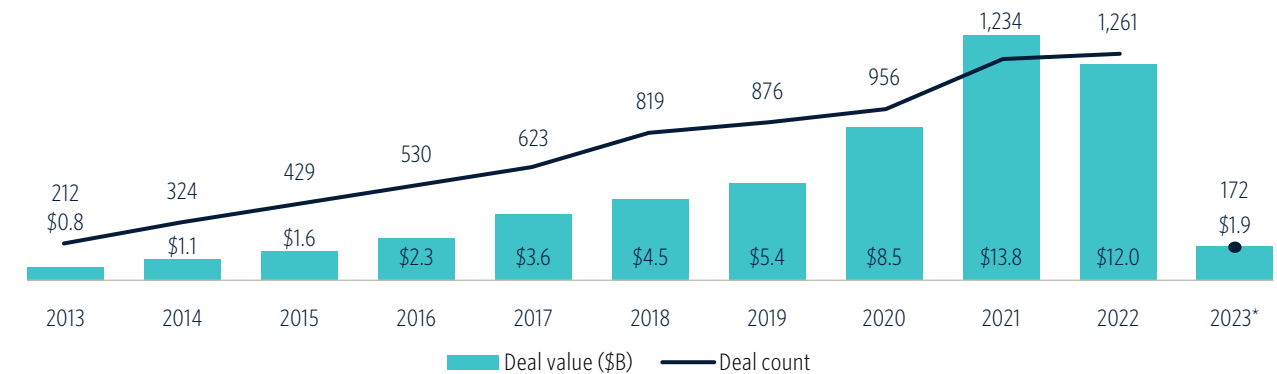
In Q1, exit activity continued to be subdued, which is consistent with the past year's trend. There were 14 exits totaling \$0.5 billion. Hindered by a closed IPO window and rising interest rates, M&A chances were scarce, leading to limited exit activity. Apart from China-based [Mingjia Environmental Technology](#)'s IPO, no other agtech companies went public. Significant Q1 exits included [Gaivota](#)'s acquisition by [Seedz Cayman](#) for \$235.0 million and [Augmenta](#)'s purchase by [CNH](#) for \$110.0 million. Exits are likely to remain restrained in the medium term until interest rates decrease and the IPO market reopens.

Agtech VC deal activity by quarter



Source: PitchBook • Geography: Global • *As of March 31, 2023

Agtech VC deal activity

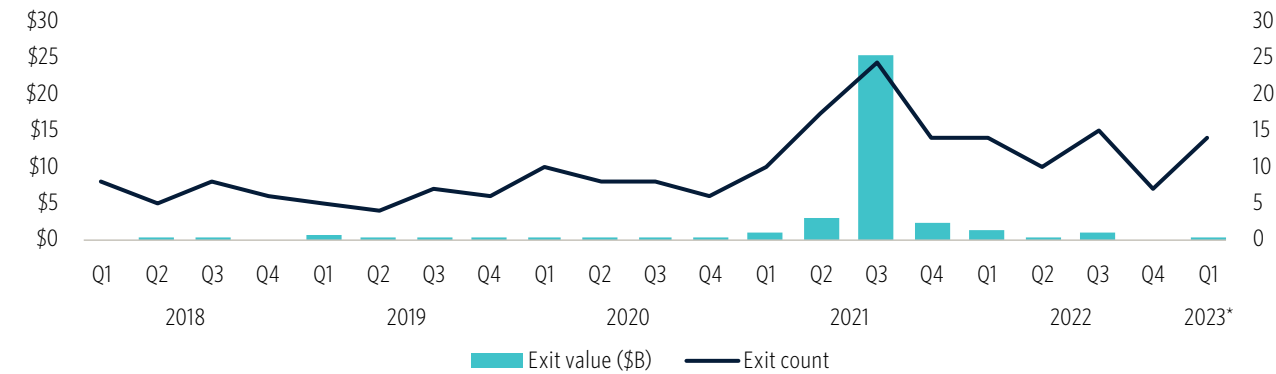


Source: PitchBook • Geography: Global • *As of March 31, 2023



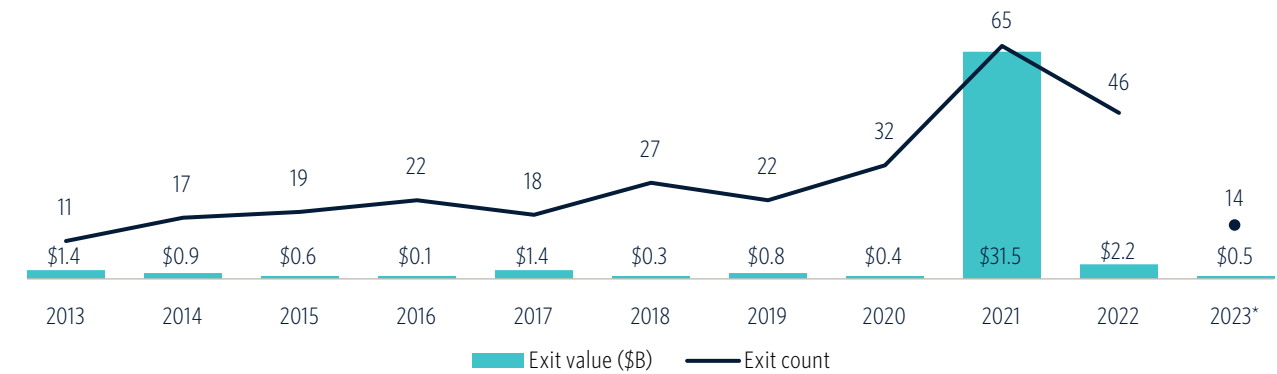
VC ACTIVITY

Agtech VC exit activity by quarter



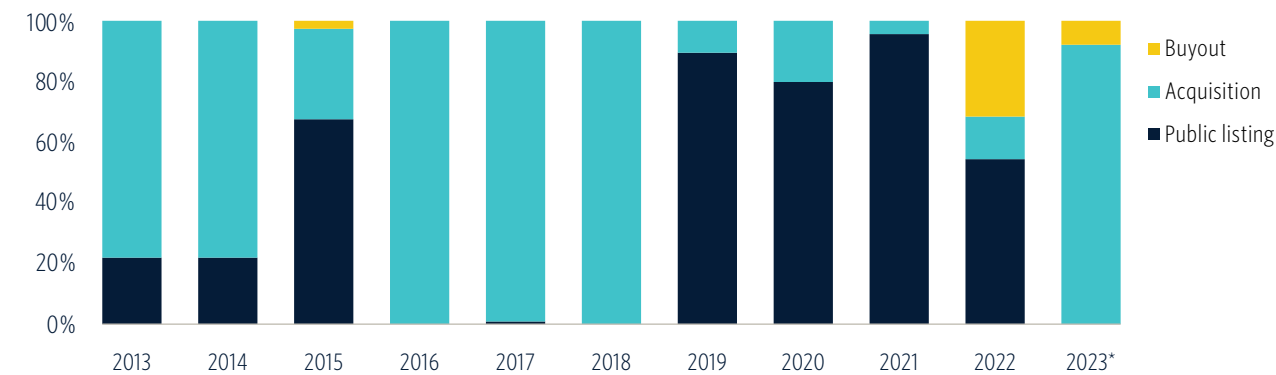
Source: PitchBook • Geography: Global • *As of March 31, 2023

Agtech VC exit activity



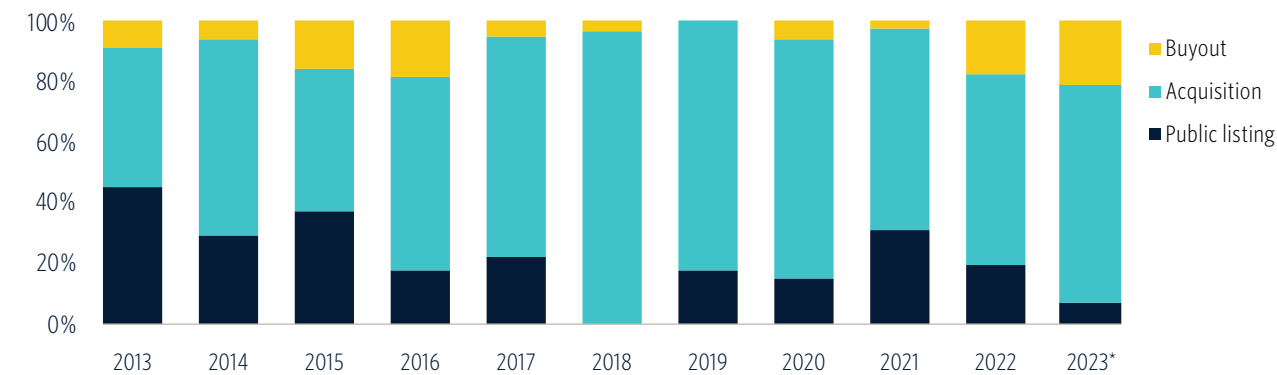
Source: PitchBook • Geography: Global • *As of March 31, 2023

Share of agtech VC exit value by type



Source: PitchBook • Geography: Global • *As of March 31, 2023

Agtech VC exit count by type

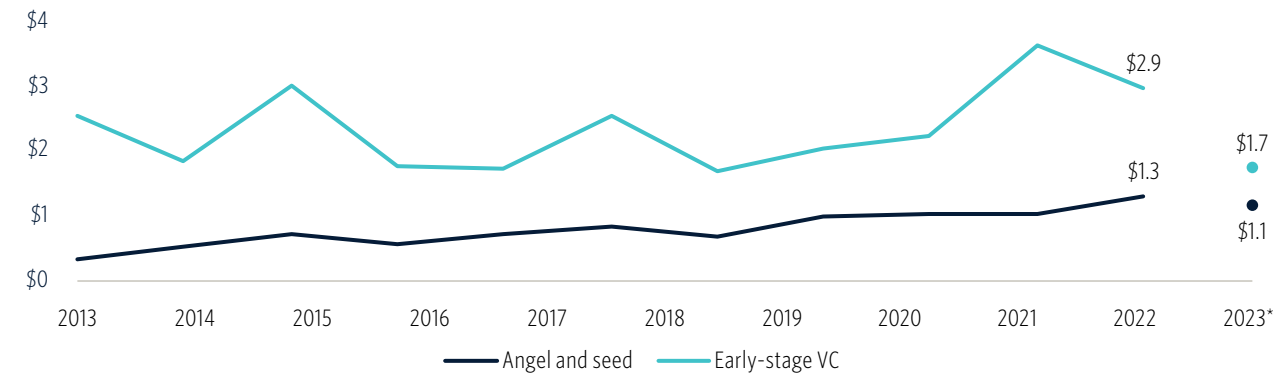


Source: PitchBook • Geography: Global • *As of March 31, 2023



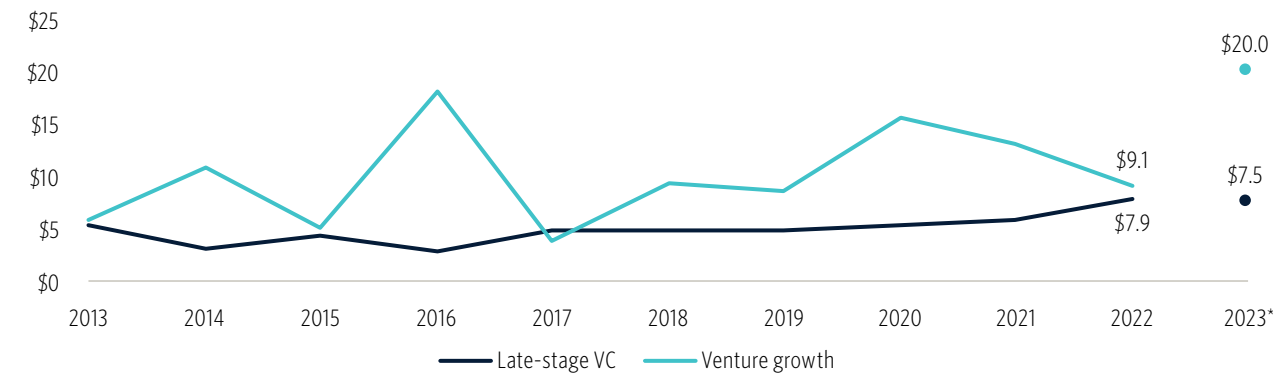
VC ACTIVITY

Median agtech angel and seed and early-stage VC deal values (\$M)



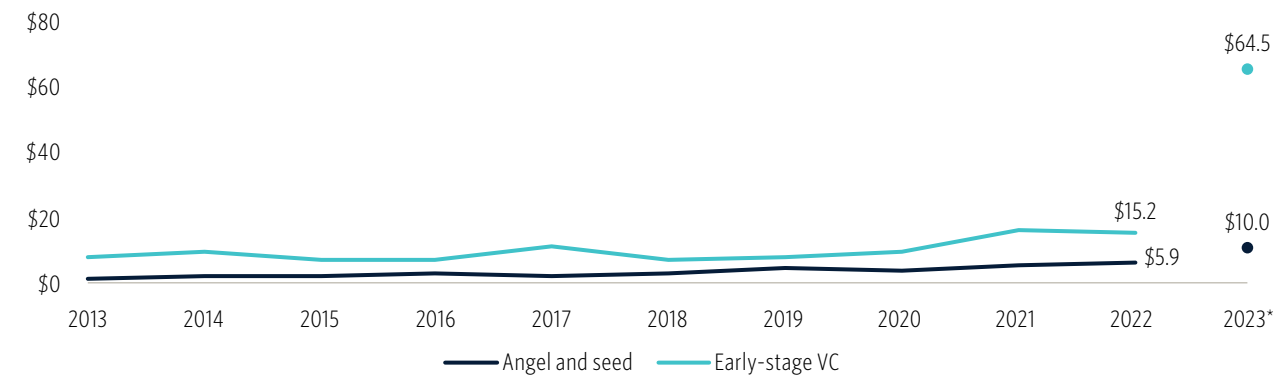
Source: PitchBook • Geography: Global • *As of March 31, 2023

Median agtech late-stage and venture growth VC deal values (\$M)



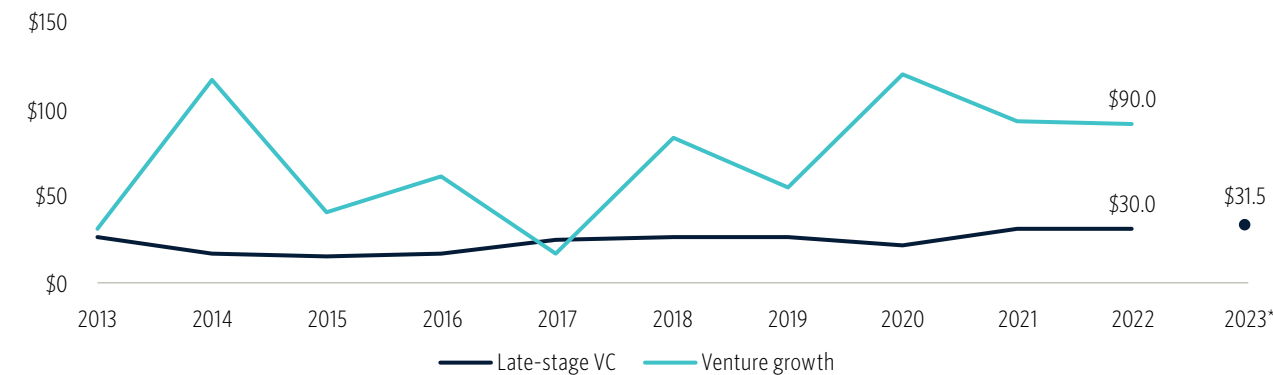
Source: PitchBook • Geography: Global • *As of March 31, 2023

Median agtech angel and seed and early-stage VC pre-money valuations (\$M)



Source: PitchBook • Geography: Global • *As of March 31, 2023

Median agtech late-stage and venture growth VC pre-money valuations (\$M)



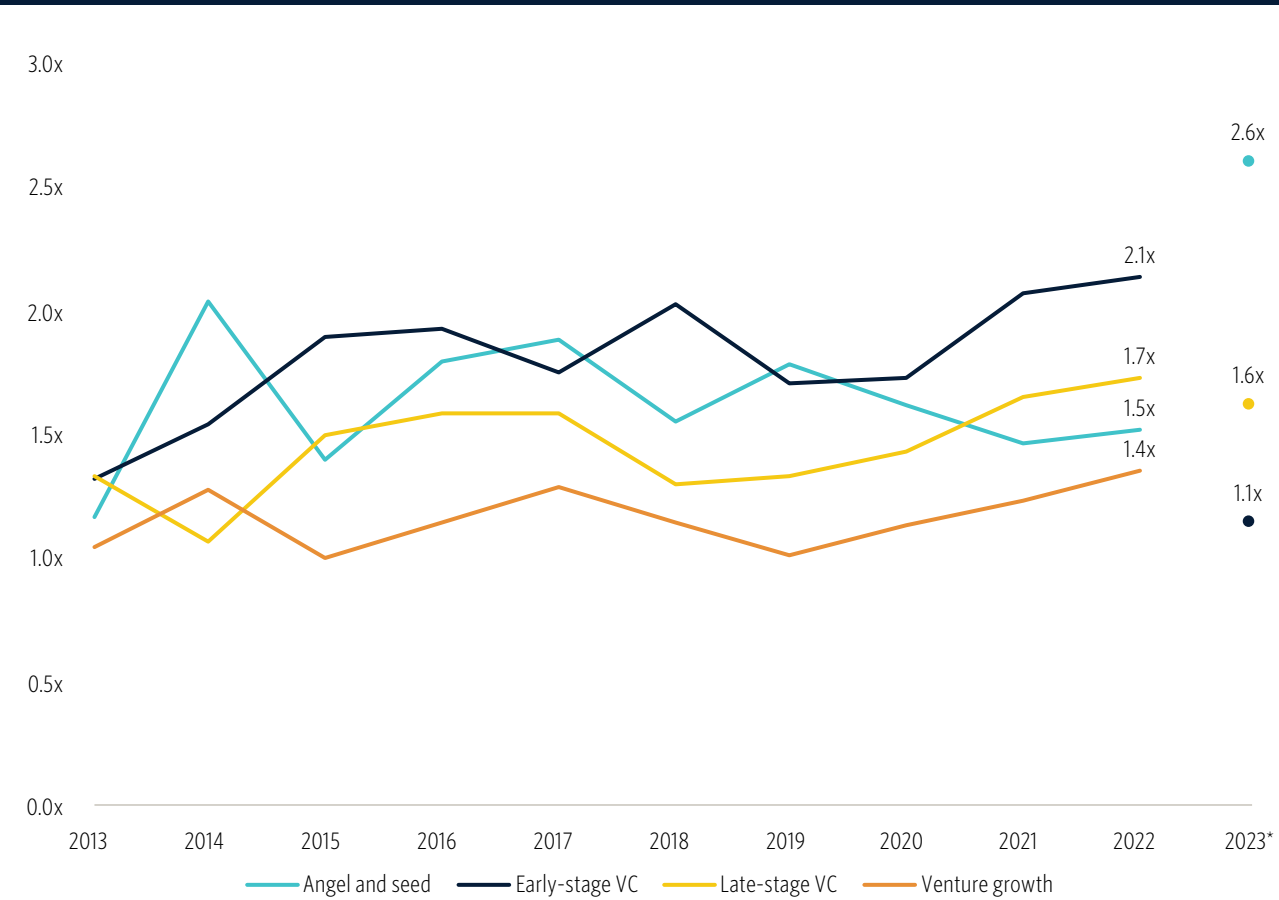
Source: PitchBook • Geography: Global • *As of March 31, 2023

Note: No venture growth deals recorded for 2023.



VC ACTIVITY

Median agtech VC pre-money valuation step-up by stage



Source: PitchBook • Geography: Global • *As of March 31, 2023
Note: No venture growth deals recorded for 2023.

Median agtech VC pre-money valuation step-up



Source: PitchBook • Geography: Global • *As of March 31, 2023



VC ACTIVITY

Key agtech angel and seed VC deals*

Company	Close date (2023)	Subsegment	Stage	Deal value (\$M)	Lead investor(s)	Valuation step-up
Rumin8	January 23	Animal biotech	Seed	\$16.3	AirTree Ventures, Blackbird Ventures, Breakthrough Energy Ventures	N/A
Planetarians	February 16	Upcycling & food recovery	Seed	\$15.5	Mindrock Capital	4.4x
IrriGreen	March 29	Robotics & smart field equipment	Seed	\$15.0	Ulu Ventures	N/A
BloomX	February 2	Pollination tech	Seed	\$8.0	Ahern Agribusiness	N/A
Robigo	February 10	Plant biotech	Seed	\$6.9	Congruent Ventures	N/A
Pigmentum	January 25	Plant data & analysis	Seed	\$6.0	Arkin Holdings, Kibbutz Yotvata	N/A
Wikifarmer	February 8	Agribusiness marketplaces	Seed	\$5.8	Point Nine Capital	N/A
Klimato	March 17	Agribusiness marketplaces	Seed	\$4.5	Global Cleantech Capital	N/A
Hyperplan	January 24	Drones & imagery analytics	Seed	\$4.4	Demeter Partners	N/A
BlueTrace	March 30	Farm management software	Seed	\$4.3	CEI Ventures, Maine Venture Fund, York IE	2.5x

Source: PitchBook • Geography: Global • *As of March 31, 2023



VC ACTIVITY

Key agtech early-stage VC deals*

Company	Close date (2023)	Subsegment	Stage	Deal value (\$M)	Lead investor(s)	Valuation step-up
Colossal Laboratories & Biosciences	January 31	Animal biotech	Series B	\$150.0	United States Innovative Technology Fund	5.3x
Source.ag	February 22	Indoor growers	Series A	\$23.0	Astanor Ventures	N/A
Living Carbon	January 17	Plant biotech	Series A	\$21.0	Temasek Holdings	1.1x
InnerPlant	March 24	Plant data & analysis	Series A	\$20.9	Deere	1.4x
Futura Gaia	February 10	Indoor farming components	Early-stage VC	\$11.9	N/A	N/A
EVAH	March 21	Animal biotech	Series B	\$6.2	N/A	N/A
Zhongxin Breeding	March 23	Animal biotech	Early-stage VC	\$5.8	N/A	0.8x
Semaai	February 28	Farm management software	Early-stage VC	\$2.9	Accion	N/A
Fred & Felia	March 21	Animal biotech	Early-stage VC	\$2.1	N/A	N/A
Birds Eye Robotics	March 13	Livestock & land animal technology	Early-stage VC	\$1.9	N/A	N/A

Source: PitchBook • Geography: Global • *As of March 31, 2023



VC ACTIVITY

Key agtech late-stage VC deals*

Company	Close date (2023)	Subsegment	Stage	Deal value (\$M)	Lead investor(s)	Valuation step-up
Asimov	January 5	Animal biotech	Series B	\$175.0	CPP Investments	9.6x
Halter	March 29	Livestock & land animal technology	Series C	\$85.0	Battery Ventures, Bessemer Venture Partners	N/A
Loam	February 13	Plant biotech	Series B	\$73.5	Lowercarbon Capital, Wollemi Capital	N/A
Capella Space	January 10	Drones & imagery analytics	Series C	\$60.0	US Innovative Technology Fund	1.2x
Degas	January 1	Finance & insurance	Late-stage VC	\$57.8	N/A	N/A
Evonetix	February 7	Plant data & analysis	Series B	\$55.3	Foresite Capital Management	1.6x
Lemnate AquaFarms	January 10	Aquaculture	Late-stage VC	\$50.7	N/A	N/A
Plus One Robotics	March 7	Robotics & smart field equipment	Series C	\$50.0	Scale Venture Partners	1.2x
Agreena	March 30	Agribusiness marketplaces	Series B	\$49.2	HV Capital	N/A
Shiyue Daotian	February 13	Plant biotech	Series C	\$42.2	N/A	1.6x

Source: PitchBook • Geography: Global • *As of March 31, 2023



VC ACTIVITY

Key agtech venture growth deals*

Company	Close date (2023)	Subsegment	Stage	Deal value (\$M)	Lead investor(s)
eFishery	March 6	Aquaculture	Late-stage VC	\$150.0	N/A
Airex Energy	March 9	Biomaterials	Late-stage VC	\$38.0	Cycle Capital Management
Metabolon	January 24	Plant biotech	Late-stage VC	\$35.0	N/A
Inscripta	January 18	Plant biotech	Late-stage VC	\$27.8	N/A
Hectare Agritech	March 1	Agribusiness marketplaces	Series A	\$20.0	N/A
UbiQD	January 13	Indoor farming components	Late-stage VC	\$5.9	N/A
Eiwa	March 6	Drones & imagery analytics	Series A	\$1.6	Serra Ventures
Ovagen	February 3	Biomaterials	Late-stage VC	\$1.2	Irrus Investments, WxNW
PittMoss	March 10	Agribusiness marketplaces	Late-stage VC	\$0.5	N/A
SupPlant	March 29	Field IoT	Series C	\$0.0	Red Dot Capital Partners

Source: PitchBook • Geography: Global • *As of March 31, 2023



VC ACTIVITY

Key agtech VC exits*

Company	Close date (2023)	Subsegment	Exit value (\$M)	Exit type	Acquirer(s)/index	Valuation step-up
Gaivota	February 24	Farm management software	\$235.0	Acquisition	Seedz Cayman	N/A
Augmenta	March 13	Robotics & smart field equipment	\$110.0	Acquisition	CNH Industrial	N/A
Agrivida	January 10	Plant biotech	\$69.5	Acquisition	Novus International, Presidio Ventures	N/A
Future Biogas	February 17	Biomaterials	\$34.2	Buyout	3i Infrastructure	N/A
M.I.T.R.A.	March 18	Robotics & smart field equipment	\$7.5	Acquisition	Mahindra & Mahindra	2.1x
Gramophone	January 24	Agribusiness marketplaces	\$1.1	Buyout	InfoEdge Ventures	N/A
FBSciences	January 30	Plant biotech	\$0.0	Acquisition	Valent Biosciences	N/A
Mingjia Environmental Technology	January 5	Livestock & land animal technology, robotics & smart field equipment	\$0.0	Public listing	N/A	N/A
Combyne	January 23	Agribusiness marketplaces	\$0.0	Acquisition	Bayer	N/A
Connecterra	January 1	Plant data & analysis, livestock & land animal technology	\$0.0	Buyout	Caisse de dépôt et placement du Québec, Columna Capital, Datamars	N/A

Source: PitchBook • Geography: Global • *As of March 31, 2023



VC ACTIVITY

Key agtech incumbents*

Company name	Category	Key products	EV/NTM Revenue	EV/NTM EBITDA
CNH Industrial	Robotics & smart field equipment	Tractors	1.8x	15.9x
Deere	Robotics & smart field equipment	Tractors, sprayers, planters	3.3x	14.8x
Archer Daniels Midland	Livestock & land animal tech	Feed, feed additives, premix, macroingredients	0.7x	11.3x
Zoetis	Animal biotech	Vaccines, parasite control products, antibiotics	10.1x	23.4x
AppHarvest	Indoor growers	Tomatoes, strawberries, and salad greens	14.5x	N/A
Hydrofarm	Indoor farming components	Nutrients, grow media, containers, lighting, atmospheric control	1.0x	10.1x
Benson Hill	Plant biotech	Phenotyping, predictive breeding, and environmental modeling	2.0x	N/A
GreenLight Biosciences	Plant biotech	dsRNA biopesticides	N/A	N/A
Corteva Agriscience	Plant biotech	Seeds & traits, crop protection, biologicals, digital tools	2.7x	15.6x
Nutrien	Plant biotech	Fertilizer, feed	1.6x	4.3x

Source: PitchBook • Geography: Global • *As of March 31, 2023



VC ACTIVITY

Top angel and seed VC-backed agtech companies by total VC raised to date*

Company name	Category	VC (\$M) raised to date	Post-money valuation (\$M)	Most recent VC deal type
Semios	Field IoT	\$180.5	\$789.6	Late-stage VC
Front Range Biosciences	Plant biotech	\$107.6	\$246.0	Series B2
Kula Bio	Plant biotech	\$71.2	\$210.0	Series A
Agroninja	Livestock & land animal technology	\$58.1	N/A	Seed
Planet Farms	Indoor farming components	\$56.4	N/A	Series A
Greeneye Technology	Robotics & smart field equipment	\$44.6	N/A	Late-stage VC
The trū Shrimp Companies	Aquaculture	\$33.3	N/A	Angel (individual)
SPREAD	Indoor growers	\$29.3	\$101.9	Series A
PredaSAR	Drones & imagery analytics	\$25.0	\$90.0	Seed
QualySense	Robotics & smart field equipment	\$24.7	\$18.2	Angel (individual)

Source: PitchBook • Geography: Global • *As of March 31, 2023



VC ACTIVITY

Top early-stage VC-backed agtech companies by total VC raised to date*

Company name	Category	VC (\$M) raised to date	Post-money valuation (\$M)	Most recent VC deal type
Plenty	Indoor growers	\$941.0	\$1,425.0	Series E
Plant-Ag	Ag retail & distribution, indoor growers	\$900.0	N/A	Early-stage VC
Misfits Market	Upcycling & food recovery	\$526.5	\$2,000.0	Series C1
Bowery	Indoor growers	\$516.6	N/A	Late-stage VC
InnovaFeed	Insect farming	\$479.3	N/A	Series D
Frubana	Agribusiness marketplaces	\$353.4	N/A	Series C
Zhongxin Breeding	Animal biotech	\$338.7	\$1,230.8	Early-stage VC
Colossal Laboratories & Biosciences	Animal biotech	\$230.0	\$1,450.0	Series B
Maihuolang Information Technology	Agribusiness marketplaces	\$150.0	N/A	Series A
Ljusgård	Indoor growers	\$149.7	\$109.9	Late-stage VC

Source: PitchBook • Geography: Global • *As of March 31, 2023



VC ACTIVITY

Top late-stage VC-backed agtech companies by total VC raised to date*

Company name	Category	VC (\$M) raised to date	Post-money valuation (\$M)	Most recent VC deal type
Solugen	Biomaterials	\$637.8	\$2,175.0	Series D
Pivot Bio	Plant biotech	\$616.7	\$1,700.0	Series D
Misfits Market	Upcycling & food recovery	\$526.5	\$2,000.0	Series C1
InnovaFeed	Insect farming	\$479.3	N/A	Series D
Little Leaf Farms	Indoor growers	\$410.0	N/A	Late-stage VC
Frubana	Agribusiness marketplaces	\$353.4	N/A	Series C
Pure Harvest Smart Farms	Indoor growers	\$334.3	N/A	Late-stage VC
Shiyue Daotian	Plant biotech	\$312.8	\$2,110.0	Series C
DNA Script	Plant biotech	\$294.0	\$659.7	Series C
Capella Space	Drones & imagery analytics	\$254.0	\$320.0	Series C

Source: PitchBook • Geography: Global • *As of March 31, 2023



VC ACTIVITY

Top venture growth VC-backed agtech companies by total VC raised to date*

Company name	Category	VC (\$M) raised to date	Post-money valuation (\$M)	Most recent VC deal type
Indigo Agriculture	Plant biotech, agribusiness marketplaces	\$1,701.6	\$3,950.0	Series H
Plenty	Indoor growers	\$941.0	\$1,425.0	Series E
Farmer's Business Network	Agribusiness marketplaces, finance & insurance, farm management software	\$919.3	\$3,800.0	Series G
Apeel Sciences	Shelf-life extension	\$665.0	\$2,450.0	Series E
Infarm	Indoor growers	\$632.4	\$1,200.1	Series D
Bowery	Indoor growers	\$516.6	N/A	Late-stage VC
Inscripta	Plant biotech	\$487.3	N/A	Late-stage VC
Soli Organic	Indoor growers	\$477.6	N/A	Series D
Inari	Plant biotech	\$476.0	\$1,500.0	Series E
Synthego	Plant biotech	\$459.5	\$1,200.0	Series E

Source: PitchBook • Geography: Global • *As of March 31, 2023



VC ACTIVITY

Most active investors in agtech accelerator deals in 2022*

Investor name	Deal count
SVG Ventures-THRIVE	30
EIT Food	29
Cultivator	22
Techstars	20
i.d.e.a. Fund	14
Google for Startups Accelerator	9
Katapult Group	7
GROW Accelerator	5
Tech Incubator Program for Startups	5
National Science Foundation	5

Source: PitchBook • Geography: Global • *As of March 31, 2023

Top VC investors in agtech companies in 2022*

Investor name	Deal count	Angel and seed	Early-stage VC	Late-stage VC	Venture-growth	Investor type
SOSV	29	17	7	5	0	VC
Yield Lab	19	8	2	7	2	VC
AgFunder	18	6	6	6	0	VC
S2G Ventures	15	1	2	9	3	VC
Omnivore Capital Management	14	6	2	6	0	VC
Cavallo Ventures	14	2	4	5	3	CVC
Conexus Venture Capital Fund	13	7	3	2	1	CVC
Ag Ventures Alliance	13	5	5	3	0	VC
Innova Memphis	13	2	5	5	1	VC
Climate Capital	9	4	3	1	1	VC

Source: PitchBook • Geography: Global • *As of March 31, 2023



VC ACTIVITY

Top PE investors in agtech companies since 2020*

Investor name	Deal count	Primary investor type
HarbourVest Partners	7	PE/buyout
Hellman & Friedman	5	PE/buyout
AlpInvest Partners	5	PE/buyout
Altas Partners	5	PE/buyout
L Capital	4	PE/buyout
The Carlyle Group	4	PE/buyout
APES Partners	4	PE/buyout
Banneker Partners	4	PE/buyout
EQT	4	PE/buyout
Capza	3	PE/buyout

Source: PitchBook • Geography: Global • *As of March 31, 2023

Top strategic acquirers of agtech companies since 2020*

Investor name	Deal count	Investor type
GrubMarket	4	VC-backed company
Hub International	4	VC-backed company
GrowGeneration	4	Corporation
Agromarket	2	Corporation
xFarm Technologies	2	Corporation
Syngenta	2	Corporation
High Street Insurance Partners	2	VC-backed company
Kubota	2	Corporation
Papé Machinery Agriculture & Turf	2	Corporation
Deere	2	Corporation

Source: PitchBook • Geography: Global • *As of March 31, 2023



Emerging opportunities

Ag finance and insurance

Startups leveraging technology and data to provide innovative financial solutions.

Land-based aquaculture

A new school of fish production takes hold.

Precision irrigation

H₂Owning the future.



Ag finance and insurance

Agriculture plays a vital role in the global economy and food security. However, traditional financial tools often fail to address the unique challenges faced by farmers, especially smallholders who lack access to credit, insurance, and financial management tools. Startups are disrupting the agricultural sector by introducing innovative financial solutions that leverage technology and data to better serve farmers.

Credit assessment and access to funding

[FarmDrive](#) and [Harvesting](#) are two startups that focus on providing smallholder farmers with access to credit. [FarmDrive](#), a VC-backed Kenyan startup, uses alternative data and machine learning algorithms to assess the creditworthiness of farmers. The platform connects them with financial institutions, allowing farmers to access affordable loans to improve their farming practices. [Harvesting](#), an Indian-based fintech startup, leverages artificial intelligence, satellite data, and remote sensing technologies to assess credit risk for smallholder farmers. The company raised a \$4.0 million seed round in August 2022. Their platform helps financial institutions extend credit and insurance products to underserved farmers, promoting financial inclusion.

Agricultural insurance

[Pula](#), an insurtech startup founded in Kenya, offers smallholder farmers agricultural insurance. The company most recently raised a \$6.0 million Series A in January 2021. Their approach uses satellite data, on-the-ground agronomic expertise, and mobile technology to create customized insurance products that protect farmers against weather-related risks and crop failures. By offering affordable insurance options, [Pula](#) helps farmers mitigate risks and invest in productivity-enhancing technologies and practices.

Supply chain financing

[ProducePay](#), [Agraloop](#), and [AgriChain](#) are three startups offering supply chain financing and payment solutions to farmers. [ProducePay](#) focuses on fresh produce farmers, providing short-term loans and a marketplace for direct sales to buyers. [Agraloop](#) connects farmers with buyers in the textile industry, utilizing agricultural waste from food crops for sustainable textiles while offering financing options. [AgriChain](#) targets small and medium-sized agricultural enterprises, offering a blockchain-based platform to streamline payment processes and improve transparency in the supply chain. These startups exemplify the growing trend of using technology to improve transparency and efficiency in agricultural supply chains.

Data-driven farm management

[FarmLogs](#), a US-based startup, offers a data-driven farm management platform that helps farmers make more informed decisions. The software provides real-time data on crop health, weather, soil conditions, and market trends. [FarmLogs](#) also integrates with financial tools to help farmers manage their budgets, forecast profits, and access loans.

Outlook

In the coming years, the outlook for startups disrupting traditional agricultural finance appears promising. As technology continues to advance and data becomes more accessible, these innovative solutions are likely to become more refined and widely adopted. The growing recognition of the importance of sustainable and efficient agricultural practices will further drive the demand for these services. Collaboration between key stakeholders—such as financial



AG FINANCE AND INSURANCE

institutions, governments, and agribusinesses—will be essential to create a supportive ecosystem for these startups. By addressing the financial challenges faced by farmers, these startups will not

only contribute to the transformation of the agricultural sector but also play a significant role in promoting global food security and economic stability.

Key ag finance and insurance VC-backed companies*

Company name	Category	VC (\$M) raised to date	Post-money valuation (\$M)	Most recent VC deal type
FarmLogs	Farm management software	\$37.0	\$106.0	Series C
FarmDrive	Finance & insurance	\$0.6	N/A	Late-stage VC
Harvesting	Finance & insurance	\$5.1	\$10.0	Series 1
Pula	Finance & insurance	\$9.0	\$32.0	Series A
ProducePay	Finance & insurance, agribusiness marketplaces	\$71.4	\$128.0	Series C2
Agraloop	Finance & insurance	N/A	N/A	Accelerator
AgriChain	Supply analytics	\$4.1	N/A	Late-stage VC
World Tree	Finance & insurance	\$0.2	N/A	Late-stage VC
Creditares	Finance & insurance	N/A	N/A	Early-stage VC
GrowAgric	Finance & insurance	\$0.1	N/A	Seed

Source: PitchBook • Geography: Global • *As of March 31, 2023



Land-based aquaculture

Land-based aquaculture refers to the farming of aquatic organisms, such as fish and shellfish, in controlled environments on land. The practice has gained traction in recent years due to its potential to address some of the most pressing challenges facing the aquaculture industry, like environmental degradation, overfishing, and disease control. Startups in this space are leveraging technology to develop innovative solutions that promote sustainable and efficient fish production, with a focus on recirculating aquaculture systems (RAS), automation, and data-driven decision-making.

Meeting market demand

The global aquaculture market is projected to reach \$495.1 billion by 2032, growing at a CAGR of 5.9% from 2022.³ With the rising global population and increasing awareness of the health benefits of fish consumption, demand for sustainably produced seafood is expected to grow. Land-based aquaculture offers an attractive solution to meet this demand, as it reduces the environmental impact of traditional fish farming methods and allows for greater control over production processes. Consequently, startups in this sector are well-positioned to capitalize on the expanding market opportunity.

Eco-friendly farming facilities

[Pure Salmon](#) and [Matorka](#) are two startup operators competing for market share. [Pure Salmon](#) is a global land-based salmon farming company utilizing RAS technology to produce sustainable, clean, and healthy fish. Founded in 2018, [Pure Salmon](#) aims to establish multiple facilities

worldwide, with a combined production capacity of 260,000 metric tons of salmon per year. Their facilities are designed to be eco-friendly, with minimal water usage and waste production. Similarly, [Matorka](#), an Icelandic startup, specializes in sustainable, land-based Arctic char farming using RAS technology. Their facility utilizes geothermal energy and 100% renewable resources, resulting in a minimal carbon footprint. [Matorka's](#) approach emphasizes the importance of environmentally friendly energy sources in land-based aquaculture, showcasing how technology can contribute to both energy efficiency and sustainable fish production.

Incumbent [Atlantic Sapphire](#) is a US-based provider pioneering large-scale land-based salmon farming using RAS technology. Their facility in Florida is set to become one of the world's largest land-based fish farms, producing up to 220,000 metric tons of salmon per year by 2031.⁴ [Atlantic Sapphire's](#) innovative approach minimizes the environmental footprint of salmon farming and reduces the risk of disease. [AquaBounty Technologies](#) is another public incumbent that has taken a more regional approach by building smaller facilities spread across Canada and the US. Their flagship product, genetically-engineered salmon, grows at a faster rate than conventional farmed salmon, enabling more efficient and sustainable fish production.

Technology-driven farming solutions

[BioFishency](#) and [eFishery](#) are two startups developing technology solutions to support aquaculture operations. [BioFishency](#), an Israeli startup, develops advanced water treatment systems for land-based aquaculture facilities. Their plug-and-play systems increase water reuse efficiency, reduce

3: "Aquaculture Market Size to Reach USD 495.10 Billion by 2032 - Rise in Consumption of Seafood to Propel Growth: The Brainy Insights," [GlobeNewswire, The Brainy Insights, April 18, 2023](#).

4: "Despite Setbacks, Atlantic Sapphire Still Has Big Ambitions," [Seafood Source, Chris Chase, January 27, 2022](#).



LAND-BASED AQUACULTURE

energy consumption, and improve fish growth rates, enabling more sustainable and cost-effective fish farming. [eFishery](#), an Indonesian startup, offers an Internet of Things (IoT)-based smart feeding system for land-based fish and shrimp farms. Their technology enables farmers to monitor and control feeding remotely, reducing waste and improving production efficiency.

Outlook

The outlook for startups disrupting land-based aquaculture is positive, as the industry continues to grow in response to the increasing global demand for sustainable seafood. Advancements in

technology, such as RAS, automation, and data analytics, are expected to drive further innovation in the sector, making land-based aquaculture more efficient and environmentally friendly.

Collaboration between startups, traditional aquaculture companies, and governments will be crucial in creating a supportive ecosystem that fosters the development and adoption of new technologies. As these startups continue to scale and refine their solutions, they have the potential to transform the aquaculture industry, contributing to global food security and environmental sustainability.



LAND-BASED AQUACULTURE

Key land-based aquaculture VC-backed companies*

Company name	Category	VC (\$M) raised to date	Post-money valuation (\$M)	Most recent VC deal type
BioFishency	Aquaculture	\$3.5	N/A	Series A
eFishery	Aquaculture	\$343.9	N/A	Late-stage VC
Matorka	Aquaculture	\$18.6	\$43.9	Late-stage VC
Northline Seafoods	Aquaculture	\$71.6	N/A	Late-stage VC
Lemnature AquaFarms	Aquaculture	\$74.7	N/A	Late-stage VC
Sofar Ocean	Aquaculture	\$46.8	\$149.3	Series B1
Aquabyte	Aquaculture, field IoT	\$44.5	\$146.0	Series B
Ava Ocean	Aquaculture	\$43.3	N/A	Late-stage VC
AlgaeCytes	Aquaculture	\$35.8	\$40.5	Late-stage VC
Atarraya	Aquaculture	\$3.9	\$41.0	Series A2

Source: PitchBook • Geography: Global • *As of March 31, 2023



Precision irrigation

Precision irrigation involves the targeted application of water and nutrients to crops based on their specific needs, ensuring optimal growth while minimizing waste. This approach not only helps conserve valuable water resources but also leads to higher crop yields and improved profitability for farmers. A growing number of startups are developing innovative technologies in this space, leveraging data-driven insights, IoT devices, and advanced analytics to create more efficient and sustainable irrigation systems.

Key startups developing precision irrigation solutions

[CropX Technologies](#) is a leading player in the precision irrigation market, offering an adaptive irrigation system that combines advanced soil sensors with cloud-based analytics. The system collects real-time soil data, enabling farmers to determine the optimal irrigation schedule and amount for each crop. This data-driven approach saves water, reduces energy consumption, and increases crop yield. [CropX](#) also provides a user-friendly mobile app, allowing farmers to access real-time data and make informed decisions about their irrigation practices.

[Hortau](#) is a startup focused on providing real-time soil tension monitoring and irrigation management solutions. Their platform uses proprietary sensors and wireless technology to measure soil tension—a key indicator of plant stress and water needs. [Hortau's](#) system enables farmers to make informed decisions about when and how much to irrigate, reducing water waste and promoting healthier crops.

[Arable Labs](#) is a startup that combines advanced sensor technology with AI-driven analytics to provide farmers with actionable insights for precision irrigation. Their Arable Mark device measures various environmental factors, such as rainfall, temperature, and humidity, to create a comprehensive picture of crop water requirements. By integrating this data with predictive models, [Arable Labs'](#) platform helps farmers optimize their irrigation strategies and improve overall water management.

Advancing the industry

Startups developing precision irrigation solutions have the potential to transform the agriculture industry in several ways:

- **Enhanced water efficiency:** Precision irrigation techniques ensure that water is used more effectively, reducing waste and conserving valuable resources.
- **Increased crop yields:** By providing crops with the optimal amount of water and nutrients, precision irrigation methods can lead to improved crop health and higher yields.
- **Cost savings:** Implementing precision irrigation solutions can help farmers reduce water and energy usage, lowering operational expenses and increasing profitability.
- **Environmental sustainability:** Data-driven irrigation practices contribute to the sustainable management of water resources and reduce the environmental impact of agriculture.

Outlook

The future of irrigation is promising, with disruptive startups continuing to develop and refine innovative solutions that address the challenges faced by farmers and the environment. As these technologies become more accessible and cost-effective, we can expect to see a broader adoption across the global agriculture sector. This widespread implementation will not only enhance water efficiency and crop yields but also contribute to the overall sustainability of food systems. Furthermore, these advancements will likely spur increased collaboration between the agriculture and technology sectors, fostering new innovations and a more resilient, efficient, and sustainable future for agriculture.



PRECISION IRRIGATION

Key precision irrigation VC-backed companies*

Company name	Category	VC raised to date (\$M)	Post-money valuation (\$M)	Most recent VC deal type
Arable	Field IoT	\$73.2	\$125.0	Series C
SupPlant	Field IoT	\$25.0	N/A	Series C
CropX	Plant biotech	\$28.5	N/A	Series C
Hortau	Field IoT	\$43.5	N/A	Late-stage VC
N-Drip	Field IoT	\$30.0	N/A	Series B
HydroPoint	Field IoT	\$104.1	\$110.0	Series C
Ketos	Robotics & smart field equipment	\$38.0	\$54.3	Series B
IrriGreen	Robotics & smart field equipment	\$20.8	N/A	Seed
Waterbit	Field IoT	\$17.2	\$37.5	Series A2
GroGuru	Field IoT	\$8.8	N/A	Late-stage VC

Source: PitchBook • Geography: Global • *As of March 31, 2023



Select company highlights



SELECT COMPANY HIGHLIGHTS: NILEWORKS

Nileworks

Founded
2015

32+ employees
in Tokyo, Japan

Total VC raised:
\$34.5M over five deals

First institutional round:
\$2.6M in a seed round
(December 2016)

Last disclosed financing:
Raised \$11.5M of
late-stage VC funding

Overview

[Nileworks](#) is a pioneering agtech company that excels in creating advanced drone technology solutions for precision agriculture. With a primary mission to enhance agricultural productivity, reduce operational costs, and encourage sustainable practices, the company equips farmers and agribusinesses with state-of-the-art tools for efficient crop management. Key capabilities include spraying and field surveying.

Operating under a B2B model, [Nileworks](#) caters to a variety of stakeholders in the agricultural value chain. Its revenue streams encompass hardware sales from custom agricultural drones, software sales of proprietary solutions for analyzing drone data, subscription-based services for ongoing support and updates, and training and consulting services aimed at helping clients maximize the benefits of the company’s technology solutions.

Competitors

The competitive landscape of agricultural drones is marked by an intense rivalry among companies vying for market share. This rapidly growing industry segment includes major global corporations, agtech startups, and traditional agricultural service providers. These players are continuously striving to develop innovative drone solutions, pushing the boundaries of technology to offer more efficient and cost-effective tools for precision agriculture, crop surveying, and chemical applications.

Global players such as [DJI](#), [Parrot](#), and [Yamaha](#) dominate the market with their extensive portfolios of drone products and services, leveraging their established reputations and resources to capture a significant share of the agricultural sector. Meanwhile, agtech startups like [PrecisionHawk](#), [Pollen Systems](#), and [Eames Robotics](#) focus on niche areas within the agricultural drone market, differentiating themselves by utilizing cutting-edge technologies to cater to specific needs. Traditional agricultural service providers also contribute to the competitive landscape by offering more conventional solutions, such as aerial spraying services using piloted aircraft. In this dynamic environment, companies must invest in research & development (R&D), forge strategic partnerships, and expand their global reach to maintain a competitive edge and capitalize on emerging market opportunities.



SELECT COMPANY HIGHLIGHTS: NILEWORKS

Financing history

Seed round	Early-stage VC	Early-stage VC	Late-stage VC	Late-stage VC
December 30, 2016	October 31, 2017	February 28, 2019	December 11, 2020	January 14, 2021
Total raised: \$2.6M	Total raised: \$7.1M	Total raised: \$14.3M	Total raised: \$11.5M	Total raised: N/A
Pre-money valuation: \$21.9M	Pre-money valuation: \$50.4M	Pre-money valuation: N/A	Pre-money valuation: N/A	Pre-money valuation: N/A
Investors: N/A	Investors: Innovation Network Corporation of Japan (Mikihide Katsumata), Kumiai Chemical Industry, Sumitomo Chemical Company (Masakazu Tokura), Sumitomo Corporation (Kuniharu Nakamura), The Norinchukin Bank (Yoshio Kono), Zen-Noh	Investors: Drone Fund, Innovation Network Corporation of Japan, Kumiai Chemical Industry, SPARX Group Company, Sumitomo Chemical Company, Sumitomo Corporation	Investors: N/A	Investors: Daihatsu Motor, Mirai Creation Capital, Sumitomo Corporation, Sumitomo Mitsui Finance & Leasing



SELECT COMPANY HIGHLIGHTS: AGREENA

Agreena

Founded
2016

158+ employees
in Copenhagen, Denmark

Total VC raised:
\$77.1M over four deals

First institutional round:
\$0.5M in a seed round
(April 2018)

Last financing:
Raised \$49.2M in a
Series B funding

Lead investor:
HV Capital

Overview

[Agreena](#) is a cutting-edge remote sensing software platform that harnesses ground-truth data, satellites, AI, and deeptech to identify and monitor regenerative farming practices. The company’s versatile software is designed for carbon market providers, agri-food corporations, and other agricultural stakeholders interested in tracking carbon-intensive farming practices while exploring sustainable alternatives.

Operating under a B2B model, [Agreena](#) caters to a diverse range of stakeholders within the agricultural value chain. The company generates revenue primarily through subscription-based services, offering plans for its regenerative agriculture monitoring, reporting, and verification software. This software delivers data-driven insights to enable stakeholders to monitor farming practices and assist farmers in making informed decisions related to crop management, irrigation, fertilization, and pest control. Additionally, [Agreena](#) collaborates with research institutions,

governments, and non-governmental organizations on various projects focused on enhancing global food security and promoting sustainable agricultural practices.

Leadership

[Agreena](#) is steered by a team of seasoned professionals with varied expertise in agriculture, technology, and business. The key members of the leadership team include the following: Co-founder and CEO Simon Haldrup has 15 years of experience in the banking industry, specializing in business innovation, digitization, and regulatory implementation; Julie Koch Fahler, Co-founder and Director of Operations, possesses four years of experience in adtech sales and a year of e-commerce consulting, contributing valuable insights to the company; and Ida Boesen, Co-founder and Director of Strategy, boasts four years of marketing and commodity trading experience, having worked with various food and agricultural businesses, which enriches her strategic approach within [Agreena](#).



SELECT COMPANY HIGHLIGHTS: AGREENA

Competitors

The agtech market is intensely competitive, with numerous companies including large multinational corporations like [John Deere](#), [Bayer CropScience](#), and [Syngenta](#); smaller startups such as [Granular](#), [Taranis](#), and [CropX](#); and traditional agricultural service providers offering similar products and services. To maintain a competitive edge in this rapidly evolving industry, [Agreena](#) must continually invest in R&D, establish strategic partnerships, and broaden its global presence to position itself as a leading player in the agtech sector.

Financing history

Seed round	Seed round	Late-stage VC	Late-stage VC
April 30, 2018	October 14, 2021	January 31, 2022	March 30, 2023
Total raised: \$0.5M	Total raised: \$4.7M	Total raised: \$22.7M	Total raised: \$49.2M
Pre-money valuation: \$1.9M	Pre-money valuation: \$26.8M	Pre-money valuation: N/A	Pre-money valuation: N/A
Investors: N/A	Investors: Danish Green Investment Fund, Giant Ventures (Cameron McLain), Vækstfonden	Investors: Giant Ventures (Cameron McLain), Gullspang Re:food, Kinnevik (Magnus Jakobson), The Growth Fund, Vækstfonden (Eric-Alan Rapp), VF Venture (Eric-Alan Rapp)	Investors: AENU, Anthemis, Denmark’s Export and Investment Fund, Gullspang Re:food, HV Capital, Kinnevik



About PitchBook Emerging Tech Research

Independent, objective and timely market intel

As the private markets continue to grow in complexity and competition, it's essential for investors to understand the industries, sectors and companies driving the asset class.

Our Emerging Tech Research provides detailed analysis of nascent tech sectors so you can better navigate the changing markets you operate in—and pursue new opportunities with confidence.

©2023 by PitchBook Data, Inc. All rights reserved. No part of this publication may be reproduced in any form or by any means—graphic, electronic, or mechanical, including photocopying, recording, taping, and information storage and retrieval systems—without the express written permission of PitchBook Data, Inc. Contents are based on information from sources believed to be reliable, but accuracy and completeness cannot be guaranteed. Nothing herein should be construed as any past, current or future recommendation to buy or sell any security or an offer to sell, or a solicitation of an offer to buy any security. This material does not purport to contain all of the information that a prospective investor may wish to consider and is not to be relied upon as such or used in substitution for the exercise of independent judgment.

PitchBook Data, Inc.

John Gabbert Founder, CEO

Nizar Tarhuni Vice President, Institutional Research and Editorial

Paul Condra Head of Emerging Technology Research

Additional research

Eric Bellomo
eric.bellomo@pitchbook.com
Gaming
E-Commerce

Brendan Burke
brendan.burke@pitchbook.com
Internet of Things
Information Security
Artificial Intelligence & Machine Learning

Aaron DeGagne
aaron.degagne@pitchbook.com
Medtech
Digital Health

Alex Frederick
alex.frederick@pitchbook.com
Agtech
Foodtech

Jonathan Geurkink
jonathan.geurkink@pitchbook.com
Supply Chain Tech
Mobility Tech

Derek Hernandez
derek.hernandez@pitchbook.com
SaaS

Ali Javaheri
ali.javaheri@pitchbook.com
Emerging Spaces

Robert Le
robert.le@pitchbook.com
Web3/DeFi
Insurtech
Crypto

John MacDonagh
john.macdonagh@pitchbook.com
Carbon & Emissions Tech
Clean Energy Tech

Rebecca Springer
rebecca.springer@pitchbook.com
Healthcare Services
Healthcare IT

Rudy Yang
rudy.yang@pitchbook.com
Fintech

Coming soon
Biotech
Pharmatech