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2022

IATI Israel's Life Science Annual Industry Report

Connecting Israel's Tech Ecosystem

Addressing Climate Change through Bioscience and Biotechnology Innovation

With the support of Dr. Ruth Dagan, Partner, Head of Environment and Climate Change Practice, Herzog

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IATI is the umbrella organization of Israel's tech ecosystem with the mission of generating impact across all value chains of the Israeli economy and society



 **Connecting Israel's tech ecosystem**

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Executive summary

IATI Israel's Life Science Annual Industry Report provides the broadest, deepest view of this thriving industry. The continuity, the annual comparison and the long-term view, all make the Report the most comprehensive take on the Israeli Life Science Industry. As the Israel's Umbrella Organization of the High-Tech & Life Science industries, IATI continuously acts to connect and promote the country's massive resources of academic and technological prowess towards creating a fertile ecosystem which will nourish growth in the coming years as well.

The Israeli life science industry kept growing in 2021 despite the COVID-19 pandemic. Continuance increase in the number of companies, stable maturity levels and innovation in new and developing sectors, all contribute to the industry's success and its significant role in the Israeli economy. 2021 was a record year in capital raising from VCs, public offerings and other investors with a challenging H1 of 2022 in these aspects.

After putting a spotlight on the industry's rising sub-sectors in our prior report, we focus this time on some new promising sub-sectors and following up on those we have identified in the past. This is in addition to the traditional sub-sectors discussed in our prior reports. The spotlight is put on those sectors not only because they are fast populated by new companies and attract more investments, but mainly as being leaders in innovation and multidisciplinary abilities, demonstrating the industry's ability to take advantage of the excellence in academic research, deep government support and the innovative ecosystem in Israel.

The healthtech industry has been experiencing dramatic changes due to the COVID-19 pandemic. From unique collaborations with players coming outside of the life sciences industry through fast paced adoption of digital health and remote health solutions, the pandemic had a huge impact on the industry. This also led to a record year when it comes to funding, as aforementioned.

The healthcare landscape is continuing to shift towards a more integrated ecosystem, converging biopharma, medtech, digital health and healthcare into a single bioconvergent industry. This emerging bio-convergent healthtech space holds great potential to make a transformative impact on health and healthcare practices. When it comes to holding a leading position in this emerging bio-convergent field, Israel has substantial strengths and capabilities. The new shifts and trends in the Israeli Health Tech space were all demonstrated for the first time in a conference driven by IATI by the industry and for the industry in continuation of the legacy of the MIXIII conference.

A broader discussion on Israel's value proposition in the bio-convergence sphere can be found in the "Bio-Convergence Revolution" chapter of this report.

The healthcare system is confronting skyrocketing costs, while the biopharma industry is coming up against aggressive pricing pressures. In an effort to meet these challenges, the healthtech industry is seeking new innovation growth engines.

Israeli life science companies can play, and in many ways already are playing, a leading role in facing the coming challenges. Fostering digital health innovation to address actual needs and not perceived ones, for example, can lead to significant improvements in integrating technological solutions, even from sources outside of traditional healthcare. We invite you to read insights from the field in the "How Can the Israeli Health-Tech Industry Reduce the Cost Burden" chapter and throughout the report.

We would like to warmly thank Omer Gavish, Partner, Pharmaceuticals & Life Sciences Leader at PwC Israel, for all the support in preparing this Report; Dr. Ami Appelbaum Chairman and Dror Bin, CEO of The Israeli Innovation Authority for supporting our Report and for partnering with us on promoting the industry throughout the year; Prof. Yossi Matias, Vice President, Engineering & Research, Google; Dr. Yair Schindel, Co-Founder & Managing Partner and the team of aMoon Fund; Oded Har-Even, Co-Managing Partner, Sullivan & Worcester Tel-Aviv; and Dr. Ruth Dagan, Partner, Head of Environment & Climate Change, Herzog Fox & Neeman.

Here's to another year of Israeli Health- Tech pride!

Karin Mayer Rubinstein

CEO & President

IATI

Yaacov Michlin

Chairman

MIXiii Health-Tech.IL

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Addressing Climate Change through Bioscience and Biotechnology Innovation¹⁵

Introduction

Simultaneously with the publication of this report, nations of the world are coming together in Sharm El-Sheikh for the 2022 United Nations Climate Change Conference (COP 27). As delegates commence discussions, strong commitments are expected from both governments and the business sector towards achieving the Paris Agreement mitigation goal of limiting global warming to below 1.50c.

It is widely agreed that this "all hands on deck" state of urgency requires utilization of much more than what are considered to be "traditional" technologies for addressing climate change, such as solar energy and electrification. As a result, we are evidencing an exponential growth in diverse fields within the climatech ecosystem, which has become a lucrative \$13.8 billion industry in 2021 and is expected to reach \$147.5 billion by 2032¹⁶.

The world of climatech is comprised of numerous technology fields including clean manufacturing, circularity and materials, green construction and buildings, smart agriculture, alternative foods, clean energy, water technologies, clean transport and supply chains, and nature tech along with broad applications of digital technologies such as emission reduction measurement, big data analytics and AI.

Many of the relevant scientific and technological disciplines are closely connected to one another and at times intrinsically intertwined. Furthermore, numerous tech companies currently operating in the climatech space had their origins in completely different fields and for different purposes, while only recently realizing their true calling was addressing climate change. For example, high-tech companies originally founded to provide digitized data collection tools to increase profitability of manufacturing plants, have discovered that with a dedicated shift in their product, it could become a game-changing tool in reducing process-related carbon emissions – thus, clean manufacturing technologies emerged. A similar evolutionary process being witnessed in recent years is the gradual turn of life science and biotechnology companies towards a focus on climate-related applications and solutions.

¹⁵ With the support of Dr. Ruth Dagan, Partner, Head of Environment and Climate Change Practice, Herzog..

¹⁶ <https://www.futuremarketinsights.com/reports/climate-tech-market>

Bioscience and Biotechnology at the Forefront of the Climate Challenge

In examining the science of biology at the intersection of climate change, it becomes clear that the connection is infinite. It is reflected in all aspects of life – how we eat, how we live, whether we succumb to the effects of climate or prevail.

It is thus estimated that the application of biosciences and biotechnology to climate-related challenges harnesses the potential to mitigate the equivalent of 3 billion tons of carbon dioxide annually by 2030, which reflect roughly half of the USA's total annual emissions¹⁷. Furthermore, while mitigation is key, biosciences equally hold solutions to climate adaptation challenges, as we prepare to live in a warmer environment with increasingly volatile climate patterns.

There are numerous ways in which biosciences and biotechnology can contribute to the fight against climate change. These include the following¹⁸:

- **Bioenergy and Biomaterials** – biofuels and biomaterials are gradually replacing petrochemicals and GHG emission-intense construction materials such as concrete. Bio-products are geared to revolutionize energy and raw material consumption in manufacturing processes, infrastructure and buildings. Examples include construction materials grown from fungi and bio-fuels produced from algae.
- **Agtech and Foodtech** – food production is responsible for a staggering one-quarter of global greenhouse gas emissions. The ability to engage in sustainable agriculture and low-carbon food production is key to both climate change mitigation and adaptation, while biosciences and biotechnology innovation is at the forefront in confronting this challenge. Cellular agriculture is allowing for the development of new strains of rice and other grains, while cutting-edge technologies are allowing for the production of cultured meat and dairy proteins in laboratory conditions. These will all result in drastic reduction of methane emissions resulting from food consumption.
- **Molecular Biology and Synthetic Biology** – gene editing allows growing organisms that are not only adapted to climate change but can help fight it. Trees and plants are being engineered for enhanced photosynthesis and new plant species are being cultivated to lock away more carbon, and faster. Rearrangement of genes creates new biological carbon-fighting systems such as pollution-removing microbes.

¹⁷ [Climate Report Executive Summary_FINAL.pdf \(bio.org\)](#)

¹⁸ [13 ways bioscience is helping fight climate change \(rsb.org.uk\)](#)

- **Climate Change and Health** – building resilience to the effects of climate change is a critical component in addressing the global climate challenge. This includes not only adaptation to rising temperatures and sea levels, but preparedness for the possible spread of diseases and increased prevalence of pandemics. Here too, life science - based applications come into play and will have a significant impact on human adaptability to climatic effects in coming decades.

Israel's Role in Addressing Climate Change through Bioscience and Biotechnology

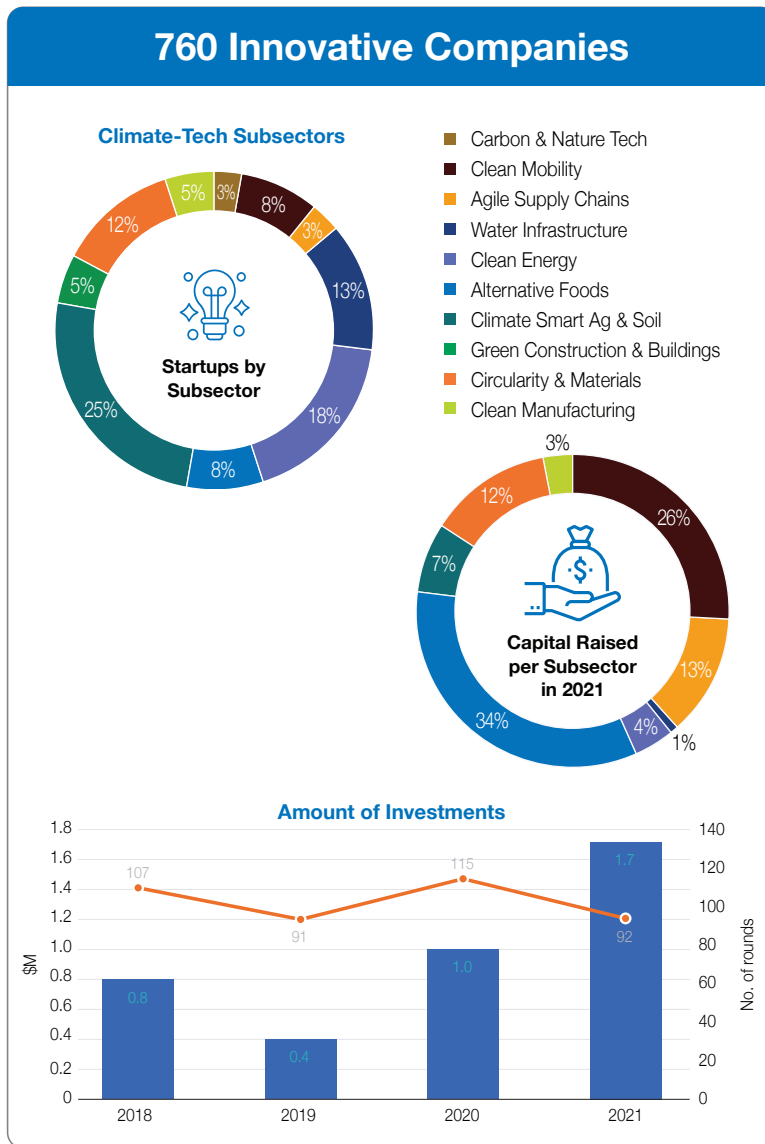
It is no secret that similar to global trends, Israel's climatech ecosystem is booming. It is estimated that the Israeli sector has seen investments in the range of \$5.2 billion between the years 2018-2021 while in the first half of 2022 alone they totaled an estimated \$1.47 billion¹⁹.

While it is unclear from sectoral breakdowns precisely what portion of this funding went to bioscience and biotechnology related companies, figures indicate this portion could be significant. According to Startup Nation Central data²⁰, 34% of capital raised in 2021 went to the alternative foods sector. 12% went to circularity and materials and 7% to climate smart agriculture.

¹⁹ <https://www.planetech.org/planetech-world-Israel's-State-of-Climatech-2022-Update>.

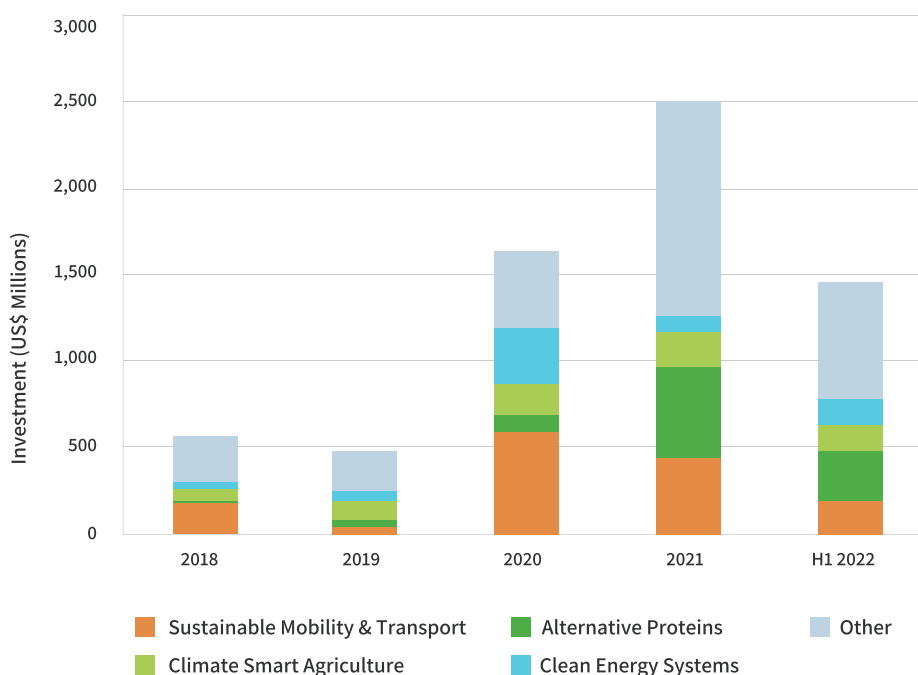
²⁰ https://startupnationcentral.org/wp-content/uploads/2022/07/Climate_tech_2-pager-JUNE22.pdf

Figure 11 - Capital raised by subsector in 2021



Source: Start-Up Nation Central - The Israeli Climate-Tech Sector

Figure 12 - Investments in Israeli Climate Tech Startups



According to PLANTech data²¹, out of approximately 700 startups identified in the climate tech space in Israel, close to 140 are classified as operating in the climate smart agriculture sector, close to 60 in alternative proteins, over 70 in materials and circularity and tens of additional startups in related fields including forest and land ecosystems, oceans and water ecosystems and biodiversity.

Based on global climate tech projections, this upward trend is expected to continue. Moreover, Israel has pledged as a matter of national policy, to promote its climate tech capabilities worldwide and essentially become the "Climate Tech Nation"²². This fact alone will do much to advance climate tech companies originating in Israel, bioscience and biotechnology sectors included. This government-backed agenda has helped to create a flourishing ecosystem of entrepreneurs, investors and experts, all working together towards a mutual goal²³.

²¹ <https://www.planetech.org/planetech-world-Israel's State of Climate Tech 2022 Update>.

²² https://www.gov.il/en/departments/news/spoke_climate241021

²³ Primary initiatives include those pioneered by the Israeli Ministry of Environmental protection, Ministry of Energy, Innovation Authority, PLANTech and Startup Nation Central. <https://innovationisrael.org.il/growth/pilot/environment>; https://www.gov.il/he/departments/news/press_120922 ; <https://innovationisrael.org.il/kol-kore/energypilot> ; <https://www.planetech.org/abinbev-planetech-innovation-lab>

Most significantly, in June 2022 the Israeli Government resolved to invest NIS 3 billion through 2026 to support national climate innovation. This resolution was approved following work of an inter-ministerial committee led by the Ministry of Environmental Protection, the Ministry of Energy and the Innovation Authority. The primary stated goals under the resolution are to accelerate development of climate technologies in Israel and to mobilize these technologies to meet Israel's climate goals while building upon the relative advantages of Israeli innovation and implementing incentives for the business sector in Israel to become involved²⁴.

This most recent resolution comes at the heels of several early programs which were initiated by various relevant government bodies to promote climatech in Israel. These include funding and grants by the Ministry of Environmental Protection in collaboration with the Innovation Authority as early as 2018, to support climate-related pilot programs by Israeli technology companies with the aim of accelerating development, implementation and commercialization of climate and environment related technologies²⁵. Under this program, a number of the grants awarded were to companies in the biosciences and biotechnology space (examples include companies offering crop protection solutions and new bio-based construction materials)²⁶.

Looking ahead, there can be identified several key trends which will affect the development of this ecosystem, as well as a number of challenges it is expected to be faced with.

Future Outlook - Key Trends, Challenges and Opportunities

Bioscience and biotechnology-based solutions can play a transformative role in the global effort to both mitigate climate change and adapt to it. However, these particular technology fields are abound with challenges and obstacles. Most significantly, such solutions are subject to stringent regulation worldwide and are characterized by lengthy approval processes²⁷. This, together with the burdensome and capital-intense processes associated with the POV stage and the heavy infrastructure element involved in climatech technology implementation in general, create significant barriers for entrepreneurs in the field.

²⁴ https://www.gov.il/he/departments/news/climate_260622

²⁵ <https://innovationisrael.org.il/growth/pilot/environment>; https://innovationisrael.org.il/press_release/5994

²⁶ https://innovationisrael.org.il/general_content/4120

²⁷ <https://www.weforum.org/agenda/2022/05/biosolutions-clear-path-to-fight-climate-change/>

The fact that the Israeli government has decidedly focused on funding major initiatives in this space will do much to support companies having to overcome these obstacles. However, funding alone will not be enough and a major government effort will have to be made to reduce regulatory and bureaucratic barriers. An additional major effort will have to be undertaken to streamline processes and regulations in relation to those existing in other OECD countries and particularly in the US and the EU, in order to support global implementation and scaling of innovative solutions originating in Israel.

One of the central recent initiatives by the Israeli Ministry of Environmental Protection is the publication of the Green Taxonomy²⁸. The Israeli Taxonomy, mirroring the EU Green Taxonomy²⁹, is a list of activities which shall be regarded as compliant with set sustainability criteria and therefore eligible for investments from financial institutions and investment funds. The publication of the Israeli Green Taxonomy will go far to promote investment in the climatech sector and in biotech-for-climate specifically.

Two key opportunity areas can be identified going forward for companies in the biotech-for-climate space:

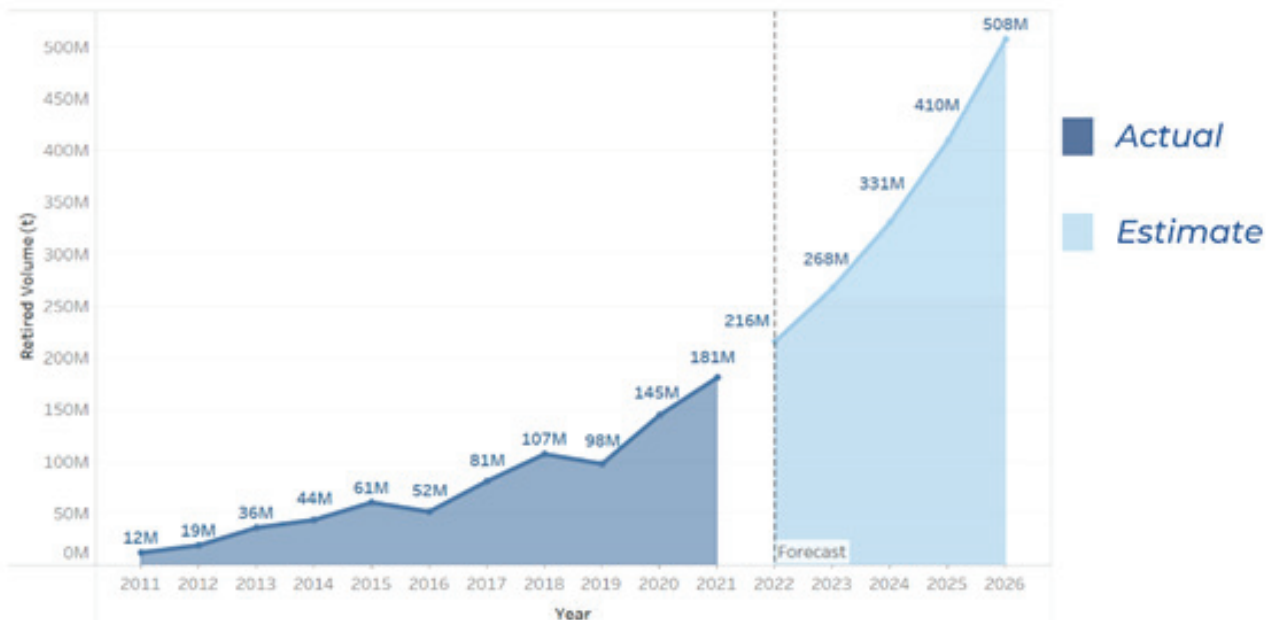
- **Harnessing Digitization and Infrastructure Innovation to Create Scalability**
 - transitioning from laboratory and pilot phases to scaled POV and ultimately to scaled solutions for global implementation are a major challenge in any technology field. For bioscience and biotechnology innovations in particular, integration of scaled digital solutions in the fields of big data, AI and carbon measurement can be game changing. The majority of biotech- for-climate initiatives existing today can benefit from adoption of such technologies, which are abundant within the Israeli tech sector and we are likely to be seeing such joint initiatives come to fruition in coming years.

²⁸ A draft of the Israeli Green Taxonomy was released for public comment on October 26th, 2022. https://www.gov.il/he/Departments/publications/Call_for_bids/taxonomy

²⁹ https://finance.ec.europa.eu/sustainable-finance/tools-and-standards/eu-taxonomy-sustainable-activities_en

- Leveraging Carbon Markets to Fund R&D and Implementation Projects** - in recent years the overall value of global carbon markets has skyrocketed³⁰. Projections through 2030 and beyond remain consistent and predict exponential growth in both voluntary³¹ and compliance market transactions, while having potential for synergies through international and bilateral carbon trading under Article 6 of the Paris Agreement³². Looking to 2030 and 2050 net zero targets set by the business sector, multinationals and financial institutions are incorporating market elements into their corporate decarbonization strategies. In doing so, they are intensively looking to identify both short-term and long-term investments which could be potentially produce future carbon offsets and credits. With bespoke tailoring of projects and offerings, this market can be significantly leveraged by biotech-for-climate startups and allow for both early-stage funding and for project financing.

Figure 13 - Global Voluntary Carbon Market - Evolution of Demand and Forecast



Source: South Pole

³⁰ <https://www.worldbank.org/en/news/press-release/2022/05/24/global-carbon-pricing-generates-record-84-billion-in-revenue>

³¹ <https://www.southpole.com/reports/voluntary-carbon-market-trend-report-2022>

³² https://unfccc.int/files/meetings/paris_nov_2015/application/pdf/paris_agreement_english_.pdf

Conclusion

The application of biosciences and biotechnology to climate-related challenges harnesses the potential to mitigate the equivalent of 3 billion tons of carbon dioxide annually by 2030. While it unclear precisely what portion of the booming Israeli climatech market can be attributed to bioscience and biotechnology related companies, figures indicate this portion could be quite significant. Based on global climatech projections, this upward trend is expected to continue.

For bioscience and biotechnology innovations in particular, integration of scaled digital solutions in the fields of big data, AI and carbon measurement can be game changing. Furthermore, tailoring projects within the biotech-for-climate space to global carbon market demand can be significantly leveraged to create investment and financing opportunities.



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