



 EMERGING TECH RESEARCH

Agtech Report

VC trends and emerging opportunities

Q2
2022





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Institutional Research Group

Analysis



Alex Frederick Senior Analyst, Emerging Technology
alex.frederick@pitchbook.com
pbinstitutionalresearch@pitchbook.com

Data

Alyssa Williams Data Analyst

Matthew Nacionales Data Analyst

Publishing

Report designed by **Jenna O'Malley** and **Julia Midkiff**

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This report serves as a quarterly snapshot of the agtech vertical in Q2 2022. For a comprehensive, detailed analysis of the agtech industry by segment, please see our latest agtech [annual report](#).



Vertical overview

The agricultural technology (agtech) vertical consists of technologies that increase crop yield, improve farming efficiency and resilience, and provide financial resources for agricultural (ag) operations. Agricultural technologies include software, biotech inputs, and hardware, such as wearable sensors and large machinery. Key themes driving investment in agtech companies include food security, data-driven productivity gains, and environmentally friendly agricultural practices.

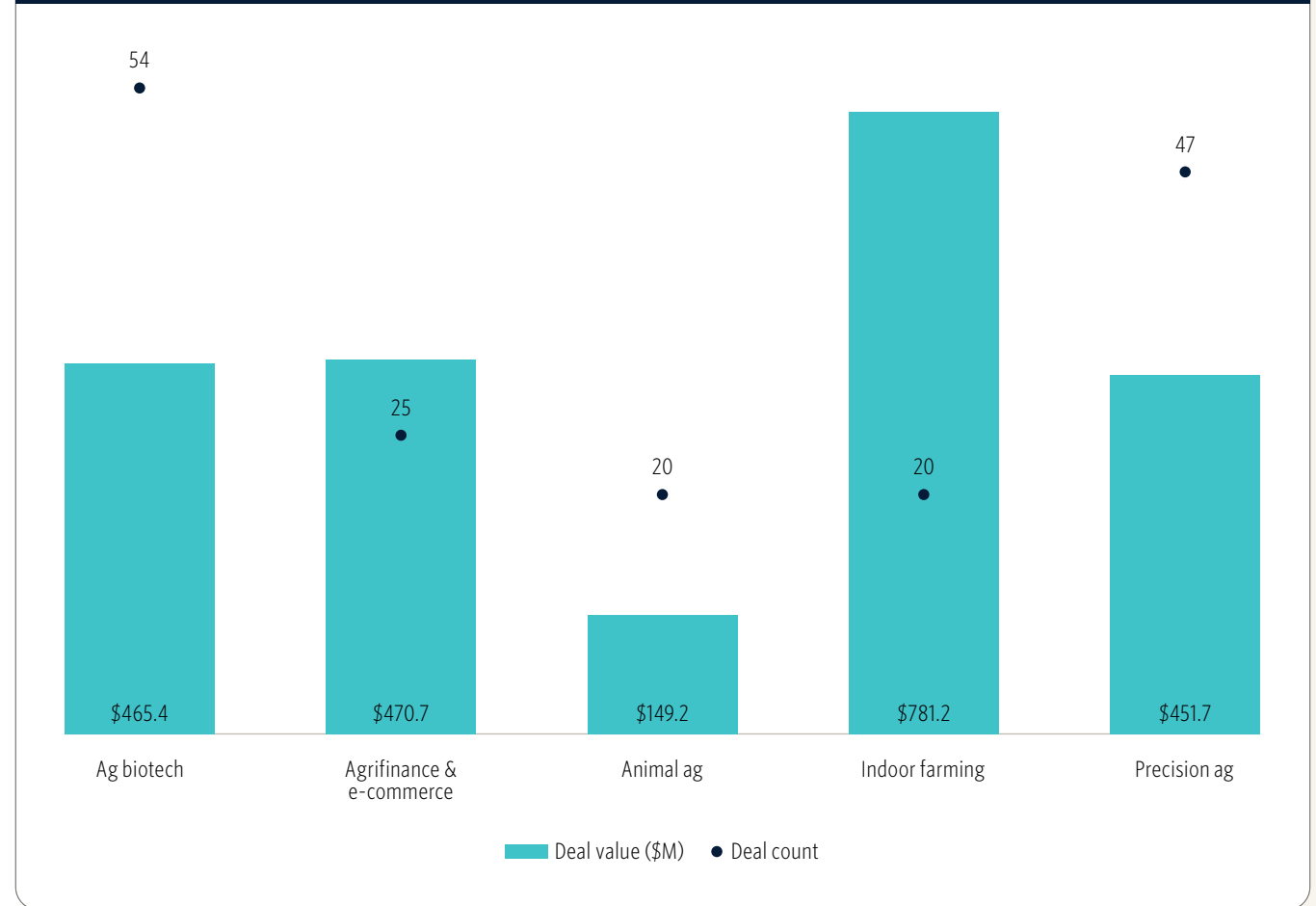
Regenerative agriculture practices—a set of sustainable farming practices that seek to restore farmland, conserve natural resources, and mitigate climate change—are gaining traction with governments and global food companies alike, spurring investment in technologies that enable adopting these practices.

[Kellogg's](#) recently earmarked \$2.0 million to incentivize rice farmers to adopt regenerative agriculture practices through its InGrained program.¹ [General Mills](#) has undertaken steps to nudge farmers toward regenerative farming, most recently including \$3.0 million to Eco-Harvest, an ag carbon credit program, and \$2.3 million into ALUS, a Canadian ag nonprofit focused on building climate resilience and improving biodiversity.² Other major food companies pursuing regenerative ag practices include [Cargill](#), [Danone](#), [Diageo](#), and [PepsiCo](#).

1: "Kellogg Company Announces \$2 million, Five-Year Program to Reward Farmers' Efforts to Reduce Greenhouse Gas Emissions," Kellogg's, February 15, 2022.

2: "General Mills Invests \$3 Million to Scale Eco-Harvest by Ecosystem Services Market Consortium," General Mills, June 7, 2022.

Agtech VC deal activity by segment in Q2 2022*



Source: PitchBook | Geography: Global | *As of June 30, 2022



VERTICAL OVERVIEW

The recently passed Inflation Reduction Act (IRA) in the US committed \$20.0 billion toward regenerative and sustainable initiatives. Funding includes \$8.5 billion to restore ecosystems and reduce ag-related greenhouse gas (GHG) emissions through practices like cover cropping, improving soil health, and reduced tilling; agtech startups that could benefit include [Loam Bio](#), [CoverCress](#), and [Regrow](#). Other callouts include \$5.0 billion for regional conservation partnerships with organizations such as environmental advisories and \$3.0 billion for the USDA Conservation Stewardship Program, which funds conservation-related projects such as the adoption of low-till/no-till, crop rotation, or soil health improvement initiatives.³

³: "Inflation Reduction Act of 2022: A Deep Dive on an Historic Investment in Climate and Conservation Agriculture," National Sustainable Agriculture Coalition, August 19, 2022.

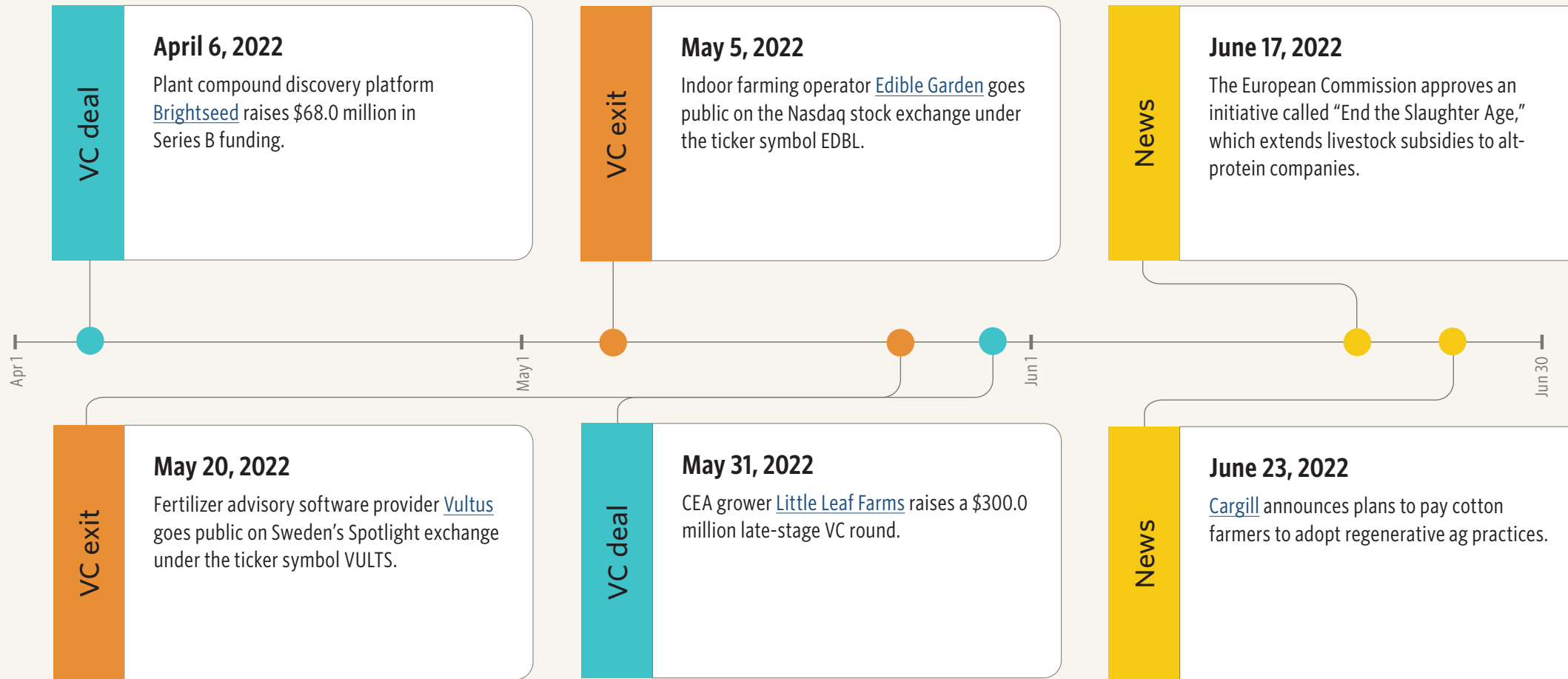
Trailing 12-month (TTM) agtech VC deal activity by segment*



Source: PitchBook | Geography: Global | *As of June 30, 2022



Q2 2022 timeline



Q2 VC activity

- 204** total deals
- 19.0%** QoQ growth
- \$2.5B** total VC raised
- 23.2%** YTD growth

TTM summary (Q3 2021 - Q2 2022)

- 916** total deals
- 12.3%** YoY growth
- \$11.8B** total VC raised
- 34.7%** YoY growth



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.

Ag biotech

Plant data & analysis



Animal biotech



Plant biotech



Biomaterials



Indoor farming

Components



Systems



Growers



Agrifinance and e-commerce

Agribusiness marketplaces



Finance & insurance





Agtech VC ecosystem market map

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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.

Animal ag

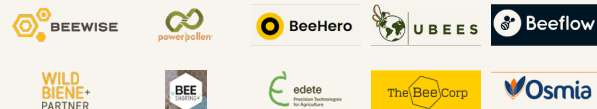
Aquaculture



Livestock & land animal tech



Pollination tech

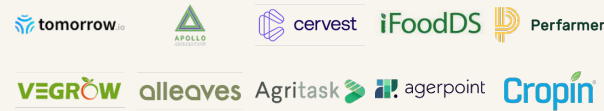


Insect farming



Precision ag

Farm management software



Robotics & smart field equipment



Field IoT



Drones & imagery analytics





Agtech landscape

- 1** Ag biotech
- 2** Agrifinance and e-commerce
- 3** Indoor farming
- 4** Animal ag
- 5** Precision ag





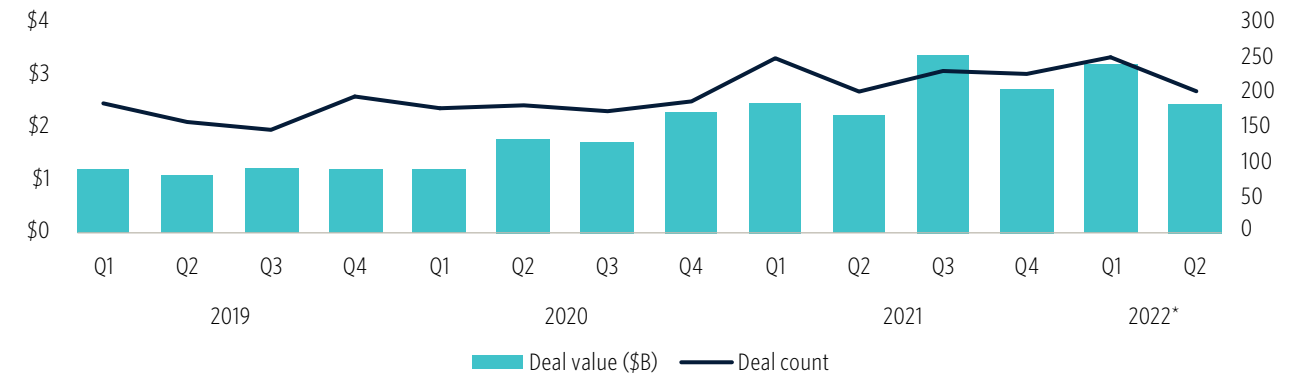
VC activity

Venture Capital (VC) investment into the agtech vertical dipped slightly from its elevated perch in Q2 2022. Agtech startups raised \$2.5 billion in VC funding across 204 deals, with deal values down 23.2% quarter-over-quarter. We expect this gap to narrow slightly over time as delayed deal reporting can raise funding levels by as much as 20%. Indoor farming and ag biotech companies dominated investor attention in Q2. Ag biotech startups received 26.5% of deal activity by count, and indoor farming startups received 31.6% of aggregate deal values. The top two largest deals of the quarter were both indoor farm operators. In late-stage VC, [Little Leaf Farms](#) raised \$300.0 million, while [Pure Harvest Smart Farms](#) raised \$180.5 million. Valuations for both companies were notably undisclosed.

Valuations for agtech startups have continued to climb at the early and angel & seed stages; however, late-stage valuations have dropped sharply. Median late-stage VC pre-money valuations are \$31.4 million in 2022, down 37.1% YoY. Market volatility has narrowed the IPO window for many companies, limited exit opportunities, and put downward pressure on valuations. Some late-stage investors have moved upstream to invest in early-stage deals to bide time until public markets stabilize. Conversely, some early-stage investors have pivoted to focus on the late stage to mitigate risk by investing in more mature businesses.

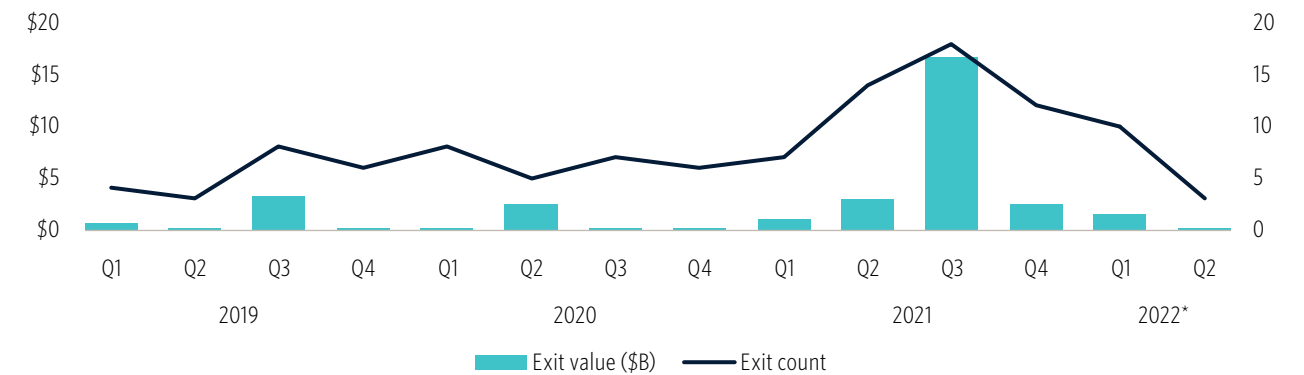
Median deal size patterns mirror valuations data, with a continued rise at early and angel & seed stages and a decline at the late stage. Increased deal sizes at the early stage were buffered by participation from late-stage investors, propelling the median deal size to \$4.1 million, up 17.9% YoY. Juxtaposing elevated early-stage deal sizes against a drop in deal count reveals that investors are mitigating risk by concentrating deal activity on fewer yet larger deals.

Agtech VC deal activity by quarter



Source: PitchBook | Geography: Global | *As of June 30, 2022

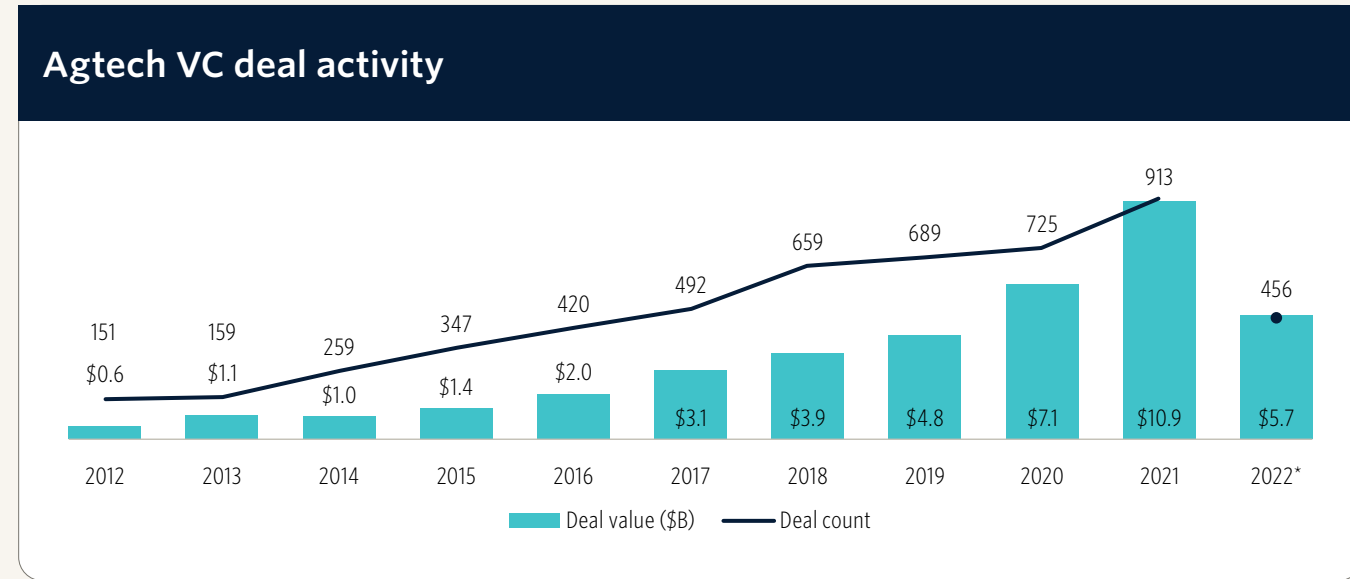
Agtech VC exit activity by quarter



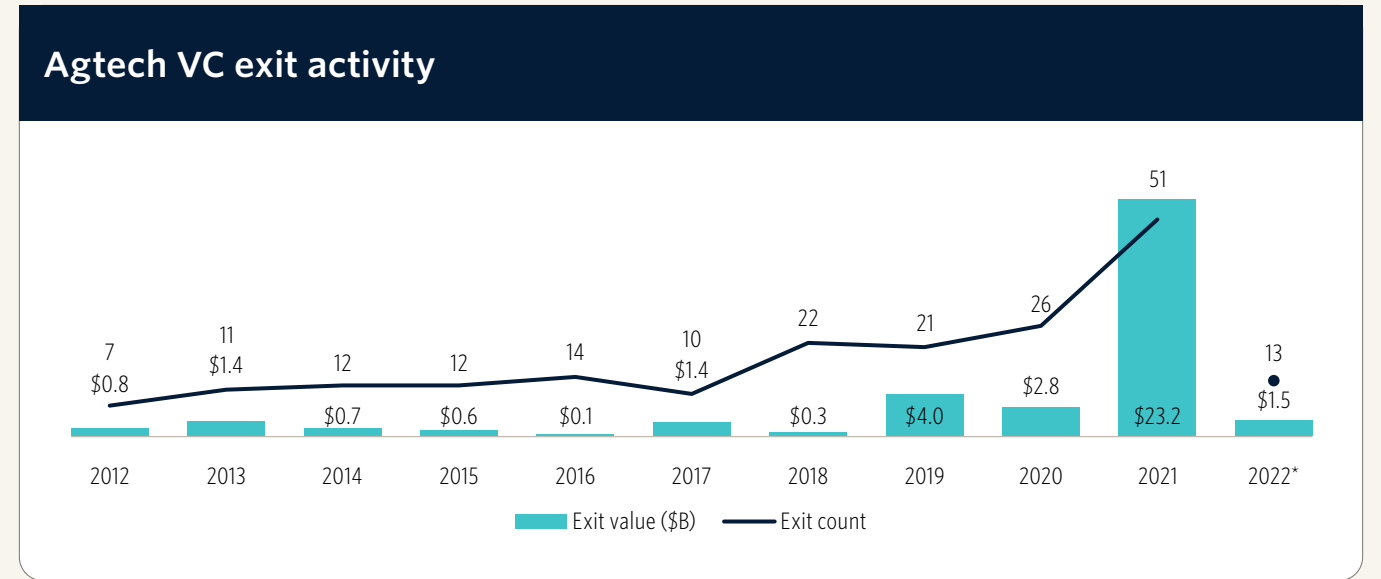
Source: PitchBook | Geography: Global | *As of June 30, 2022



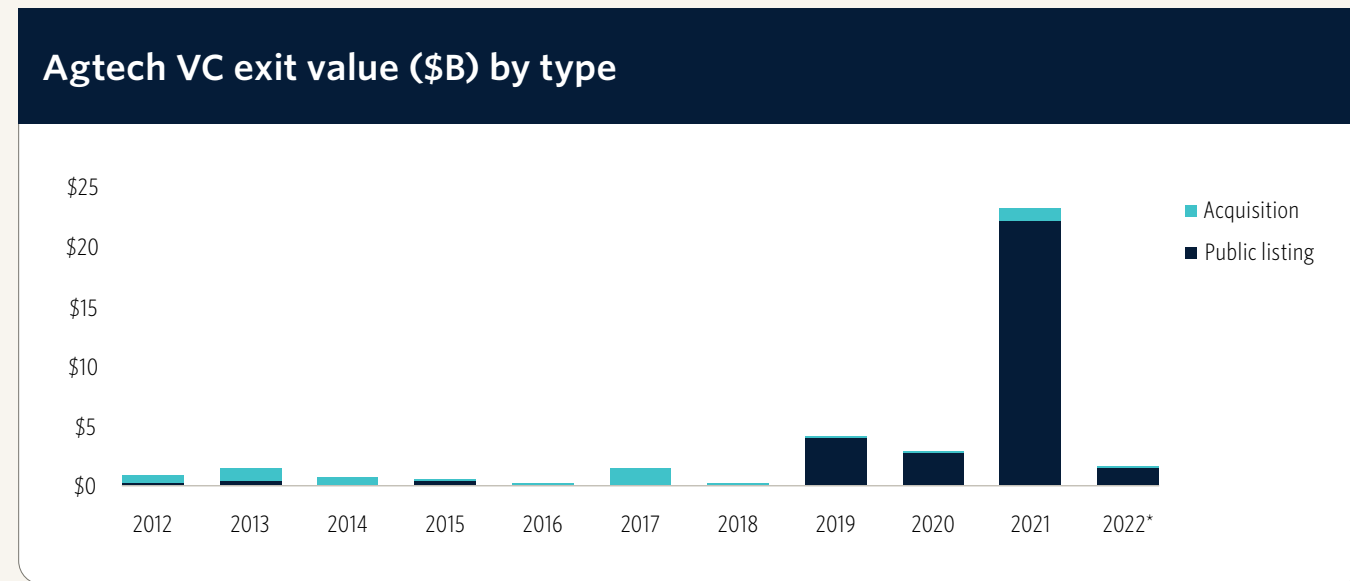
VC ACTIVITY



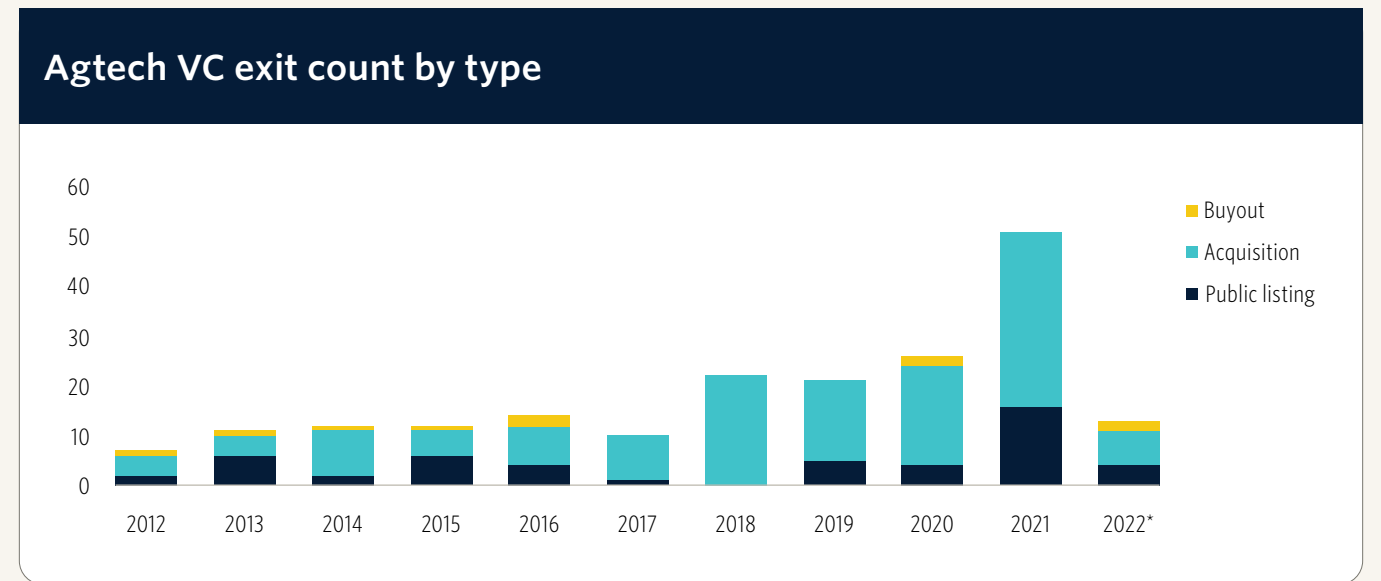
Source: PitchBook | Geography: Global | *As of June 30, 2022



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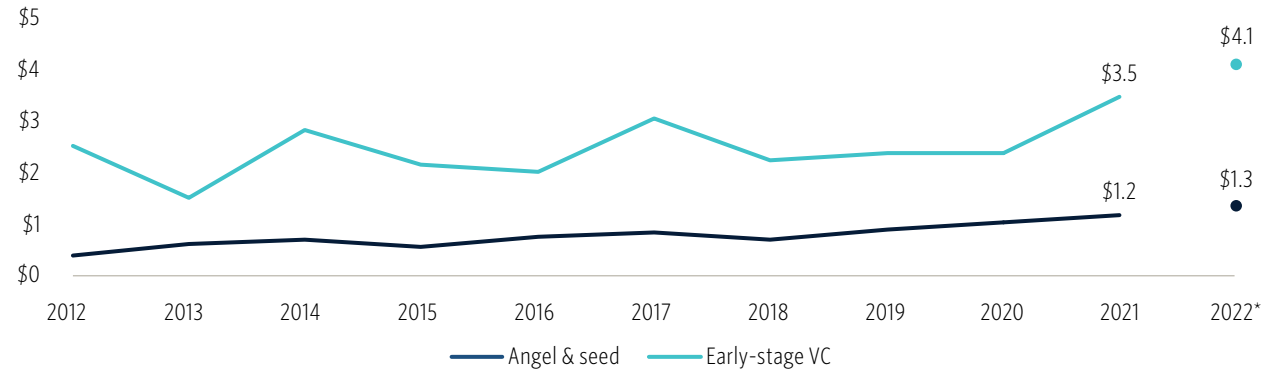


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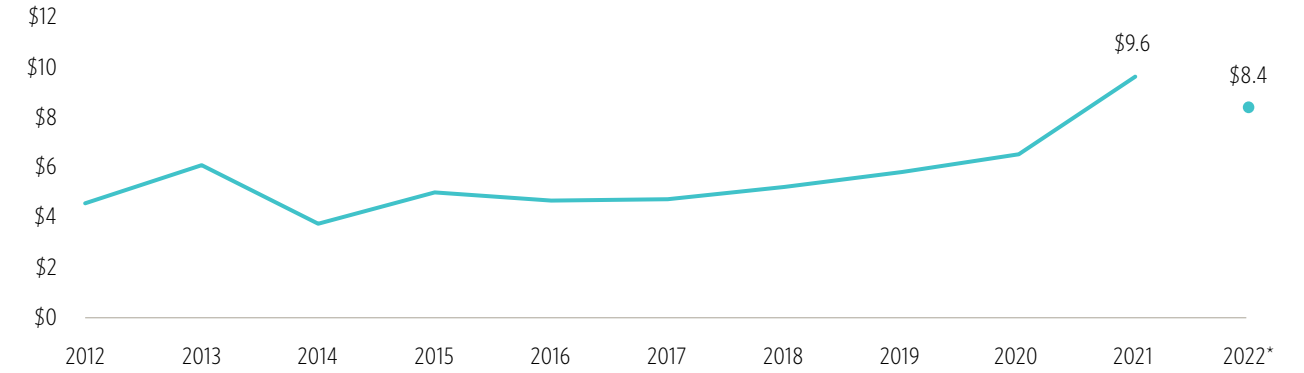
VC ACTIVITY

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



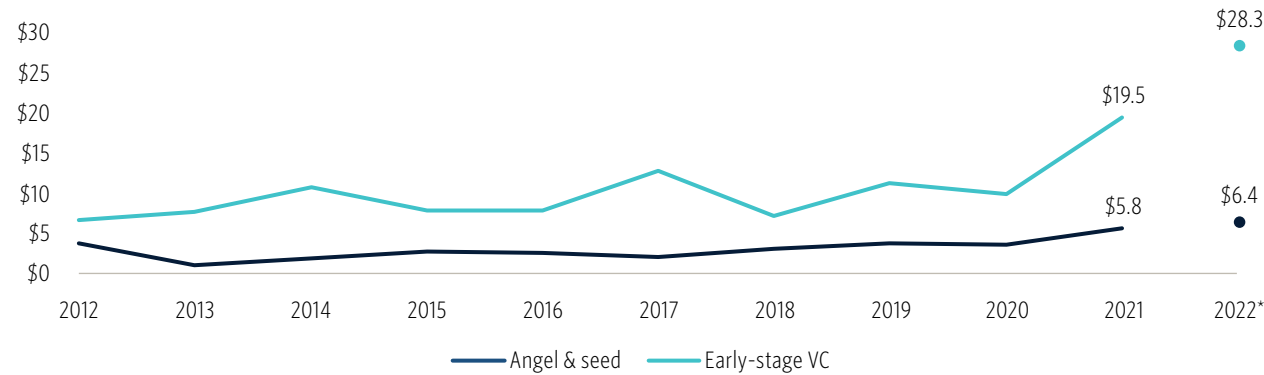
Source: PitchBook | Geography: Global | *As of June 30, 2022

Median agtech late-stage VC deal value (\$M)



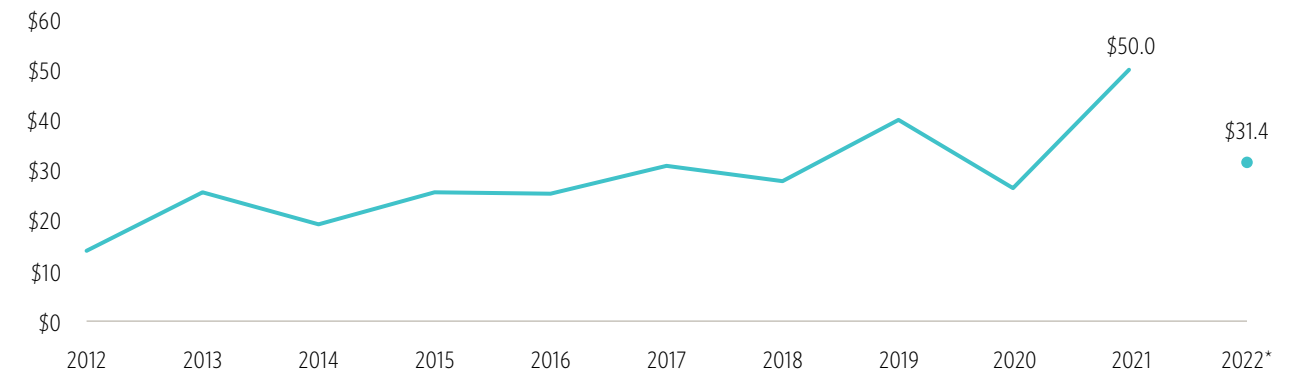
Source: PitchBook | Geography: Global | *As of June 30, 2022

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



Source: PitchBook | Geography: Global | *As of June 30, 2022

Median agtech late-stage VC pre-money valuation (\$M)

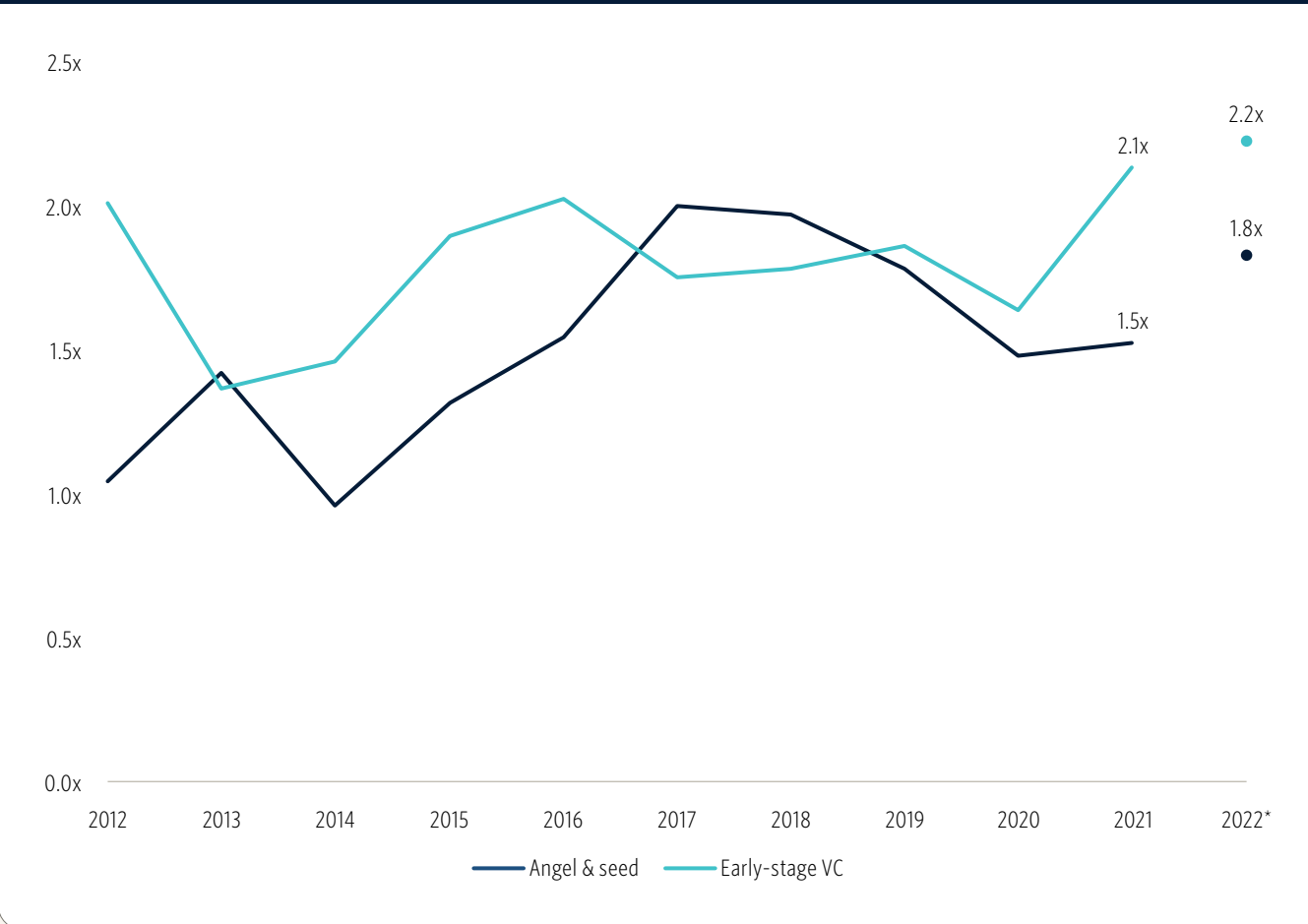


Source: PitchBook | Geography: Global | *As of June 30, 2022



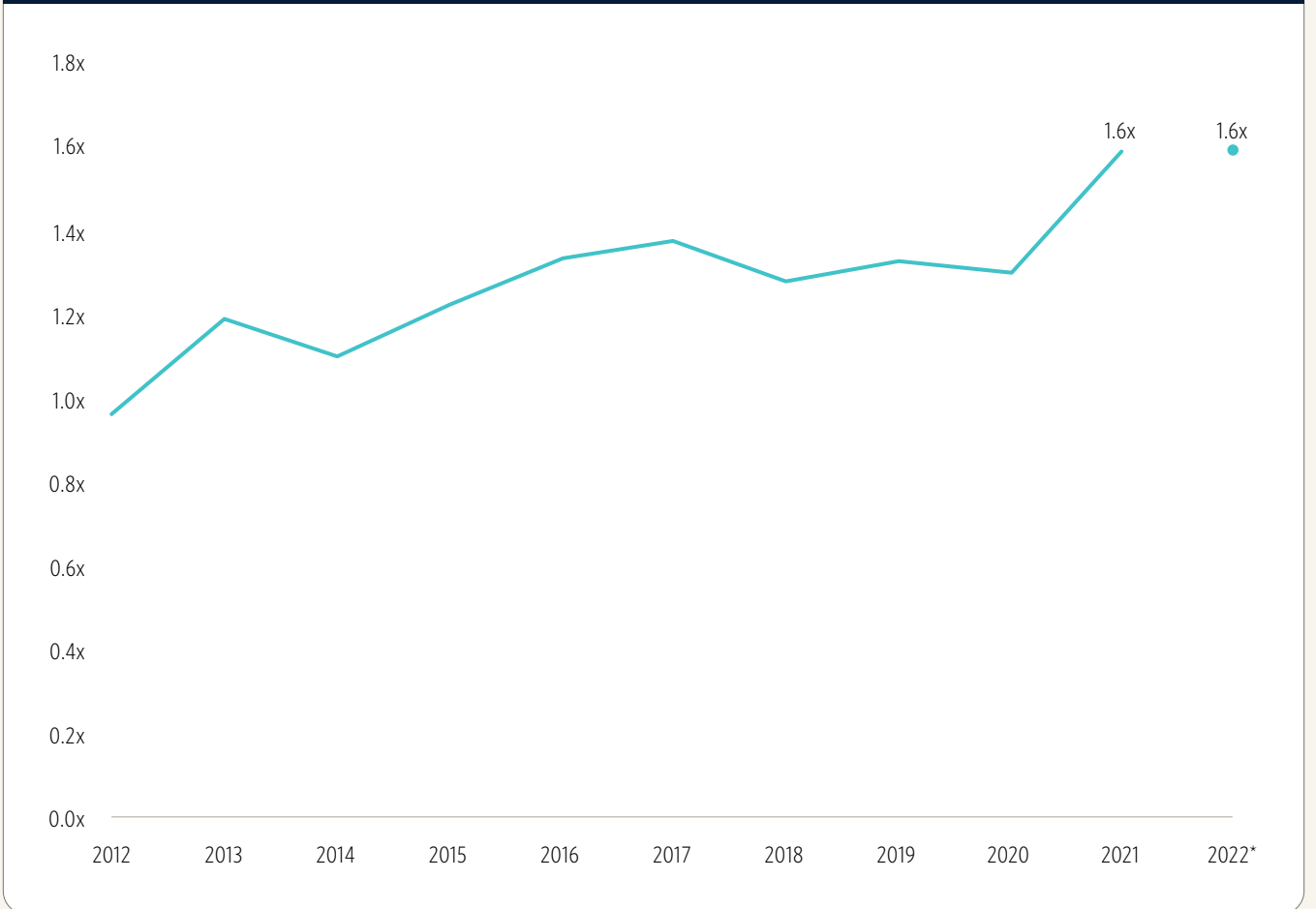
VC ACTIVITY

Median agtech angel & seed and early-stage VC pre-money valuation step-up



Source: PitchBook | Geography: Global | *As of June 30, 2022

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



Source: PitchBook | Geography: Global | *As of June 30, 2022



VC ACTIVITY

Key agtech angel & seed deals*

Company	Close date (2022)	Subsegment	Stage	Deal size (\$M)	Post-money valuation (\$M)	Lead investor(s)	Valuation step-up
Farmerline	April 26	Agribusiness marketplaces	Seed	\$12.9	N/A	Acumen Resilient Agriculture Fund, FMO- Dutch entrepreneurial development bank	N/A
Brevel	June 2	Plant biotech	Seed	\$8.4	N/A	N/A	N/A
Waterplan	April 8	Drones & imagery analytics	Seed	\$7.0	N/A	David Helgason, Energy Transition Ventures	N/A
Salient Predictions	June 2	Farm management software	Seed	\$5.6	\$19.6	Wireframe Ventures	N/A
Inseco	April 21	Plant biotech	Seed	\$5.3	N/A	Futuregrowth Asset Management	N/A
Infinite Enzymes	April 14	Plant biotech	Seed	\$5.2	N/A	N/A	N/A
Nutrifresh	May 30	Indoor farming systems	Seed	\$5.0	N/A	Archer Private Investments, Florintree Advisors, Green Frontier Capital, Mathew Cyriac, Sandiip Bhammer, Sky Kurtz, Theodore Cleary	N/A
Greenfield Robotics	June 22	Robotics & smart field equipment	Seed	\$5.0	\$25.0	N/A	1.8x
Switch Bioworks	May 25	Plant biotech	Seed	\$4.3	N/A	Acre Venture Partners, Anthos Capital	N/A
Unicorn Biotechnologies	April 21	Animal biotech	Series 1	\$3.2	N/A	Acequia Capital	N/A

Source: PitchBook | Geography: Global | *As of June 30, 2022



VC ACTIVITY

Key agtech early-stage VC deals*

Company	Close date (2022)	Subsegment	Stage	Deal size (\$M)	Post-money valuation (\$M)	Lead investor(s)	Valuation step-up
Inventa Consulting Services	April 27	Agribusiness marketplaces	Series B	\$55.0	N/A	Greylock Partners	N/A
MOA Technology	May 11	Plant biotech	Series B	\$44.5	\$99.6	Lansdowne Partners, Oxford Science Enterprises, Parkwalk Advisors	2.3x
BiomEdit	June 20	Animal biotech	Series A	\$40.0	\$66.7	N/A	N/A
Nitricity	June 8	Plant biotech	Series A	\$20.9	\$75.9	N/A	N/A
Milk Moovement	June 16	Livestock & land animal tech	Series A	\$20.4	N/A	Richard Cargill, VMG Partners	N/A
Loyal	April 4	Animal biotech	Series A2	\$20.0	\$220.0	N/A	1.6x
Red Sea Farms	April 25	Indoor farming systems	Series A	\$18.5	N/A	Savola Group, Wa'ed Ventures	N/A
MircoCyto	May 30	Plant biotech	Early-stage VC	\$14.9	N/A	Matrix Partners China	N/A
Pitik	May 19	Livestock & land animal tech	Series A	\$14.0	N/A	Alpha JWC Ventures	N/A
AmplifiedAg	May 27	Indoor farming systems	Early-stage VC	\$10.0	N/A	N/A	N/A

Source: PitchBook | Geography: Global | *As of June 30, 2022



VC ACTIVITY

Key agtech late-stage VC deals*

Company	Close date (2022)	Subsegment	Stage	Deal size (\$M)	Post-money valuation (\$M)	Lead investor(s)	Valuation step-up
Little Leaf Farms	May 31	Indoor growers	Late-stage VC	\$300.0	N/A	Bank of America, TPG, The Rise Fund	N/A
Pure Harvest Smart Farms	June 30	Indoor growers	Late-stage VC	\$180.5	N/A	IMM Investment, Metric Capital Partners	N/A
Ninjacart	May 18	Agribusiness marketplaces	Series D	\$154.0	\$815.0	Flipkart, Walmart	1.4x
Wasoko	April 22	Agribusiness marketplaces	Series B	\$125.0	\$625.0	Avenir Growth Capital, Tiger Global Management	N/A
Absolute	May 5	Indoor growers	Series B	\$100.0	\$500.0	Sequoia Capital India	35.0x
Capella Space	May 12	Drones & imagery analytics	Series C	\$97.0	\$217.0	NightDragon	0.7x
VisionNav Robotics	April 29	Robotics & smart field equipment	Series C1	\$76.0	\$500.0	5Y Capital, Meituan	N/A
Brightseed	April 6	Plant biotech	Series B	\$68.0	\$300.0	Temasek Holdings	1.8x
Captain Fresh	May 1	Agribusiness marketplaces	Series C	\$57.5	\$507.5	Prosus Ventures, Tiger Global Management	2.2x
Entosystem	April 26, 2022	Insect farming	Late-stage VC	\$52.4	N/A	N/A	N/A

Source: PitchBook | Geography: Global | *As of June 30, 2022



VC ACTIVITY

Key agtech VC exits*

Company	Close date (2022)	Subsegment	Exit size (\$M)	Exit type	Acquirer(s)/index	Post-money valuation (\$M)
Vultus	May 20	Field IoT	\$4.1	IPO	Nasdaq OMX Nordic Exchange - AktieTorget	\$5.2
Prakshep	June 2	N/A	N/A	M&A	Arya.ag	N/A
Rapid Genomics	April 1	Plant data & analysis	N/A	Buyout/LBO	Abu Dhabi Investment Authority, Astorg (Paris), Cinven, LGC, Omnes Capital	N/A

Source: PitchBook | Geography: Global | *As of June 30, 2022



VC ACTIVITY

Key agtech incumbents*

Company	Subsegment	Key products	EV/NTM revenue	EV/NTM EBITDA
Deere	Robotics & smart field equipment	Tractors, sprayers, planters	3.3x	14.8x
Yara International	Plant biotech	Fertilizer, fertigation, foliar	0.7x	3.9x
Corteva Agriscience	Plant biotech	Herbicide, fungicide, insecticide, disease control	2.7x	15.6x
Zoetis	Animal biotech	Vaccines, parasite control products, and antibiotics	10.1x	23.4x
The Mosaic	Plant biotech	Fertilizer	1.2x	3.3x
New Hope Liuhe	Livestock & land animal tech	Animal feed products	1.0x	89.7x
Kubota	Robotics & smart field equipment	Tractors, balers, rakes, tedders	1.6x	11.2x
Merck Animal Health	Animal biotech	Vaccines, nutritionals, reproductions, therapeutics	4.4x	10.7x
Archer Daniels Midland	Livestock & land animal tech	Feed, feed additives, premix, macroingredients	0.7x	11.3x
Lindsay	Field IoT	Irrigation systems, management, scheduling	1.9x	14.7x

Source: PitchBook | Geography: Global | *As of June 30, 2022



VC ACTIVITY

Key VC-backed agtech angel & seed companies*

Company	Subsegment	VC (\$M) raised to date	Last known post-valuation (\$M)	Most recent VC deal type	Time (years) since close
trū Shrimp	Aquaculture	\$33.3	\$139.7	Angel (individual)	1.3
Living Carbon	Plant biotech	\$30.0	\$65.1	Seed	0.3
Mootral	Animal biotech	\$28.8	\$30.0	Seed	0.4
QualySense	Robotics & smart field equipment	\$24.7	\$18.2	Angel (individual)	0.5
Iroquois Valley	Finance & insurance	\$23.9	N/A	Seed	1.1
Pursell Agri-Tech	Plant biotech	\$22.2	\$27.5	Seed	0.7
Precision AI	Drones & imagery analytics	\$20.0	N/A	Seed	1.2
Opti-Harvest	Indoor farming components	\$17.8	\$201.3	Seed	0.7
Guardian Agriculture	Drones & imagery analytics	\$16.5	\$29.5	Seed	1.2
Aqgromalin	Farm management software	\$11.5	\$21.5	Seed	0.4

Source: PitchBook | Geography: Global | *As of June 30, 2022



VC ACTIVITY

Key VC-backed agtech early-stage companies*

Company	Subsegment	VC (\$M) raised to date	Last known post-valuation (\$M)	Most recent VC deal type	Time (years) since close
Plant-Ag	Agribusiness marketplaces	\$800.0	N/A	Early-stage VC	1.3
InnovaFeed	Insect farming	\$229.3	N/A	Early-stage VC	1.6
Pairwise	Plant biotech	\$115.0	N/A	Series B	1.4
E-ctare	Finance & insurance	\$114.6	N/A	Early-stage VC	0.8
Climavision	Drones & imagery analytics	\$100.0	N/A	Series A	1.1
Monarch Tractor	Robotics & smart field equipment	\$90.0	271	Series B	0.6
Knowde	Agribusiness marketplaces	\$87.0	\$531.5	Series B	0.9
Revol Greens	Indoor growers	\$79.3	N/A	Series A	1.8
Enko	Plant biotech	\$65.7	\$320.0	Series B	1.1
Growers Edge	Finance & insurance	\$58.3	\$75.0	Series B	2.0

Source: PitchBook | Geography: Global | *As of June 30, 2022



VC ACTIVITY

Key VC-backed agtech late-stage companies*

Company	Subsegment	VC (\$M) raised to date	Last known post-valuation (\$M)	Most recent VC deal type	Time (years) since close
Pivot Bio	Plant biotech	\$616.8	\$1,700.0	Series D	0.9
Inscripta	Plant data & analysis	\$459.5	\$1,300.0	Series E	1.2
Ynsect	Insect farming	\$408.4	\$41.0	Late-stage VC	1.2
Inari	Plant biotech	\$352.0	\$1,208.0	Series D	1.1
Shiyue Daotian	Plant biotech	\$268.3	N/A	Series B	1.1
Orbital Insight	Drones & imagery analytics	\$203.7	\$323.2	Series E	1.1
Xaircraft	Drones & imagery analytics, robotics & smart field equipment	\$201.8	\$560.7	Series C3	1.6
Provivi	Plant biotech	\$192.1	\$256.5	Series C2	1.3
Central Coast Agriculture	Plant biotech	\$177.2	\$499.2	Series C	1.5
Tomorrow.io	Farm management software	\$163.2	\$1,200.0	Series D	1.3

Source: PitchBook | Geography: Global | *As of June 30, 2022



ACCELERATOR AND VC ACTIVITY

Most active investors in agtech accelerator deals since 2021*

Investor	Deal count
SVG Ventures-THRIVE	25
National Science Foundation	21
Google for Startups Accelerator	18
Astralabs	10
Techstars	7
Plug and Play Tech Center	6
StartLife	5
Wells Fargo Innovation Incubator	5
EIT Food	5

Source: PitchBook | Geography: Global | *As of June 30, 2022

Most active agtech VC investors in 2022*

Investor	Deal count	Angel & seed	Early-stage VC	Late-stage VC	Investor type
SOSV	18	12	5	1	VC
Yield Lab	7	2	4	1	VC
SP Ventures	6	1	2	3	VC
S2G Ventures	6	2	0	4	VC
ForwardFood.Tech	5	0	3	2	VC
AgFunder	5	0	3	2	VC
iSelect Fund	5	0	2	3	VC
Fall Line Capital	5	0	2	3	VC
Cavallo Ventures	5	1	2	2	CVC
GV	5	2	1	2	CVC
Innova Memphis	5	1	3	1	VC
Enterprise Ireland	5	1	4	0	VC

Source: PitchBook | Geography: Global | *As of June 30, 2022



LEAGUE TABLES

Most active agtech PE investors since 2016*

Investor	Deal count	Primary investor type
Unigrains	15	Growth/expansion
IDIA Capital Investissement	13	Growth/expansion
Eurazeo	9	PE/buyout
Sofiproteol	6	PE/buyout
Aqua Capital	5	PE/buyout
Mérieux Equity Partners	4	Growth/expansion
Farol Asset Management	3	PE/buyout
Sofina	3	Growth/expansion
Banneker Partners	3	PE/buyout
L Capital	3	PE/buyout
APES Partners	3	PE/buyout

Source: PitchBook | Geography: Global | *As of June 30, 2022

Most active strategic acquirers of agtech companies since 2016*

Investor	Deal count	Primary investor type
Deere	10	Corporation
Farmer's Business Network	9	VC-backed company
ADM Germany	8	Corporation
CNH Industrial	7	Corporation
Deveron	7	Corporation
Nutrien	7	Corporation
Danish Agro	6	Corporation
Zoetis	6	Corporation
BASF	6	Corporation
Hydrofarm	5	Corporation
GrowGeneration	5	Corporation

Source: PitchBook | Geography: Global | *As of June 30, 2022



Emerging opportunities

RNA and synthetic biology

Synthetic biology creates genuine value in agriculture.

Gas-X for cows

Feed additives take a bite out of GHG emissions.



RNA and synthetic biology

Overview

Synthetic biology (synbio) is an emerging body of research that applies engineering principles to biological systems, modifying or redesigning organisms with new abilities. It combines multiple fields and technologies, including molecular biology, computational biology, bioinformatics, artificial intelligence (AI), and genetic engineering. Synbio is being used to solve problems in healthcare, foodtech, ag, and many other industries. Popular use cases include vaccine development, alternative proteins, and, increasingly in agriculture, the development of new crop traits as well as alternatives to synthetic fertilizers and pesticides.

Synbio has many different potential areas of opportunity and applications within agriculture, making it impossible to provide a comprehensive overview in the scope of this report. Relevant technologies include precision fermentation, gene editing—for example, CRISPR—and cell cultivation. Ag synbio use cases include:

- soil amendments to improve soil health, biodiversity, and atmospheric carbon sequestration
- environmentally friendly alternatives to ag inputs such as fertilizer and pesticides
- crops designed to be more resilient to shifting climates, extreme weather events, pests, and other threats
- increased plant growth or yields
- increased nutritional value or other desirable attributes in plants

Definitions

- **Cells** - the basic building blocks of all living things.
- **Proteins** - a chain of amino acids, usually 100-plus. They can be thought of as the components that make up cells and tissues.
- **Peptides** - similar to proteins, peptides are a shorter chain of amino acids, generally around 20. Peptides play an important role in regulating cell-to-cell communication. In plants, this transmission is important in regulating growth, development, and stress defense activities.
- **Micropeptides** - a short peptide that regulates plant genes and proteins.
- **Genes** - made of DNA or RNA, genes regulate the traits of an organism. They encode the information to create proteins.
- **DNA (Deoxyribonucleic acid)** - a biomolecule that carries genetic instructions for the development, function, growth, and reproduction of organisms.
- **RNA** - a type of nucleic acid and a type of molecule involved in coding, decoding, and expressing genes.
- **RNA (Ribonucleic acid)** - a biomolecule that carries instructions from DNA for controlling the synthesis of proteins.
- **mRNA (messenger RNA)** - “a type of single-stranded RNA involved in protein synthesis. mRNA is made from a DNA template during the process of transcription. The role of mRNA is to carry protein information from the DNA in a cell’s nucleus to the cell’s cytoplasm (watery interior), where the protein-making machinery reads the mRNA sequence and translates each three-base codon into its corresponding amino acid in a growing protein chain.”⁴
- **RNAi (RNA interference)** - a method of targeting and destroying specific mRNA molecules, thus reducing a target protein. Agricultural applications include bioinsecticides and biopesticides.

⁴: “Messenger RNA.” National Human Genome Research Institute, August 25, 2022.



RNA AND SYNTHETIC BIOLOGY

We instead concentrate on one molecule within SynBio: Man-made RNAi molecules can be used in agriculture as an insecticide, pesticide, or viricide. The technology can target specific species, making it much safer than traditional chemical inputs. On the downside, production can often be expensive and require extreme storage specifications.

A growing number of synbio companies are developing RNAi-based agricultural products. [Renaissance BioScience](#), which refers to itself as a “global microorganism bioengineering company,” develops yeast-based RNAi solutions for multiple industries. It is currently developing biopesticides targeting Colorado potato beetle larvae.⁵ Rival [Pebble Labs](#) has developed an RNAi delivery system that utilizes naturally occurring and symbiotic microbes from the target plant or animal. These microbes continuously produce RNAi, extending the length of effectiveness. Initial products target shrimp aquaculture, potatoes, and tomatoes.⁶ Lastly, startup [Micropep](#) uses micropeptides—a lower cost alternative to RNAi—to develop biological solutions. [Micropep’s](#) micropeptide discovery platform is developing biological products to replace synthetic fertilizers, pesticides, and fungicides.⁷

Synthetic biology is in its infancy, and we are only just beginning to see the earliest use cases. Aside from the aforementioned companies, there is a growing list of startups developing solutions that will reach the market in the near-to-medium term. Synbio technologies will play an essential role in aiding ag operators to adapt to climate change by designing more resilient crops and inputs. Government initiatives like the IRA will help incentivize adoption. The rising cost of synthetic inputs due to the war in Ukraine and future global macro events make synbio inputs essential to growers’ nutrition and crop protection programs.

5: “RNA-Based Biopesticide Technology Delivers 98% Mortality of Colorado Potato Beetle in Independent Test,” *Cision PR Newswire*, September 29, 2021.

6: “RNA Runs the World From Inside Our Cells,” *Pebble Labs*, n.d., accessed August 31, 2022.

7: “About Us,” *Micropep*, accessed August 31, 2022.



RNA AND SYNTHETIC BIOLOGY

Key RNA companies*

Company	VC (\$M) raised to date	Most recent deal type	Most recent deal investor(s)	HQ location
Inscripta	\$459.5	Series E	D1 Capital Partners, Durable Capital Partners, Fidelity Management & Research, Foresite Capital Management, GoldenArc, JS Capital Management, Jonathan Feldstein, Korys Investments, Morgan Stanley, T. Rowe Price	Boulder, US
AgBiome	\$235.0	Series D	Blue Horizon Corporation, Blue Water Life Science Advisors, DOV Management, Darren Streiler, Kiersten Stead, Leaps by Bayer, Novalis LifeSciences, Ryan Rakestraw, Volta Circle	Durham, US
Pairwise	\$115.0	Series B	Aliment Capital, Deerfield Management, Leaps by Bayer, Temasek Holdings	Durham, US
Phylos	\$41.1	Late-stage VC	Accomplice VC, Entourage Effect Capital, Merida Capital Holdings	Portland, US
Micropep	\$25.3	Series A1	FMC Ventures, Fall Line Capital, IRDI Capital Investissement, Sofinnova Partners, Supernova Invest	Auzeville-Tolosane, FR
Pebble Labs	\$24.2	Series A	N/A	Los Alamos, US
Meiogenix	\$15.6	Series A	Alexandria Venture Investments, Bpifrance, Casdin Capital, Genoa Ventures, Kurma Partners, Sofinnova Partners	Paris, FR
Rev Genomics	\$1.5	Seed	Merida Capital Holdings	Oakland, US
RNAiSSANCE AG	\$1.0	Early-stage VC	BioGenerator, Cultivation Capital	Saint Louis, US
Computomics	\$0.6	Series A	Amathaon Capital, BASF Venture Capital, EIT Food, ForwardFood.Tech	Tübingen, DE
Renaissance BioScience	\$9.1	Early-stage VC	Carpere Capital	Vancouver, CA
Silvec Biologics	N/A	Early-stage VC	TEDCO	Rockville, US

Source: PitchBook | Geography: Global | *As of June 30, 2022



Gas-X for cows

Overview

Ag is increasingly in the crosshairs of environmentalists and regulators as a key source of GHG emissions. The livestock supply chain is estimated to produce 7.1 gigatons of CO₂-eq per annum, or 14.5% of all human-induced emissions. 44% of these emissions, 3.1 gigatons CO₂-eq, are from methane, which can largely be attributed to cattle and other ruminants.⁸

The recently passed IRA cites enteric fermentation—digestion by ruminant animals resulting in methane emissions—as the most significant contributor of methane emissions in the US.⁹ The bill carves out \$25 million to \$50 million for Conservation Innovation Trials, with the USDA prioritizing proposals that “utilize diet and feed management to reduce enteric methane emissions from ruminants.”¹⁰

In 2005, a Canadian farmer noticed that cows kept in beach-front paddocks were eating seaweed that had washed up along the shore. These cows were healthier, more productive, and had longer cycles of reproductive activity. This observation kicked off research by Canadian and Australian scientists, which led to the discovery that a specific type of red algae can reduce methane production by over 99% in the lab. One of the key chemicals in seaweed inhibiting methane production is called Bromoform.¹¹ Ongoing studies are assessing whether Bromine in dairy milk could reach levels unsafe for human consumption.

8: Ruminant: a hoofed, herbivorous, and grazing mammal that absorbs nutrients by fermenting plants in its stomach prior to digestion. Ruminant species include cattle, goats, and sheep.

9: “Inflation Reduction Act Methane Emissions Charge: In Brief,” Congressional Research Service, August 29, 2022.

10: “An Act to Provide for Reconciliation Pursuant to Title II of S. Con. Res. 14 (Inflation Reduction Act),” 117th United States Congress, August 7, 2022.

11: “One Farmer’s Seaweed Discovery Could Help Slow Methane Emissions—and Change the World,” CBS News, December 18, 2021.

Today, at least six companies are helping farmers combat ruminant methane emissions by commercializing feed additives containing natural ingredients, including seaweed. The research teams at CSIRO, Meat & Livestock Australia, and James Cook University hold intellectual property for one key strain of red seaweed technology. Researchers from CSIRO went on to found [FutureFeed](#), one of the leading providers in the space. [FutureFeed](#) has licensed its technology to multiple companies focused on the livestock methane emissions issue, including [Volta Greentech](#), [Sea Forest](#), and [SeaStock](#).¹² [Volta Greentech](#) grows seaweed in aquaculture tanks on land and has teamed up with Swedish grocery chain [Coop](#) and food company Protos to commercialize meat marketed as “low-methane beef.”¹³ Rival [Blue Ocean Barns](#) was the first company to market with seaweed-based feed additives. The company, which raised a \$20.0 million Series A in July 2022, has partnered with three dairy companies—[Ben & Jerry’s](#), [Straus Family Creamery](#), and [Clover Sonoma](#)—to reduce the carbon footprint of dairy operations.¹⁴

Although seaweed is grabbing headlines, other feed additives also appear to reduce methane emissions. Startup [Mootral](#) sells a feed additive made with garlic and citrus extract that can decrease methane emissions by 30%. Complementing its feed additive business, [Mootral](#) has developed a methodology to quantify and monitor methane reductions, which it has used to develop carbon credits issued by Verra, a voluntary carbon credit registry.¹⁵

12: “FutureFeed,” CSIRO, July 1, 2022.

13: “The World’s First ‘Methane-Reduced’ Beef is Now at Grocery Stores,” *Fast Company*, Adele Peters, June 30, 2022.

14: “Blue Ocean Barns Completes \$20 Million Series A Financing, Accelerating Solution to Agricultural Methane Emissions,” *Cision PR Newswire*, July 13, 2022.

15: “About Mootral,” Mootral, n.d., accessed August 31, 2022.



GAS-X FOR COWS

Key feed additives companies*

Company	VC (\$M) raised to date	Most recent deal type	Most recent deal investor(s)	HQ location
Mootral	\$28.8	Seed	AVG Basecamp Fund, Climate Capital, Daughters Capital, Earthshot Ventures, Kindred Ventures, Lowercarbon Capital	Abertillery, UK
Blue Ocean Barns	\$26.5	Series A	Tao Capital Partners, Valor Equity Partners	Kailua-Kona, US
CH4 Global	\$16.0	Series A	AgFunder, DCVC, DCVC Bio	San Francisco, US
ZELP	\$13.2	Series A	Collaborative Fund, Danone Manifesto Ventures, Novo Holdings	London, UK
FutureFeed	\$9.3	Early-stage VC	AGP Sustainable Real Assets, CSIRO, GrainCorp, Harvest Road Group, SparkLabs Group, Woolworths Group	Newstead, AU
Symbrosia	\$8.3	Series A	Danone Manifesto Ventures, HATCH, Kamehameha Schools, Mana Up Capital, Pacific6 Enterprises, Presidio Ventures	Kailua-Kona, US

Source: PitchBook | Geography: Global | *As of June 30, 2022



Select company highlights



SELECT COMPANY HIGHLIGHTS

infarm

Founded
2012

1200+ employees

Based in Berlin, Germany

Total VC raised:
\$632.4M
over six deals

Most recent (disclosed) round:
\$203.0 million of Series D
venture funding

Post-money valuation:
Undisclosed

First institutional round:
\$4.5 million
Seed (June 2017)

Overview

[Infarm](#) is a controlled environment ag (CEA) operator that differentiates from competitors by locating modular grow facilities directly at the point of sale, enabling consumers to buy produce at its freshest. The company begins the grow journey at larger indoor facilities, then moves crops into retail grow facilities when they reach maturity. Products include leafy greens, herbs, and mushrooms.

[Infarm](#) recently opened a 10,000 square meter Growing Center in Bedford, UK. The facility is highly automated with “AI-powered modular vertical farming units” and can produce 20 million plants annually.¹⁶ Its centralized location allows it to reach 90% of end consumers in the UK, and the company has partnered with over 30 major food retailers globally.

¹⁶: “[Infarm Launches First UK Growing Centre in Bedford](#),” Infarm, Youtube, July 5, 2022.

Leadership

Cofounder & CEO: Erez Galonska

Cofounder & CTO: Guy Galonska

Cofounder & CMO: Osnat Michaeli

CFO: Carmine Visconti

COO: Eilam Gazit.¹⁷

¹⁷: “[Eilam Gazit](#),” LinkedIn, n.d., accessed September 14, 2022.



SELECT COMPANY HIGHLIGHTS

Competitors

[Infarm](#) differentiates itself through its technology and distribution strategy. The company uses hydroponics, highly automated facilities, and a unique modular point-of-sale strategy. [Infarm](#) has scaled quickly compared to other providers, expanding across Europe, North America, and Asia.

[Infarm](#)'s largest competitors include [Bowery Farming](#), [AeroFarms](#), and [AppHarvest](#). [Bowery](#) takes a similar approach, using vertical hydroponic technologies to grow leafy greens and herbs sold

in the Northeast and mid-Atlantic regions. [Aerofarms](#) uses vertical and aeroponic technologies to grow leafy greens, herbs, and microgreens for sale on the East Coast of the US. [AppHarvest](#) hydroponically grows tomatoes and leafy greens for sale on the East Coast of the US and went public via SPAC in 2021.

Financing history

Seed round	Series A	Series B	Series C	Late-stage VC	Series D
June 26, 2017	February 5, 2018	June 11, 2019	September 17, 2020	March 5, 2021	December 16, 2021
Deal size: \$4.5M	Deal size: \$24.5M	Deal size: \$99.0M	Deal size: \$201.3M	Deal size: \$100.0M	Deal size: \$203.0M
Post-money valuation: \$13.0M	Post-money valuation: \$82.5M	Post-money valuation: \$406.1M	Post-money valuation: \$577.6M	Post-money valuation: N/A	Post-money valuation: N/A
Lead investors: Cherry Ventures	Lead investors: Balderton Capital	Lead investors: Atomico	Lead investors: Lightrock	Lead investors: N/A	Lead investors: N/A



SELECT COMPANY HIGHLIGHTS

INARI®

Founded
2016

285+ employees

Based in Cambridge, MA

Total VC raised:
\$352.0M
over four deals

Most recent (disclosed) round:
\$208.0 million of Series D
venture funding in a deal led by
Flagship Pioneering

Post-money valuation:
\$1.2 billion

First institutional round:
\$15.0 million
Series A (December 2017)

Overview

[Inari](#) is a seed development company that uses AI, machine learning, gene editing (CRISPR), and other synbio tools to optimize crop traits and meet performance objectives. The company uses multiplexed gene editing, which means multiple genes are expressed at once, which can improve the scope and efficiencies of gene editing. [Inari](#) is focused on corn, soybeans, and wheat. Their goals include building resiliency by reducing the need for water and nutrients, improving crop yields, and reducing ag’s carbon footprint.

The company’s CEO has stated three environmental goals for its products:

- increase productivity to reduce land usage
- reduce water usage by 40%
- reduce synthetic nitrogen fertilizer usage by 40%

[Inari](#)’s CEO noted that the seed breeding industry improves productivity by less than 1% per year, spends over \$2 billion per year, and takes 10 years on average to produce a new crop variety. [Inari](#)’s genome editing toolkit disrupts traditional seed breeding techniques by making trait design faster and less expensive with higher productivity gains.¹⁸

Leadership

CEO & Director: Ponsi Trivisvavet

Chief Scientific Officer: Dr. Catherine Feuillet

CFO: Stuart Brown

Chief Product Officer: Claudia Nari

Chief Information and Data Officer: Dr. Rania Khalaf

¹⁸: [“Ponsi Trivisvavet, CEO at Inari — A Fireside Conversation at Harvard with HPAIR,” Harvard University, Youtube, August 21, 2021.](#)



SELECT COMPANY HIGHLIGHTS

Competitors

[Inari](#) faces competition from incumbent seed breeding companies and a growing cohort of synbio startups. Israeli startup [Equinom](#) uses computation breeding technologies including genomics, bioinformatics, and phenomics, and focuses on crops for the plant-based protein industry. The company recently signed an agreement with Obela, a joint venture of [PepsiCo](#) and [Strauss Group](#), to cooperate in a breeding program. Agrochem giant [Bayer](#) and investor Temasek recently joined forces to launch a jointly owned company called [Unfold](#), which will focus on developing traits for controlled environment ag. Other VC-backed providers include [SeedLinked](#), [Sound Agriculture](#), and [Cibus](#).

Financing history

Early-stage VC	Series B	Series C	Series D
December 21, 2017	August 9, 2018	July 29, 2019	May 12, 2021
Total raised: \$15.0M	Total raised: \$40.0M	Total raised: \$89.0M	Total raised: \$208.0M
Post-money valuation: \$25.0M	Post-money valuation: \$165.0M	Post-money valuation: \$589.0M	Post-money valuation: \$1,208.0M
Lead investors: N/A	Lead investors: N/A	Lead investors: N/A	Lead investors: Flagship Pioneering

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PitchBook Data, Inc.

John Gabbert Founder, CEO

Nizar Tarhuni Senior Director, Institutional Research & Editorial

Paul Condra Head of Emerging Technology Research

Additional research

Agtech

Alex Frederick
alex.frederick@pitchbook.com

Artificial Intelligence & Machine Learning

Brendan Burke
brendan.burke@pitchbook.com

Clean Energy Tech and Climate Tech

John MacDonagh
john.macdonagh@pitchbook.com

E-commerce & Gaming

Eric Bellomo
eric.bellomo@pitchbook.com

Fintech

Robert Le
robert.le@pitchbook.com

James Ulan

james.ulan@pitchbook.com

Rudy Yang

rudy.yang@pitchbook.com

Foodtech

Alex Frederick
alex.frederick@pitchbook.com

Healthtech

Rebecca Springer
rebecca.springer@pitchbook.com

Information Security

Brendan Burke
brendan.burke@pitchbook.com

Insurtech

Robert Le
robert.le@pitchbook.com

Internet of Things (IoT)

Brendan Burke
brendan.burke@pitchbook.com

Mobility Tech

Jonathan Geurkink
jonathan.geurkink@pitchbook.com

Supply Chain

Jonathan Geurkink
jonathan.geurkink@pitchbook.com