

New Harvest

Strategic Plan

2020-2025



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We always welcome feedback on our strategic plan. It is an ongoing collective work in progress, which strives to remain relevant in an ever-changing world. If you would like to add thoughts or feedback, please email isha@new-harvest.org.



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SUMMARY

Our mission is to maximize the positive impact of cellular agriculture on the world.

By applying New Harvest's INPUTS....




+ Our Philosophy

- Our Strategies for Impact
 - People First, Projects Second
 - Default to Open
- Our Values
 - Integrity in Everything
 - Informed Optimism
 - Inclusive Expertise




+ Our Generosity Network

- Donor contributions
- Relationships
- In-kind Support




...to our IMPACT OBJECTIVES,

-  **Empowering Emerging Leaders:** Training and supporting individuals towards field-level leadership roles that fortify and advance cellular agriculture.
-  **Mobilizing the Ecosystem:** Becoming the trusted, equitable, and productive convener of cellular agriculture stakeholders around key neglected topics.
-  **Collective Value Creation:** Co-creating resources, knowledge, and tools that have collective value for the cellular agriculture ecosystem and beyond.

we will see the following OUTPUTS through the next five years.

-  Rising stars who expand and diversify the cell ag talent pool
-  Systems and venues for collaboration and cooperation
-  A public body of knowledge which elevates and accelerates the field

This leads to the following OUTCOME...

 100 leaders who add unique value to the field,  who actively collaborate and cooperate,  to advance and improve the cell ag ecosystem and beyond.

...which will create the IMPACT we wish to see.

- **The safe, unabated advancement of cell ag products to market;**
 - Reducing our dependence on animal-based agriculture
 - Reducing the environmental impact of food production
 - Increasing the resilience of our food system
- **The establishment of systems for accountability and transparency;**
 - Ensuring cell ag products are safe
 - Ensuring claims can be substantiated
 - Ensuring the field is transparent and data-driven
 - Ensuring that policymaking is evidence-based
- **And ongoing innovation in cellular agriculture.**
 - Perpetuating the diversification and optimization of cell ag products and manufacturing processes
 - Ongoing evaluation of product safety and sustainability

INTRODUCTION

Ten years ago, the concept of growing meat, milk, or eggs without farming animals was little more than science fiction.

Today, we see a burgeoning landscape of nearly one hundred cellular agriculture companies attracting over one billion dollars¹ in investment, creating hundreds of jobs, and taste-testing prototypes on a regular basis.

These are the promising beginnings of a much longer story. The potential impact that cellular agriculture can have on our world - for animals, for people, and for the planet - has yet to be realized.

How can we maximize the positive impact of cellular agriculture? This question fuels the vision of New Harvest and drives the thinking behind our new strategic plan.

How far have we come? Over the past five years, New Harvest has raised \$7.5 million from a community of over 1000 donors to accelerate breakthroughs in cellular agriculture. With these funds we have supported 36 pioneering cellular agriculture scientists through our research programs.^{2,3}

We believe that enabling leadership contributes most to the advancement of cellular agriculture through catalytic network effects. The network effects of our work have led to the following outcomes:

- **Collective value creation:** New Harvest coining the term “cellular agriculture” and advocating for open access research set important baselines for the field, and continue to foster collaboration and propel innovation.
- **Knowledge infrastructure:** Our research grantees have published seventeen groundbreaking peer-reviewed publications which strengthen the foundation of this new field and investigate next-generation applications of the technology.⁴
- **Industry growth:** Our grantees have gone on to become co-founders and

¹ CellAgri. (2020). *CellAgri Investment Report*. CellAgri. Retrieved 2020, from <https://www.cell.ag/reports>

² New Harvest. (2020). *Nationbuilder's donors data set, 2015 to 2020*.

³ Number of New Harvest supported scientists as of December 2020.

⁴ Number of peer-reviewed publications published as of December 2020.

staff scientists at leading cellular agriculture companies around the world. Fourteen New Harvest community members and grantees went on to found nine cellular agriculture companies, which have collectively raised over \$640 million USD in venture capital, - representing more than 60% of the global investment in cellular agriculture food companies.⁵

- **Government buy-in:** Two fellowship grantees, in the US and NZ, have secured landmark grant support from their respective federal governments, totalling over \$5 million USD.^{6,7}

Over the next five years, we seek to accelerate change through our catalytic work.

Our new strategic plan is intended to drive the impact of New Harvest's work using the momentum of the past five years of success, with adjustments for the current strategic context. It reaffirms our commitment to building the infrastructure of a new tech industry - one where we can produce animal products without animals.

In this plan, we present our five-year goal and three compelling priorities guiding us towards achieving it. Informing these priorities is our commitment to maximizing the positive impact of cellular agriculture while understanding that the development of a new science, technology, industry, and supply chain is a complex pursuit.

The five-year horizon reflects our belief that the complex and interrelated issues facing the advancement of cellular agriculture can only be addressed through a long-range effort and sustained commitment. At the same time, the pace of innovation and the rapid expansion of the cellular agriculture ecosystem demands that we pursue these aims with vigilance and adaptability as new challenges and opportunities arise.

In an ever-changing environment, this strategic plan is our compass. It will guide our approach toward implementation, budgeting, and detailed tactics in the coming months and years.

⁵ New Harvest. (2020, November 12). 2020 Year in Review. https://www.youtube.com/watch?v=4aAyK_IlrJc

⁶ Fell, A. (2020, September 23). UC Davis Establishes Research, Training in Cultivated Meat. <https://www.ucdavis.edu/news/uc-davis-establishes-research-training-cultivated-meat>

⁷ Ministry of Business, Innovation & Employment. (2020, October 01). *Catalyst: Strategic – New Zealand-Singapore Future Foods Research Programme*. Retrieved 2020, from <https://www.mbie.govt.nz/science-and-technology/science-and-innovation/funding-information-and-opportunities/investment-funds/catalyst-fund/catalyst-strategic-new-zealand-singapore-future-foods-research-programme/>

THE PROBLEM

The status quo is ripe for change⁸

While industrial animal agriculture feeds millions around the globe, its growth is creating an industry that is increasingly dangerous, unsustainable, and inhumane.

With animal farms being optimized for high density, the risk of epidemic viruses, foodborne illness, and antibiotic resistance are at all-time highs, deeply threatening food security and public health.⁹ With animals being optimized for food production, cows, chickens, and pigs are producing more milk, eggs, and meat than their counterparts were fifty years ago, at great costs to the health and welfare of animals and the planet.¹⁰ These optimizations - to farms and to animals - radically reduce the resiliency of our food system in a climate-changed world.

To New Harvest, animal agriculture should be more like a factory and less like farming. Creating animal products such as meat, milk and eggs from cell cultures rather than from whole animals is the logical next step for food sustainability. This is called cellular agriculture.

The next agricultural revolution is cellular agriculture

In 2015, cellular agriculture was named by New Harvest as a new interdisciplinary field of study focused on making agricultural products from cell cultures rather than from whole plants or animals.

In the past five years, over \$1 billion has been invested in over 80 companies around the world aiming to produce foods from cell cultures.^{11, 12} While some are developing products such as gelatin, milk, and eggs from cell cultures, the majority of companies are focused on creating cell-cultured meat.

The challenge is a lack of infrastructure

Normally, complex biotechnology would follow a pathway from discovery to market as described below (Figure 1).

⁸ The full strategic context assessment can be found in [Appendix I](#).

⁹ Espinosa, R., Tago, D., & Treich, N. (2020, August 04). *Infectious Diseases and Meat Production*. Environmental and Resource Economics, (76), 1019-1044. <https://doi.org/10.1007/s10640-020-00484-3>

¹⁰ Thornton P. K. (2010). *Livestock production: recent trends, future prospects*. Philosophical transactions of the Royal Society of London. Series B, Biological sciences, 365(1554), 2853–2867. <https://doi.org/10.1098/rstb.2010.0134>

¹¹ CellAgri. (2020). CellAgri Investment Report. CellAgri. Retrieved 2020, from <https://www.cell.ag/reports>

¹² To the best of our knowledge, this was the number of companies as of December 2020.

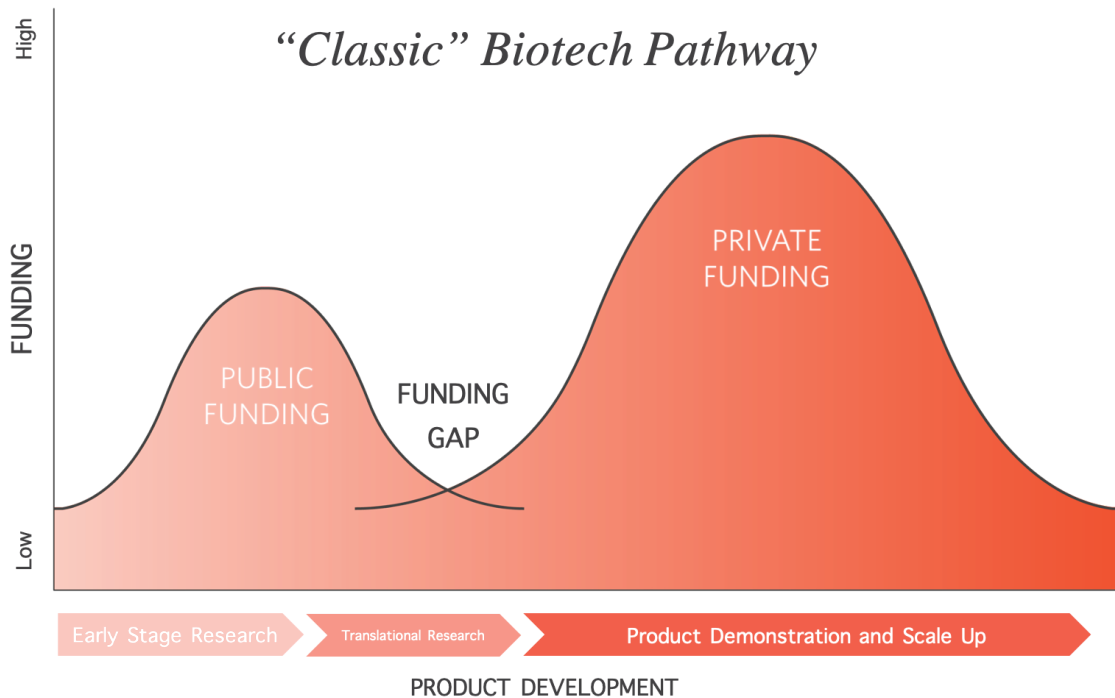


Figure 1. Classic Biotechnology Product Development Pathway

The first $\frac{1}{3}$ of the pathway is funded by government grants and other public funding sources, the last $\frac{1}{3}$ is funded by venture capital, and the middle $\frac{1}{3}$ is the notorious “valley of death” which many translational research efforts aim to remedy.¹³ This first, publicly funded $\frac{1}{3}$, is the education and knowledge infrastructure of the industry. This infrastructure trains talent and perpetuates ongoing innovation in the field.

This multi-stakeholder, multi-funder discovery pipeline is typical for highly complex technologies. Interdisciplinary expertise and collaboration is needed to discover and scale, as well as to generate data to demonstrate safety and efficacy.

Interdisciplinary collaboration is well-established in “typical” biotech, with developed academic societies, journals, public-private partnerships, industry organizations, and networked centers. This is the convening infrastructure of the industry. This infrastructure brings stakeholders together to foster collaboration and address complex field-wide issues.

¹³ Auerswald, P. E., & Branscomb, L. M. (2003, August). *Valleys of Death and Darwinian Seas: Financing the Invention to Innovation Transition in the United States*. The Journal of Technology Transfer, (28), 227–239. <https://doi.org/10.1023/A:1024980525678>

Cellular agriculture does not currently exist in the classic biotech discovery pathway paradigm. Due to a series of complex factors, such as a lack of dedicated funding streams through government funding agencies and the boundless availability of impact investment capital, cell ag sees a disproportionate amount of private funding for translation and scale-up of technologies that have barely been understood from a public research perspective (Figure 2).

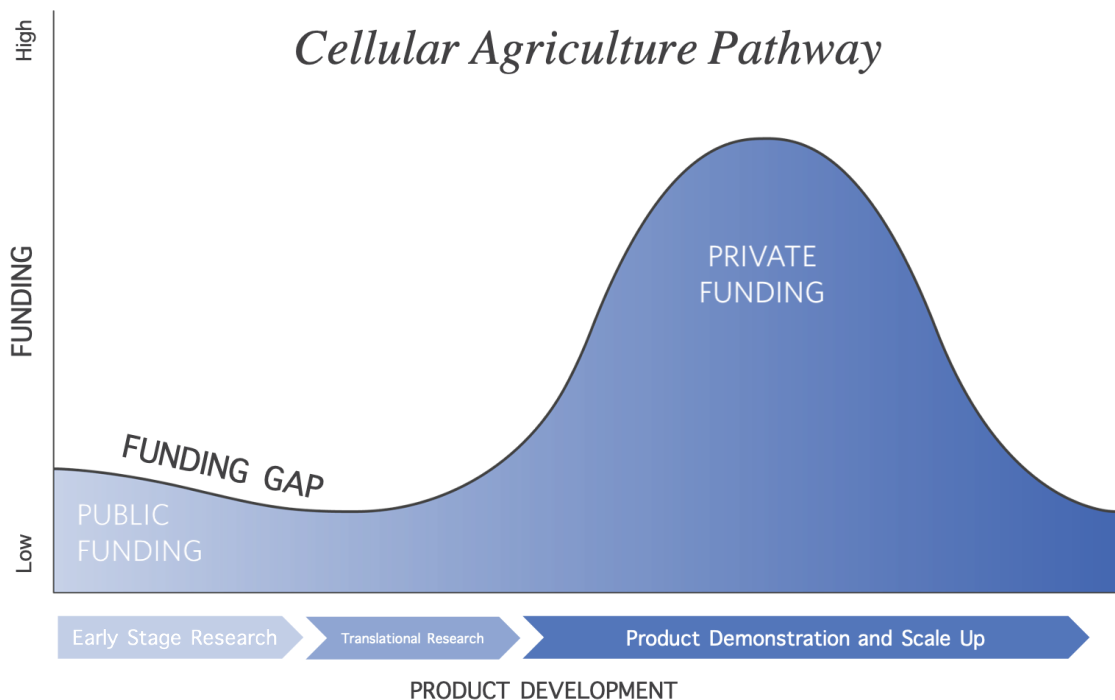


Figure 2. Cellular Agriculture Product Development Pathway

This leads to a lack of independent, credible information which can appropriately guide and inform policymakers and consumers about cellular agriculture. This also leads to a lack of independent experts who can develop, evaluate, and optimize cellular agriculture science.

In short: cellular agriculture lacks infrastructure - the education, knowledge, and convening infrastructure - which is crucial for ongoing innovation and industry growth.

OUR THEORY OF CHANGE

The lack of infrastructure is the critical, neglected factor holding back 1) the development of a robust cellular agriculture product pipeline from discovery to

commercialization, 2) the evaluation of the products to ensure that they deliver on their promised benefits, and 3) the research quantum leaps that could propel the field forward which would be too expensive and/or exploratory for private companies to pursue.

New Harvest, as the leading 501(c)(3) building the field of cellular agriculture, aims to develop the infrastructure of the greater cellular agriculture ecosystem through the following impact objectives. In doing so we create credible independent data, address key pre-competitive research questions, and develop the expertise of the cellular agriculture talent pool necessary to catalyze the change we want to see in the world.

If cellular agriculture is a new city, New Harvest's initiatives are the critical infrastructure projects - the pipelines for talent development, the bridges between stakeholders, and the roads to new discoveries.



OUR APPROACH

The following describes the strategies, philosophies, and aims we employ in working toward our theory of change.

Our Strategies for Maximizing Impact

We employ the following two strategies to sustain and amplify our impact.¹⁴

People First, Projects Second

The dream of all non-profits is sustained impact. We believe people, rather than ideas or intellectual property, are at the heart of creating change. Projects, ideas, and

¹⁴ The core thinking on our strategies for impact is deeply inspired to the point of near plagiarism by the Shuttleworth Foundation, one of our early funders. The Shuttleworth Foundation. (2019). *50 Shades of Green*. <https://shuttleworthfoundation.org/book/downloads/fifty-shades-of-green.pdf>

initiatives come and go; what continues is an individual's drive to make a difference in the world through their knowledge and experiences.

This is why we choose to fund and partner with individuals who are “*not only brave enough to reimagine the future, but brave enough to try.*”¹⁵ At the core of each of our programs, projects, and initiatives are individuals who we believe will spark growth and change in cellular agriculture.

By focusing on individuals, we are building a community of leaders united by our mission and strengthened by our differences.

Default to Open

In conventional situations, intellectual property (IP) is considered most valuable when protected, something which is key to generating a return on investment. At New Harvest, we are seeking a return on impact - how can we create the most change with our resources?

Our approach is to default to open. By ensuring that the IP assets that we create (publications, images, etc.) are accessible for all to use, re-use, redistribute and build upon, we are multiplying the impact of that asset. Open invites collaboration, discussion, and reflection. All of this is crucial in positively transforming our food system.

We understand that not every piece of content needs to be open. But we choose - as a public charity - to default to open, to push for and establish new norms when it comes to publicly funded research and publicly consumed products.

Our Five Year Goal

The 100 Leader Bioreactor

Our big, hairy, audacious goal¹⁶ is to enable 100 individuals towards leadership roles in cellular agriculture within the next five years.

What is a leader in cellular agriculture?

A leader is a person who advances the development and maturation of the field. They might be a thought leader, whose voice and ideas deepen the conversation and considerations for the field. They might be an operational leader, who turns ideas into

¹⁵ The Shuttleworth Foundation. (2019). *50 Shades of Green*.
<https://shuttleworthfoundation.org/book/downloads/fifty-shades-of-green.pdf>

¹⁶ Collins, J. C., & Porras, J. I. (1994). *Built to Last: Successful Habits of Visionary Companies*. William Collins.

actions and material progress. They could be a facilitation leader, who rallies groups together and builds momentum. They could be an entrepreneur, an academic, a staff scientist, an independent consultant, a policy maker, a non-profit founder.

Leaders are agents of ongoing change.

An industry flourishes with a robust mix of expertise, perspectives, and voices. By being a “100 Leader Bioreactor” we are equipping, enabling, and empowering individuals to uniquely add value to the cellular agriculture ecosystem.

Our Mission

To maximize the positive impact of cellular agriculture on the world.

Our previous mission was “to build the field of cellular agriculture”. We revised our mission to acknowledge that building the field is not simply about the number of players or dollars involved; how the field is built is crucially linked to how cellular agriculture impacts the world.

“The most widely held views of technologies fail to reflect the complexity of our relationship with them.”¹⁷

Our new mission is about building the field while also ensuring that cellular agriculture delivers on its promises to end our dependence on animal agriculture, reduce the impact of protein production on our environment and public health, and improve our global food system. We must acknowledge that positive impacts are not innately built into the advancement of technology.

Our Vision

“When the goal is to create something that is beneficial for the world, rather than beneficial for the market, everything gets reconsidered.”¹⁸

We believe that positive impact is maximized - and our mission realized - when cellular

¹⁷ Philbeck, T., Davis, N., & Engtoft Larsen, A. M. (2018). *Values, Ethics and Innovation Rethinking Technological Development in the Fourth Industrial Revolution*. World Economic Forum. http://www3.weforum.org/docs/WEF_WP_Values_Ethics_Innovation_2018.pdf

¹⁸ Philbeck, T., Davis, N., & Engtoft Larsen, A. M. (2018). *Values, Ethics and Innovation Rethinking Technological Development in the Fourth Industrial Revolution*. World Economic Forum. http://www3.weforum.org/docs/WEF_WP_Values_Ethics_Innovation_2018.pdf

agriculture is:

- **Accessible**, such that anyone in the world can participate in the understanding, production and consumption of cellular agriculture products;
- **Applicable**, such that cell ag technologies can be applied accordingly and appropriately to different cultures, regions, and cuisines; and
- **Accountable**, such that claims can be substantiated and there is transparency along the length of the supply chain.

Cellular agriculture is a transformative technology that will change our world. This is both an opportunity and a responsibility to create a world that is better than the one we inhabit today.

“Technology changes ethics, it challenges old beliefs, it upends institutions that do not grow and change. ...As synthetics or lab grown meats get cheaper, healthier, and safer, most will wonder why we caged and slaughtered billions of sentient beings. Future generations will judge many of our practices outdated, inefficient, and in some cases, outrageous and evil.”¹⁹

We want to see animal products that were not the product of artificial insemination, breeding, or slaughter - that’s a given. But that is not the only ethical issue that we would like to see addressed as we reimagine our food system.

We want to be able to look at every aspect of cellular agriculture food production - the supply chains, labor practices, land use, waste management, subsidies, policies, standards, regulations, etc. - and be proud to see ethical, data-driven decision-making that creates a better world for animals, people, and the planet.

Our food system is not the *only* system that is ready to be re-envisioned. In working towards our mission we uncover shortcomings in academia, philanthropy, and policy that need updating. We want to see our work leave a wake of positive impacts in everything we touch - and for cellular agriculture to spark greater transformation beyond its own boundaries.

Our Values

Embedded in our vision are our values, which further define the ethical world we hope to create. The following values are the core ideals which guide our decisions and actions:

¹⁹ Enriquez, J. (2020). *Right/Wrong: How Technology Transforms Our Ethics*. MIT Press.

- **Integrity in Everything.** The ends do not justify the means. We are committed to honesty, honor, and truthfulness in everything we do. We recognize the power and responsibility that we hold - as a funder, as a thought leader, as a public voice - and strive to always and only use it for good.
- **Informed Optimism.** We must communicate the promise and progress of cellular agriculture to the world - and differentiate between the two. Data and evidence must guide us towards realizing our vision.
- **Inclusive Expertise.** There is strength in diversity - of thought, of perspective, of experience, of expertise. Our work will not change the world *unless* it welcomes diverse voices and creates equitable means of contribution.

IMPACT OBJECTIVES

To the extent that a strategic plan is a “road map,” our impact objectives describe the focus of our activities over the next five years. Based on our strategic context research, we developed the following three impact objectives, which we believe will have the greatest impact in advancing our mission over the next five years.

★ **Empowering Emerging Leaders**

🌐 **Mobilizing the Ecosystem**

🌊 **Collective Value Creation**

★ **Empowering Emerging Leaders**

Training and supporting individuals towards field-level leadership roles that fortify and advance cellular agriculture.

New Harvest provides unique opportunities to empower leaders within the cellular agriculture context, with special focus on supporting voices and perspectives which are currently neglected or underrepresented.

We see technical leadership in cellular agriculture as one of the biggest limiting factors to growth in this field. Technical leaders - individuals who will become key technical co-founders, principal investigators, and independent experts - become drivers of ongoing innovation in cellular agriculture. Our research programs create opportunities for individuals to hone technical skills in an environment that provides peer support, network connections, and unique visibility.

Empowering leaders goes far beyond our programming into our day-to-day interactions with members of our broader community. By having our “100 Leaders” goal top of mind, we find ways to use our unique vantage point in the field to help newcomers get to where they’re going.

This objective ties most directly to our goal of enabling 100 individuals towards leadership roles in cellular agriculture within the next five years.

LOGIC MODEL

Mission	To maximize the impact of cellular agriculture on the world	
Objective	★ Empowering emerging leaders	<ul style="list-style-type: none"> • Training and supporting individuals towards field-level leadership roles that fortify and advance cellular agriculture.
Output	Rising stars who expand and diversify the cell ag talent pool	<ul style="list-style-type: none"> • Visionary, operational, and facilitative leaders with a diversity of thought, perspective, experience, and expertise who are equipped to fortify and advance cellular agriculture.
Outcomes	100 leaders who add unique value to the field	<ul style="list-style-type: none"> • A developed workforce equipped to advance cellular agriculture across industry, academia, and beyond. • Individuals equipped to independently vet, evaluate, and/or collaborate with the cell ag industry.
Impact	The safe, unabated advancement of cell ag products to market	<ul style="list-style-type: none"> • Equitable expansion of the industry landscape • An appropriately competitive ecosystem • Diversification of the protein portfolio to lessen our dependence on animal agriculture

PROGRAMS

- New Harvest Fellowship Program
 - Our flagship fellowship program is the pre-eminent opportunity for graduate students and post-doctoral researchers pursuing research-oriented leadership positions in cellular agriculture. Researchers are provided with multi-year funding for work in the lab plus opportunities for mentorship and thought leadership.
- New Harvest Dissertation Award
 - The Dissertation Award is an opportunity for students in their final year of doctoral studies. The goal is to enable outgoing doctoral students to recontextualize their research for cellular agriculture. Dissertation awardees are provided with funding for preparation of their publication and opportunities for mentorship and thought leadership.

- New Harvest Seed Grant Program
 - Our seed grant program is shorter-term support for individuals exploring research-oriented opportunities in cellular agriculture.

Mobilizing the Ecosystem

Becoming the trusted, equitable, and productive convener of cellular agriculture stakeholders around key neglected topics.

In this developing ecosystem, collaboration is an active practice. Convening stakeholders is not simply about providing a venue; it is about creating environments that welcome new voices to the field, and it is about setting up systems that design for equitable participation and meaningful exchange.

As an independent non-profit research organization, New Harvest is well-suited to be the convener of this nascent field and industry around certain pre-competitive issues, especially where certain cell ag groups - such as trade associations and research centres - have not yet formed.

We convene the ecosystem at two levels - at the level of the disciplines across the sciences, and at the level of stakeholders across the landscape.

We could describe New Harvest as “*antidisciplinary - not against disciplines, but explicitly seeking out ideas and research agendas that work across disciplines, research that falls into the white space between them.*”²⁰ This approach has been key to advancing cellular agriculture, whose research questions rarely fall neatly within existing disciplines.

By connecting the academic disciplines which touch cellular agriculture, we increase the critical interdisciplinary cross-talk that drives innovation. As our fellowship program continues to seed new research groups^{21, 22} around the world, we hope to share our learnings on how to facilitate collaboration across disciplines that have not collaborated before and explore what the next phases of supporting research could look like for New Harvest.

²⁰ Ito, J. (2017, October 31). *The Antidisciplinary Approach*. *Research-Technology Management*, 60, 22-28. [10.1080/08956308.2017.1373047](https://doi.org/10.1080/08956308.2017.1373047)

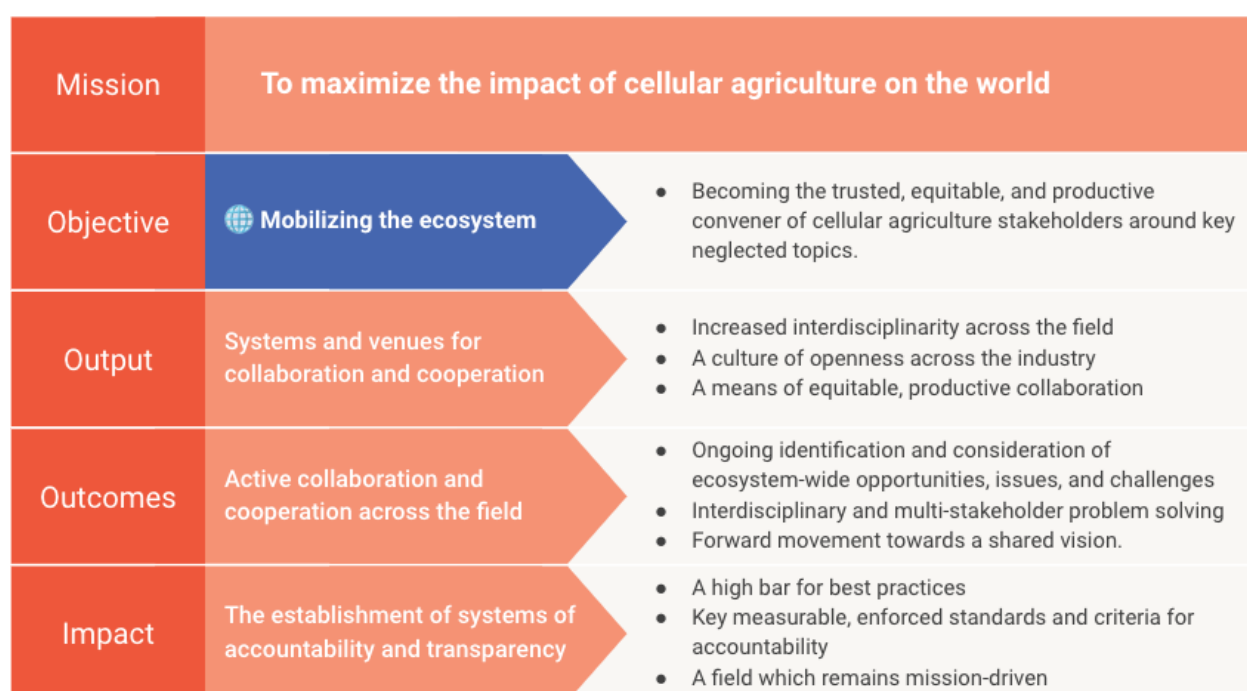
²¹ The supervisor of our research fellows Ted O'Neill and Zach Cosenza at UC Davis [recently won a large federal grant from the US National Science Foundation](#) to establish a cultivated meat research consortium.

²² The supervisor of our research fellow Kai Steinmetz at the University of Auckland [recently won a large federal grant from the New Zealand Ministry of Business, Innovation & Employment](#) to understand the interactions between plant-based protein and cellular agriculture.

Beyond research disciplines, cellular agriculture demands the coming together of stakeholders who will impact and be impacted by this industry. Our intent is to bring everyone to the table, listen to the needs of the ecosystem, and work toward collectively and equitably addressing those needs and challenges.

This objective ties to our 100 leader goal by enabling leaders who are importantly adjacent to cellular agriculture. In mobilizing the ecosystem we bring in experts and leaders who are well-versed in ecosystem challenges - safety, regulation, policy, tissue engineering, food science, etc. - and bring them up to speed on the cell ag side of things, helping individuals find unique niches in the broader landscape.

LOGIC MODEL



PROGRAMS

- New Harvest Fellowship Program**
 - Unlike the average research fellowship, New Harvest mandates pre-publication collaboration amongst active fellows. The result is a global network of 20+ scientists sharing challenges, know-how, and protocols on a weekly basis in something akin to a distributed laboratory meeting.
 - Lab Meets are twice per year events where active New Harvest fellows convene in person, often at a fellows' institution or the New Harvest headquarters. Programming includes laboratory skill shares, industry tours, and fellow-designed talks to share pre-published learnings and best

practices.

- **New Harvest Conference**

- The New Harvest Conference is the world's longest-running event dedicated entirely to advancements in cellular agriculture. Previous editions of the boutique event had brought together around 300 participants per year, which represent a mix of new and established players and individuals pursuing careers in cellular agriculture. The programming lifts up new voices in the field and addresses critical, neglected conversations.

- **Cultured Meat Safety Initiative**

- The Cultured Meat Safety Initiative is New Harvest's inaugural industry-wide initiative designed to illuminate a key research gap of paramount importance: the data required to demonstrate the safety of cultured meat products. The result of this initiative will be a peer-reviewed publication delineating a path to safety demonstration and the beginnings of ongoing collaboration around cultured meat safety research.

Collective Value Creation

Co-creating resources, knowledge, and tools that have collective value for the cellular agriculture ecosystem and beyond.

Unlike other fields, cellular agriculture has yet to form a canon of knowledge - the established body of publications, tools, resources, and protocols that serve as the scientific basis for a field. These are valuable assets that contribute to our collective progress - the “rising tide” which lifts all boats²³.

This canon of knowledge is essential for informing policymakers and increasing public literacy around cellular agriculture. It lowers the barriers to entry for new entrants into the ecosystem - allowing them to “*stand on the shoulders of giants*”²⁴ - and it is crucial to the establishment of standards and systems of accountability in the field. This is research with collective value.

Exploratory research - which investigates ideas that are too “out there” for corporations to explore - accelerate the field. Resulting publications become critical for pushing the field forward well beyond the introduction of the first commercialized cell ag products.

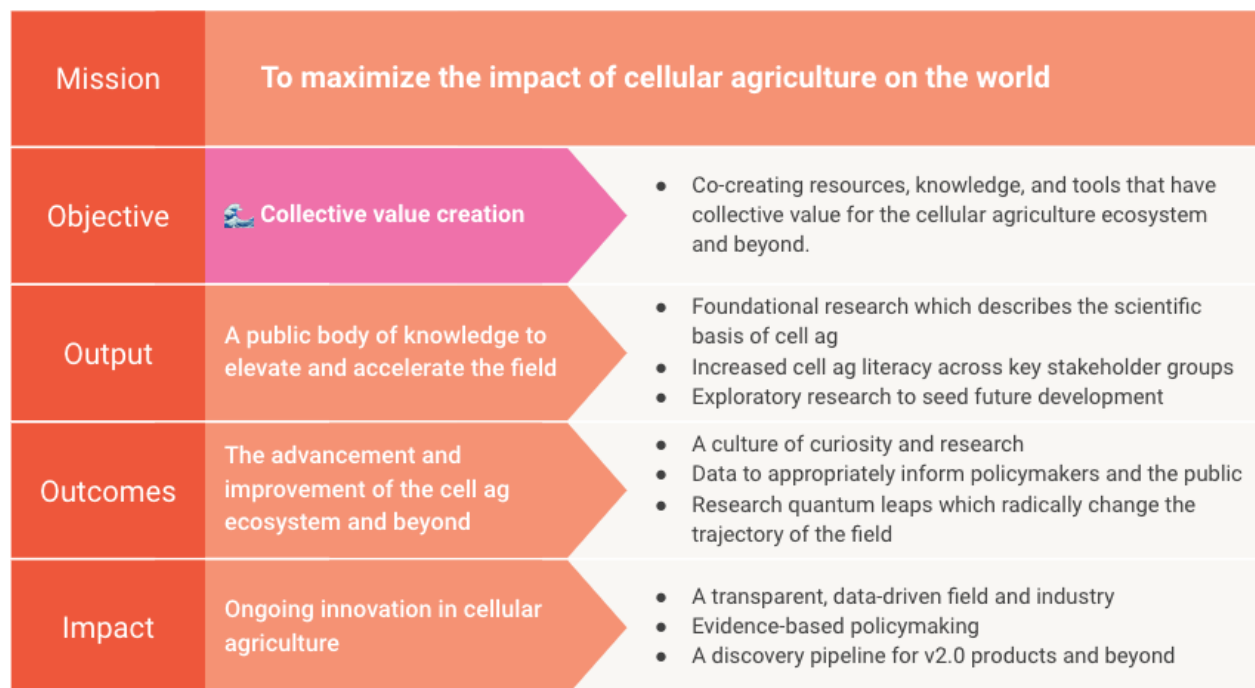
²³ A modification of the slogan from the New England Council which was popularized by 35th President of the United States, John F. Kennedy.

²⁴ A metaphor often used in academia which refers to the advancement of discovery and understanding by building on previous discoveries: Keith, B., Vitasek, K., Manrodt, K., & Kling, J. (2016). *Strategic Sourcing in the New Economy*. Palgrave Macmillan US. [10.1007/978-1-137-55220-4](https://doi.org/10.1007/978-1-137-55220-4)

These investigations can drive research quantum leaps which can radically change the trajectory of cell ag as a field and industry.

This objective ties to our 100 leader goal by enabling leaders who drive the co-creation process and own and perpetuate the use of the co-created assets. They may be operational leaders who manage large multi-stakeholder projects; they may be thought leaders who advocate for open, active use of these assets; they may be facilitative leaders who increase accessibility and/or applicability of the assets.

LOGIC MODEL



PROGRAMS

- **New Harvest Fellowship Program**
 - New Harvest fellows are selected in part on the basis of their project proposals. Proposals that focus on critical, neglected topics that establish research foundations or explore radically novel concepts are prioritized in the application process.
- **New Harvest Dissertation Award**
 - Dissertation awardees are selected in large part on the basis of project proposals that address novel topics in cellular agriculture or expand into institutions or fields.
- **New Harvest Seed Grant Program**

- Seed grantees are selected in large part on the basis of project proposals that address novel topics in cellular agriculture or expand into institutions or fields.
- **Cultured Meat Safety Initiative**
 - The Cultured Meat Safety Initiative will be addressing the key research gap which is the lack of data required to demonstrate the safety of cultured meat products. The result of this initiative will be a peer-reviewed publication that outlines research gaps related to safety, planting the seeds for ongoing cultured meat safety research.
- **IRNAS-New Harvest Modular Bioreactor Initiative**
 - This special project is dedicated to designing an open source bioreactor that can be used by cellular agriculture researchers around the world. The presence of tools designed for cellular agriculture research is a major gap in the field. Bioreactors are key technologies for scaling cellular agriculture processes. This project addresses this technological tool gap by designing a modular bioreactor, testing it in real world research applications, and sharing the manufacturing plans on open source platforms to encourage improvements in the design.

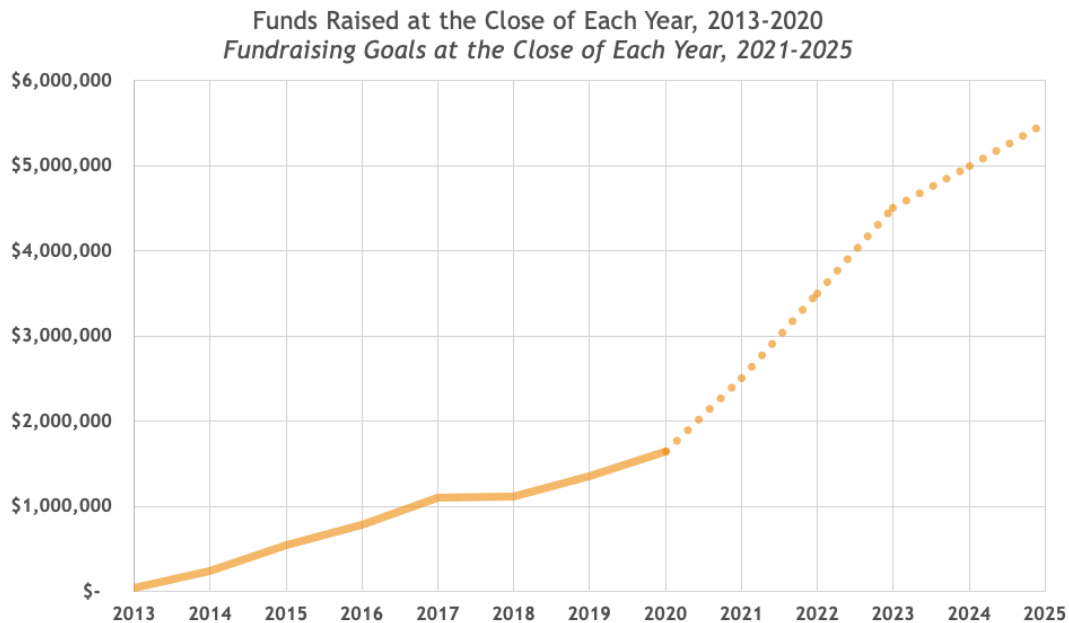
REALIZING OUR IMPACT

What are the organizational capabilities we must build in order to achieve our impact objectives?

To realize our impact, New Harvest must be well-resourced and fully operationalized, with the nimbleness to react to the ever-changing landscape in which we work.

Budget

We envision New Harvest pursuing our impact aims maximally with a \$5 million annual budget. Our hope is to continue steadily growing toward this budget size over the following five years. Once we begin to hit a \$5M/yr budget, we would re-evaluate our priorities and our approach to impact.



At budgets substantially beyond \$5M, we can begin to consider much larger infrastructural interventions for the field, such as the creation of a physical institutes of cellular agriculture for workforce development or applied science; the development of a functional, open access cell repository, or facilities for scale-up research. These types of initiatives will always and only be co-created alongside like-minded partners.

People

Over the next five years, we do not envision New Harvest as a large, unwieldy organization. We want to remain a skunkworks operation - flexible, agile, unbureaucratic - focused on making radical change through targeted interventions. We believe that the key to making radical change is a group size that maximizes interpersonal connection.

“Never doubt that a small group of thoughtful, committed, citizens can change the world. Indeed, it is the only thing that ever has.”²⁵

To us, focused departments (of ~5 individuals), within a tight-knit core team (~10), surrounded by a cohesive community of grantees (~30), supported by a highly interconnected generosity network of activated supporters (~150) is optimal to our work at this point in time.

Our rough 5-10-30-150 rule of thumb for group size is inspired by both the size of military units in the US Army and the research of anthropologist Robin Dunbar.

²⁵ Cultural anthropologist, author, and speaker Margaret Mead

In the Army, the first four military units are a team, squad, platoon, and company; consisting, respectively, of 4, 10, 36, and 200 soldiers.²⁶

Dunbar's research describes social networks as structured into a sequence of layers with the size of each layer increasing as emotional closeness decreases.²⁷ The number of individuals in each layer has been found to be around 5, 10, 35 and 115 individuals in each layer, leading to a cumulative 150 across all layers.²⁸

The generosity network size of 150 is suggested to be the cognitive limit to the number of people with whom one can maintain stable social relationships— in which an individual knows who each person is and how each person relates to every other person.²⁹ Beyond this number, groups tend to fracture. Cohesion is crucial for our work to remain strategic, useful, and community-driven.

Internal Building Blocks

In order to apply our budget and team to achieving the impact objectives described above, New Harvest must strengthen its internal capabilities. In the coming five years, New Harvest will focus on the following areas:

Expanding our Generosity Network

Expanding and diversifying our giving community with a focus on establishing long-term relationships.

Relationships with mission-aligned donors power our organization and make our work possible. Long-term commitments in particular are critical for New Harvest, given our multi-year research grants. Over the next five years we hope to expand our donor base to new types of support which will deepen our connections within the cellular agriculture ecosystem while also welcoming new funders to the cause.

At the root of our donor strategy is our ongoing commitment to New Harvest's independence as a non-profit research organization.

STRATEGIES

- Increasing donor outreach and stewardship

²⁶ Military units in the U.S. Army are described [here](#).

²⁷ Dunbar, R.I. (1998). The social brain hypothesis. *Evol. Anthropol.*, (6) 178-190

²⁸ Isaacs, A., Lindenmann, J., & Valentine, R. C. (1957). *Proc. R. Soc. Lond. B. Biol. Sci.* (272): 439-444

²⁹ Dunbar, R. I. M. (1992). "Neocortex size as a constraint on group size in primates". *Journal of Human Evolution*. 22 (6): 469–493.

- Designing and implementing a corporate donor program
- Designing appropriate opportunities for government funding

Becoming a Learning Organization

Becoming “skilled at creating, acquiring, and transferring knowledge, and at modifying [our] behavior to reflect new knowledge and insights.”³⁰

As New Harvest’s long-term vision turns to measurable successes, we need to become a data-driven organization. This means implementing infrastructure, processes, and practices to create and capture data and knowledge to evaluate the short- and long-term effectiveness of our activities and inform our decisions going forward.

STRATEGIES³¹

- **Implementing tools for tracking data and knowledge**
 - Developing a KPI dashboard
 - Developing methods to document institutional knowledge and experiments
 - Implementing a new donor management system and grant management system to assist with data collection and capture metrics in real time
- **Instituting learning processes**
 - Developing clear OKRs to track the success and progress of the team
 - Conducting quarterly business reviews with the entire team to discuss successes and failures and capture key takeaways and insights
 - Beginning all projects and initiatives with a project charter and ending them with a post-mortem review
 - Developing clear OKRs to track success and progress of the team
 - Conducting quarterly business reviews with the entire team to discuss successes and failures and capture key takeaways and insights
 - Beginning all projects and initiatives with a project charter and ending them with a post-mortem review
- **Professional Growth and Learning**
 - Implementing performance development plans to encourage professional

³⁰ Garvin, D. A. (1993). *Building a Learning Organization*. *Harvard Business Review*, (July-August). <https://hbr.org/1993/07/building-a-learning-organization>

³¹ Strategies inspired by Garvin, D. A. (1993).

growth of all team members

Fostering our Team Culture

*Drawing from research into high-performing teams to promote a positive, collaborative, and healthy work culture.*³²

In 2020 we decided to take the team remote-forward to better support one another in our continued work during a pandemic. Going forward we hope to promote a positive, collaborative, and healthy work culture in the absence of a physical work environment.

STRATEGIES

- Fostering psychological safety by encouraging a culture of asking questions, challenging assumptions, sharing doubts, concerns, successes and failures
- Creating dependability and accountability by clearly defining roles and deadlines across our organizational documents and project management tools
- Connecting our daily work to its meaning and impact by tracking OKRs against our impact objectives
- Valuing diversity and making a commitment to being an actively anti-racist organization.

OUR WAY FORWARD

As we look to the future, accelerating change, increasing complexity, and continued uncertainty define the strategic landscape. In the midst of these challenges, our intent is clear: New Harvest will continue to learn and adapt in order to maximize the positive impact of cellular agriculture. This plan sets us on a trajectory for deepening our impact and improving every aspect of our operation.

³² Rozovsky, J. (2015, November 17). *The five keys to a successful Google team*. re:Work. <https://rework.withgoogle.com/blog/five-keys-to-a-successful-google-team/>

Appendix I: Strategic Context

The strategic context for this plan was derived from examining both the internal and external landscape in which New Harvest does its work.

External Trends

What issues and trends, external to New Harvest, shape our thinking about the future?

New Harvest operates in a complex and dynamic environment in which current and emerging trends present potential opportunities, as well as challenges, to our ability to carry out our mission. The following themes emerged in our research and reflections:

The risk of animal agriculture is increasing.

- Pandemics such as COVID-19 and African Swine Fever are deeply threatening the security of our food supply and the health and safety of workers.³³
- Catastrophic climate events are seeing thousands of head of livestock being eradicated overnight, while climate change is demonstrating that our current animal-oriented food systems are not easily adaptable to record temperatures.³⁴
- Antibiotic resistance continues to be a looming threat to animal and public health alike.³⁵

Funding for foundational research is limited.

- Federal funding for science is declining in the US,³⁶ leaving academics to seek external support, especially for highly novel research such as cellular agriculture.
- Singapore, Israel, Belgium, Japan, and New Zealand are among a handful of countries (notably with relatively small landmass) which are dedicating

³³ Travillian, R. S. (2020, June 16). *Pig Pandemics and Other "Epizootic" Threats*. Think Global Health. <https://www.thinkglobalhealth.org/article/pig-pandemics-and-other-epizootic-threats>

³⁴ Herrero, M., & Thornton, P. K. (2013, December 24). *Livestock and global change: Emerging issues for sustainable food systems*. Proceedings of the National Academy of Sciences, 110(52), 20878-20881. [10.1073/pnas.1321844111](https://doi.org/10.1073/pnas.1321844111)

³⁵ Katrime Integrated Health. (2016). *The Role of Human Health and Animal Health in Antimicrobial Resistance*. National Collaborating Centre for Infectious Diseases. Retrieved December 30, 2020, from <https://nccid.ca/publications/role-human-health-animal-health-antimicrobial-resistance/>

³⁶ Congressional Research Service. (2020, January 24). *U.S. Research and Development Funding and Performance: Fact Sheet*. CRS Report, Version 13 (updated)(R44307). <https://fas.org/sgp/crs/misc/R44307.pdf>

government support to cellular agriculture.^{37, 38, 39, 40}

- There is a rise in commercialism of academic science - more later-stage research is being sponsored, leaving little support for foundational and exploratory research in areas of pressing need.⁴¹

Private investment is driving innovation - behind closed doors.

- The appetite for investment in cellular agriculture is increasing while public research infrastructure remains undersupported.
- It is likely that this is leading to research redundancy, overlap, and excessive on-the-job training for technical hires.

The cellular agriculture industry is growing and maturing.

- Companies founded in the past one to two years tend to have founders with advanced degrees and focus on specific aspects of the supply chain, such as media development, growth factor manufacturing, or bioprocess design.
- Companies are beginning to self-organize into industry organizations around the world.
- New companies are emerging and relocating outside of the US/Silicon Valley hub.
- Several companies aim to put products on the market in the next few years.

The academic cellular agriculture ecosystem faces structural barriers.

- Most universities have not acknowledged cellular agriculture as a new discipline

³⁷ Agency for Science, Technology and Research (A*STAR). (2020, November 30). *Sg Food Story IAF Grant Call For Future Foods: Alternative Proteins*. Agency for Science, Technology and Research (A*STAR). Retrieved December 30, 2020, from <https://www.a-star.edu.sg/Research/funding-opportunities/singapore-food-story-r-d-programme-future-food-alternative-protein-iaf-pg-grant-call>

³⁸ Israel Innovation Authority. (2019, September 24). *Israel Innovation Authority Report: The Potential of Israeli Foodtech*. Israel Innovation Authority. Retrieved December 30, 2020, from <https://innovationisrael.org.il/en/news/israel-innovation-authority-report-potential-israeli-foodtech>

³⁹ Integriculture Inc. (2017, November 23). *Integriculture Inc. starts joint research with Japan Science and Technology Agency on cellular agriculture*. News Release. Retrieved December 30, 2020, from <https://integriculture.jp/news/209/?locale=en>

⁴⁰ Dolgin, E. (2020, December 9). *Will cell-based meat ever be a dinner staple?* Nature, 588, S64-S67. <https://doi.org/10.1038/d41586-020-03448-1>

⁴¹ Caulfield, T., & Ogbogu, U. (2015, October 14). *The commercialization of university-based research: Balancing risks and benefits*. BMC Medical Ethics, 16(1 70). [10.1186/s12910-015-0064-2](https://doi.org/10.1186/s12910-015-0064-2)

warranting specialized undergraduate or graduate programs.

- Food and agriculture as disciplines and biomedical-oriented disciplines such as tissue engineering and cell biology have conventionally been siloed. These are the fields that make up the interdiscipline that is cellular agriculture.
- Funding for the above disciplines is also often siloed, preventing collaboration and reducing the likelihood of receiving institutional or government support.

The field continues to lack credible, public information.

- There is little independent, credible information and there are few expert scientists who can appropriately guide and inform policymakers and consumers about cellular agriculture.
- Companies aim to put products on the market in the absence of peer-reviewed data which would inform public policy regarding the safety, regulation, and advancements of said products.
- This leaves room for mis- and dis-information on cellular agriculture.
- The cellular agriculture industry has so far remained relatively unaffected by oppositional groups - this can change at any time, especially in an information vacuum.

COVID-19 has changed the game for funding, research, and views of the supply chain.

- Funding:
 - Job insecurity and support for COVID-affected groups may negatively affect appetite for cellular agriculture philanthropy.
 - Linkage between pandemics, animal husbandry, and food security may positively affect appetite for cellular agriculture philanthropy.
- Research:
 - Large sums of funding have been dedicated to vaccine and pandemic research, potentially overlapping with cell ag-relevant experts such as protein biochemists and bioprocess engineers.
 - COVID-19 research and diagnostic testing efforts have contributed to a

shortage of certain common laboratory materials and reagents.⁴²

- Laboratory work remains relatively unchanged given the baseline use of PPE and work in small cohorts.
- Public perception of scientists is becoming more favorable.⁴³
- Supply Chain:
 - COVID-19 disproportionately affected animal product supply chains, drawing attention to the challenges they present to food security.⁴⁴

Wild card factors.

- In a climate-changed world, we must be resilient and agile in the face of high-impact but impossible to predict events, such as the state of the economy, international events such as war or terrorism, natural disasters, election outcomes, policy changes, and technological breakthroughs.

Internal Trends

What are the key strengths and vulnerabilities within New Harvest that influence our ability to achieve our strategic mission and vision?

Strengths

We are thought leaders. We continue to see ideas, talking points, actions, and values originating within New Harvest be replicated around the world, magnifying the impact of our organization.

Our research network. Our research grantee network spans 26 universities across eight countries.⁴⁵ Catalyzing and deepening network relationships allows us to increase investment in cellular agriculture beyond the support that New Harvest alone can offer.

⁴² Behnam, M., Dey, A., Gambell, T., & Talwar, V. (2020, July 15). *COVID-19: Overcoming supply shortages for diagnostic testing*. McKinsey & Company. <https://www.mckinsey.com/industries/pharmaceuticals-and-medical-products/our-insights/covid-19-overcoming-supply-shortages-for-diagnostic-testing#>

⁴³ Andrews Fearon, P., Götz, F. M., & Good, D. (2020, April 21). *Pivotal moment for trust in science – don't waste it*. *Nature*, 580(456). <https://doi.org/10.1038/d41586-020-01145-7>

⁴⁴ Hashem, N. M., Gonzalez-Bulnes, A., & Rodriguez-Morales, A. J. (2020, October 15). *Animal Welfare and Livestock Supply Chain Sustainability Under the COVID-19 Outbreak: An Overview*. *Frontiers in Veterinary Science*, 7(582528). [10.3389/fvets.2020.582528](https://doi.org/10.3389/fvets.2020.582528)

⁴⁵ New Harvest. (2020, November 12). 2020 Year in Review. https://www.youtube.com/watch?v=4aAyK_lIrJc

Our long-term commitment to research. Foundational research does not happen overnight - only several years later are we seeing our theory of change come to life through New Harvest researchers securing independent leadership roles, researchers receiving landmark government grants, and peer-reviewed publications on original, cellular agriculture-focused research.

We focus on ecosystem growth. New Harvest team members do not sign NDAs and do not engage in due diligence with investors. We fiercely protect our independence as a philanthropy-supported non-profit research organization. Our current potential conflict of interest is founding equity held in Perfect Day Foods and Clara Foods, two companies who came out of our ecosystem work.

A trusted, independent organization. Our commitment to academic integrity and peer-review have established New Harvest's reputation as a credible research organization. Our clear foregoing of lobbying activities and initiatives that can be construed as private inurement preserve the impartiality in our work. We are advocates for investigation and inquiry into a promising science and technology.

A commitment to transparency. We only support open science research and all of our research fellows commit to publishing in open access journals during the course of their fellowship.

A focused, nimble team. The growth of the cellular agriculture landscape has allowed us to narrow in on work that is highly impactful and neglected. Our distributed but highly connected team can rapidly make and implement organization-wide decisions in the face of new opportunities or challenges.

Strength in diversity. Our team members and grantees are united in our differences. We believe that bringing together individuals with different backgrounds in terms of identity, areas of expertise, lived experience, and orientation to our mission strengthens the work of our organization.

Vulnerabilities

We are undercapitalized. We often find ourselves having to forego work on activities and initiatives because of an inability to fund all the high-impact work that we would like to pursue.

We take on risk for long-term research. Each research project we support, is on average, three years long. We often make funding decisions using capital that is not yet secured, meaning that our organization relies on future success to deliver on current commitments.

Catching up on operational growth. New Harvest's operations are due for a re-optimization in light of the expansion of our research program.

We are not the loudest organization. To us, awareness building is hard to measure, difficult to do well, and not the most important bottleneck to the advancement of cellular agriculture science. Because we don't pursue this type of work, we're not necessarily driving a lot of traffic towards our organization, perhaps leading to our undercapitalization.

We're blazing a new trail. As first-time leaders, every connection, relationship, and message is new, the trajectory of organizational growth is novel, and there is no built-in network or community to leverage.

We're misfits. We are a challenging organization to categorize. Our work addresses several issues: animal welfare, sustainability, public health; our actions resemble a research foundation but we operate like an institute; we're biotechnology experts exploring food science and vice versa. It's hard to tell our story.

Our impact is long term and challenging to measure. The outcomes that matter to us are very big, distant, and hard to measure; the number of animals no longer needed to be reared and slaughtered for food, the global reduction of greenhouse gases, the generation of new agriculture jobs, the reduction of pandemics and outbreaks, the resilience of our food system. It's challenging to demonstrate how our work chips away at these goals in an annual report and we refuse to focus on flashy short term metrics of limited utility.

Appendix II: Current Programs Overview (Nov 2020)






The following table outlines and describes New Harvest's main programs as they relate to the impact objectives:


★ **Empowering Emerging Leaders**

🌐 **Mobilizing the Ecosystem**

🌊 **Collective Value Creation**

Program (as of Oct 2020)	Description
<p>New Harvest Fellowship Program</p> <p>2015-ongoing</p>	<p>★ Our flagship fellowship program is the pre-eminent opportunity for graduate students pursuing research-oriented leadership positions in cellular agriculture. Researchers are provided with multi-year funding for work in the lab plus opportunities for mentorship and thought leadership.</p> <p>🌐 Unlike the average research fellowship, New Harvest mandates pre-publication collaboration amongst active fellows. The result is a global network of 20+ scientists sharing challenges, know-how, and protocols on a weekly basis in something akin to a distributed laboratory meeting.</p> <p>Lab Meets are twice per year events where active New Harvest fellows convene in person, often at a fellows' institution or the New Harvest headquarters. Programming includes laboratory skill shares, industry tours, and fellow-designed talks to share pre-published learnings and best practices.</p> <p>🌊 New Harvest fellows are selected in part on the basis of their project proposals. Proposals that focus on critical, neglected topics that establish research foundations or explore radically novel concepts are prioritized in the application process.</p>
<p>New Harvest Dissertation Award</p> <p>2019 - ongoing</p>	<p>★ The Dissertation Award is an opportunity for students in their final year of doctoral studies. The goal is to enable</p>

	<p>outgoing doctoral students to recontextualize their research for cellular agriculture. Dissertation awardees are provided with funding for preparation of their publication and opportunities for mentorship and thought leadership.</p> <p> Dissertation awardees are selected in large part on the basis of project proposals that address novel topics in cellular agriculture or expand into institutions or fields.</p>
<p>New Harvest Seed Grant Program</p> <p>2017 - ongoing</p>	<p>★ Our seed grant program is shorter-term support for individuals exploring research-oriented opportunities in cellular agriculture.</p> <p> Seed grantees are selected in large part on the basis of project proposals that address novel topics in cellular agriculture or expand into institutions or fields.</p>
<p>New Harvest Conference</p> <p>2016 - 2019</p> <p>2020 - 2021 (cancelled)</p>	<p> The New Harvest Conference is the world's longest-running event dedicated entirely to advancements in cellular agriculture. The boutique event (300 participants per year) is attended by a mix of new and established players and individuals pursuing careers in cellular agriculture. The programming lifts up new voices in the field and addresses critical, neglected conversations.</p>
<p>Cultured Meat Safety Initiative</p> <p>2020 - Ongoing</p>	<p> The Cultured Meat Safety Initiative is New Harvest's inaugural industry-wide initiative designed to illuminate a key research gap of paramount importance: the data required to demonstrate the safety of cultured meat products. The result of this initiative will be a peer-reviewed publication delineating a path to safety demonstration and the beginnings of ongoing collaboration around cultured meat safety research.</p> <p> The Cultured Meat Safety Initiative will be addressing the key research gap which is the lack of data required to demonstrate the safety of cultured meat products. The result of this initiative will be a peer-reviewed publication that outlines research gaps related to safety, planting the seeds for ongoing cultured meat safety research.</p>

<p>IRNAS-New Harvest Modular Bioreactor Initiative 2018 - Ongoing</p>	<p> This special project is dedicated to designing an open source bioreactor that can be used by cellular agriculture researchers around the world. The presence of tools designed for cellular agriculture research is a major gap in the field. This project addresses the gap by designing a modular bioreactor, testing it in real world research applications, and sharing the manufacturing plans on open source platforms to encourage improvements in the design.</p>
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Appendix III: Decision Making Criteria

The following questions should guide adoption of new activities and initiatives into New Harvest's portfolio.

Does the activity/initiative in question:

- Alignment with organization
 - Align with or further our mission and vision?
 - Align with our values?
 - Align with our position as a trusted collaborator and leader in cell ag?
 - Address one or more of our impact aims?
- Alignment with approach
 - Does it elevate and provide ownership opportunities to an individual (leader)?
 - Does it contribute to greater diversity in cell ag across all criteria?
 - Does it result in assets that can be used by anyone, anywhere?
- Alignment with non-profit status
 - Is this neglected work that no other group is doing/supporting?
 - Is this work pre-competitive?
 - Is this work catalytic?
- Alignment with operational capabilities
 - Does this leverage our existing assets?
 - Can it be accomplished with existing funds and/or is it feasible to raise new funds?
 - Can it be accomplished by the existing team and/or is it feasible to hire new team members?