When the world turns to Israel for agricultural innovation,

Israel turns to Volcani
For decades, Israel has been a global leader in agriculture. Our small country’s impressive agricultural expertise has been driven by the Volcani Institute—the leading, largest and oldest agricultural research center in Israel. Accounting for approximately 75% of the country’s agricultural research, Volcani is the main driving force behind Israel’s internationally acclaimed agricultural achievements. It is our cutting-edge research, done by Israel’s leading scientists, that breeds the innovative solutions for sustainable agriculture and environmental preservation from which the whole world stands to benefit.

Through direct relationships with local farmers, international capacity building initiatives and prestigious programming for higher education in agricultural sciences, Volcani’s global impact is constantly growing.

Earning Israel international recognition, Volcani’s agricultural innovations provide solutions to some of the world’s greatest challenges:

- Food Security
- Climate Change
- Environmental Sustainability

The Land

of Israel was a desolate landscape in the 19th century. It was the Zionist dream and a pioneering spirit that drove new immigrants to move to Israel to work the land. However, they had no agricultural experience.

Isaac Elazari Vilkansky, a Lithuanian agronomist, arrived in 1908 in response to a request to assist, four decades before Israel’s independence. With his vision to establish a dedicated agricultural research institute, he became an instrumental force in changing the landscape, helping the young nation to achieve food security and prosperity as it prepared to declare itself the Jewish State.

Establishing Volcani in 1921, Vilkansky and Israel’s early pioneers not only achieved agricultural miracles in making the desert bloom, but set the stage for Israel to become a world leader in agricultural research. Since its establishment, Volcani has been sharing its unique expertise with partners around the world.
Volcani is on the front lines of the global battle for greater food security.

Achieving food security is key to our future. By 2050, the world’s population is estimated to reach 9.7 billion. Thus, one of the greatest challenges facing the world today is ensuring that a rapidly growing global population has access to enough affordable and nutritious food. Volcani scientists are working to ensure greater food security in Israel and around the world.

Breeding Better Crops
Pest infestation and plant disease can be responsible for devastating losses in the field, leading to extensive waste, rot and ruin. By breeding new crop varieties with important traits such as increased yields, disease resistance and greater stress tolerance, Volcani is working to ensure that more food can be made available for safe and healthy consumption.

Enough to Go Around the Table
The UN’s food organization estimate accounts for 1.3 billion tons of food per year lost after being harvested from the field. These losses are devastating to a growing population with dwindling natural resources. Volcani’s work in extending shelf life and avoiding rot has made monumental strides in preserving the food grown around the world, feeding millions.

Minimizing Post-Harvest Loss
A Myriad of Methods for Ensuring Grain Survival
Wheat is a staple food in more than 40 countries, feeding over 35% of the global population, yet it is estimated that 10% to 30% of the world grain crop is lost each year post-harvest. To combat this, Volcani scientists have developed a portfolio of unique approaches and innovative solutions, resulting in record-breaking grain preservation. The approaches include preventative measures, systematic inspection, eco-friendly protectants and improved fumigation technology.

Got Milk?
The World’s Most Productive Cows
Through efficient dairy farming, the Israeli milk cow has become the most productive in the world. This is due to Volcani’s work in livestock management, genetic breeding and feed optimization. In 2014, Volcani’s cows produced almost 30% more milk than American cows.
Volcani is advancing the quest for sustainable agricultural practices for Israel and the world.

Unsustainable agricultural practices present a looming and immediate threat to species and ecosystems across the world. While we need the land to sustain us with food, we must also ensure that our farming practices sustain the environment well beyond our lifetimes.

**Sustainable Agricultural Practices**

Through the establishment of a Model Farm dedicated to developing and disseminating innovative solutions for sustainable agriculture, Volcani is introducing more sustainable agricultural practices benefitting Israel and the world. Among the primary goals of the model farm: a reduced need for harmful chemicals in pesticides and fertilizers and increased water and soil conservation.

**Preserving Israel’s Soil**

Good soil is essential; it lays the groundwork for sustaining agriculture. Yet Israel’s soils are thinning, harmed by the use of low-quality water, the harsh climate and intensive cultivation. Volcani researchers are promoting the use of soil conditioners and improved cultivation methods, which can prevent salination and erosion and help Israel’s soil maintain its vitality.

**Agri-Tech for Sustainability**

Precision agriculture is the key to minimizing the use of valuable resources (as well as harmful chemicals) needed to grow healthy crops. Volcani scientists are developing innovative technologies using robots, computers and sensors to enable farmers to grow more while reducing damage to our health and environment.

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**Reducing Pesticides**

**Insect Vacuum**

Volcani’s insect vacuum cleaner is designed specifically to target pests on herbs, removing the insects without damaging the plants. This natural pest solution eliminates the need for harmful pesticides, resulting in herbs that are safer to consume.

**Environmentally Friendly Fertilizer**

**Formula for Success**

Fertilizers provide essential nutrients for plant growth. Volcani scientists created an environmentally friendly formula for the optimization of plant nutrition. The formula has increased yield and quality and makes the plants more resilient to disease and climate stress. As an added bonus, the formula increases the plant’s post-harvest shelf life.
The Seeds

Today, our food supply is threatened by climate change, pests and diseases. Yet, at the same time, we must meet the global need for healthier and more nutritious food.

Plant breeding is a key weapon in our battle against these challenges. Though this process naturally takes thousands of years, Volcani is accelerating the pace of improvement exponentially to keep pace with the needs of the future. Today, Volcani scientists breed crops adapted to warmer climate conditions with special resistance to pests and diseases, as well as crops with enhanced nutritional content.

The Soil

Healthy soil is essential for the production of high quality crops with greater yield. Unfortunately, as a result of aggressive agricultural practices, soil is being degraded at a rapid rate that will take thousands of years to regenerate.

Volcani scientists are improving our understanding of the processes leading to a loss of soil fertility and developing methodologies to reclaim damaged soils and prevent deterioration in soil productivity.

The Water

Most countries use more water for irrigating land than any other purpose, but water resources are scarce.

Superior water use and efficient irrigation techniques are, therefore, critical for food security.

Volcani scientists are world leaders in developing innovations to maximize irrigation efficiency and devising protocols for the use of recycled water.

The Plants

A high percentage of crops are lost to disease and pest infestations, but many of the conventional solutions, such as pesticides, contain harmful chemicals.

The food that is lost could be helping to feed a hungry world.

Scientists at Volcani are developing a variety of methods for natural pest prevention that keep plants healthy and whole, while protecting the environment and remaining safe for human consumption.

The Journey to Your Table

Food waste takes a heavy toll on global food security and intensifies the pressure to increase the yield of produce.

Approximately 1.3 billion tons of food are wasted annually, with 520 million resulting from losses on the farm or improper storage and handling.

Volcani has one of the largest post-harvest institutes in the world, where scientists are pioneering safe technologies to prolong the shelf-life of produce, including cooling technologies, humidity control, edible coatings, packaging materials and antimicrobial compounds.

The Plate

Ensuring that we can feed the global population is important, but it is also vital that the food on our plates provides enough nutrients to keep us healthy and strong.

Volcani is enhancing the nutritional value of our food by increasing antioxidant qualities and fiber content in certain crops. Also, by taking natural properties from plants and using them for medical purposes, Volcani is contributing to healthier outcomes for people around the world.

Volcani is ensuring that we all have enough healthy food to eat.
Climate change threatens the viability of crops throughout the world. Recent numbers indicate that the food security and livelihoods of nearly one billion people in around 100 countries are threatened by desertification. Farmers around the world are facing greater water scarcity, increased desertification and the spread of new pests and diseases. Given the rapid pace of these changes, it is becoming ever more crucial to cultivate crops that can thrive in arid conditions. For decades, Volcani scientists have been leading the way in devising solutions for arid area agriculture to ensure sustainable livelihoods for farmers in Israel and beyond.

**Dangers of Desertification**

By 2025, it is estimated that 1.8 billion people will be subject to absolute water scarcity, and two-thirds of the world’s population could live under water stress conditions. Due to Israel’s naturally hot and arid landscape, Volcani scientists have great experience in devising solutions for arid area agriculture, enabling agriculture and farming efforts to flourish across Israel’s desert.

**Eye in the Sky**

*A Bird’s Eye View of the Field in Real Time*

Water is a valuable resource and should be allocated only where needed on a farmer’s field. To pinpoint the thirsty crops, Volcani has developed thermal imaging drones that tell farmers at a glance how much water each crop needs, allowing them to conserve both money and water by optimizing irrigation.

**Finding Solutions**

Through the Center for Agriculture in Arid Areas, a specialist research hub and experimental beta-site for implementing cutting edge innovations, Volcani has developed innovative solutions that assist in water conservation, and others that help farming around the world flourish in the face of climate change.

**Weatherproof Wheat**

*Adaptation to Withstand the Test of Time*

As the global climate changes, it threatens one of the world’s largest staple crops: wheat. Volcani scientists have improved the future food security of millions around the world by developing wheat varieties better suited to arid conditions. The “Benedictus” (also known as “Binyamin”) and “Aviv” varieties flourish in high temperatures and flower earlier, thus avoiding drought during the critical stage of grain filling. This wheat breeding serves as a unique example for how researchers can conserve genetic diversity while transferring beneficial traits and genes from wild relatives to commercial varieties.
Volcani’s international collaborations and contributions are building bridges in the region and around the world.

Tikkun Olam
A core tenet of Volcani’s mission is to repair the world and build a better tomorrow, and that means everywhere—not just Israel. Volcani’s agricultural research has the capacity to save lives around the globe. By sharing knowledge with developing nations and empowering them through courses, summits, seminars and workshops, Volcani carefully guides these countries through major agricultural obstacles.

Bridges to Peace
Agriculture knows no borders; Israel shares the same agricultural challenges as its neighbors. Volcani engages in hands-on regional cooperation, including joint research, seminars and training with other players in the region, including the Palestinian Authority, Egypt and Jordan, forming connections that transcend political differences and ideologies.

International Cooperation: Volcani’s Joint Research Programs
Volcani is dedicated to international collaboration with both governmental and private organizations. Volcani cooperates with institutions in countries across five continents:
- Africa
- Asia
- Australia
- Europe
- North America

Cassava and Teff
Improving the Quality and Quantity of Superfoods
Volcani has made tremendous breakthroughs in the cultivation of two staple African crops: cassava, one of the top ten most imported crops in the world, and teff, an Ethiopian superfood. By applying successful protocols for irrigation and fertilization, Volcani has helped to improve their growing practices and increase their yield.

Olive Oil Project
Extending an Olive Branch Across the Region
Fostering regional collaboration in the growth of olive groves between Israel and its neighboring countries, the olive oil project works to empower indigenous farmers through joint research and knowledge dissemination. With specialized irrigation practices and optimized production methodologies, these farmers see increased yield and quality, and in turn, increased profits.
A STRONGER ISRAEL

Through education and innovation, Volcani helps to strengthen Israel on a global scale.

Through the years, Israel has been breaking ground for new and life-changing agricultural technologies. Volcani is the force behind this strength, spreading knowledge and improving Israel’s standing across the world.

Training Future Generations
Volcani strongly believes that the next generation of scientists must be equipped with the tools and the knowledge to build upon today’s research. To ensure a better tomorrow, Volcani trains Ph.D.s and post-doctoral students from Israel and around the world in agricultural sciences.

Boosting Israel’s Economy
Israel, famously known as the ‘Start-Up Nation,’ is home to countless world-changing innovations and the field of agriculture is no exception. Today Israel boasts a rapidly growing agri-tech scene with over 400 agri-tech start-ups.

The cutting-edge agri-tech research undertaken at Volcani is a key driver to this innovation economy.

Working in the Periphery
The vast majority of Israel’s agriculture is located in the periphery. Volcani provides regionally specific support and outreach to farmers working in the periphery and creates prestigious career opportunities for talented scientists in Israel’s northern and southern regions.

Light Unto the Nations
The first Israeli resolution ever to pass in the United Nations was on agricultural innovation—a topic that has since become a standing item on the agenda. Volcani has been instrumental in laying the foundations for and maintaining Israel’s position as an agricultural leader, which has opened avenues for dialogue and enabled Israel to advance a positive narrative on the global stage.

International Education
Volcani invites countries from around the world to take courses that teach them how to implement new technologies in irrigation, conservation, plant protection and more. Around 70 countries, including many developing nations, have participated in these courses. Many students, often from India and China, come to Volcani for high-level research training in post-doctoral programs, taking home with them priceless knowledge to improve their homeland’s agricultural future.
The Volcani Institute is comprised of hundreds of scientists in six institutes on its main campus, and in two off-campus experimental stations.

**Bet-Dagan Campus**
Institute of Plant Sciences  
Institute of Animal Sciences  
Institute of Plant Protection  
Institute of Soil, Water and Environmental Sciences  
Institute of Postharvest and Food Sciences  
Institute of Agricultural Engineering

**NORTHERN RESEARCH CENTRE**  
**Neve Ya’ar**  
Environmental Sustainability

**SOUTHERN RESEARCH CENTRE**  
**Gilat**  
Desert Agriculture

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Volcani International is a non-profit organization committed to supporting the work of the Volcani Institute.