



THE SIXTH INDIA ISRAEL FORUM

EXECUTIVE SUMMARY

28 – 30 OCTOBER, 2013

TEL AVIV



**India-Israel Forum:
Food Security White Paper**

India-Israel Forum: Food Security White Paper

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The sixth India- Israel Forum, held at Tel Aviv University on October 28, 2013, brought together high-level Indian and Israeli academics and business leaders to discuss issues relevant to both countries. Food security was one of the topics, and a joint session was held and explored possible collaborations based on existing challenges, goals, and interests – all with the interest of creating a joint roadmap for future collaboration in promoting local and global food security.

This document is the product of that session.

i. Introduction

With over 7 billion mouths to feed globally, ensuring a secure supply of food is a burgeoning and critical challenge for scientists and policymakers alike.

Providing long-term solutions for these critical issues requires not only advances in the biological and chemical sciences, but also a re-evaluation of strategic business and policy issues, as they relate to food policy. Multidisciplinary and multi-sector cooperation is thus essential for successfully tackling of these critical issues.

In the 1960's India was faced with huge food security issues that manifested in potential devastating famine. Through adopting "green revolution" technologies, India managed to pull itself out of this dire situation and to securely produce a large share of its food needs. However India is predicted to become by 2030 the world's most populous country, leaving China behind. India is also rapidly urbanizing, currently with 400 million people living in urban areas and likely to go to 600 million by 2030. This increase in population, and rapid urbanization, coupled with rising incomes and prosperity, and with unpredictable climate changes, will put added pressures on land and water. Solution have to be found in better technologies that can give higher productivity not only on per hectare basis, but also on per unit of water basis, and also higher efficiency in the end to end food supply-chain to ensure food security of people of India.

Israel has pioneered producing more food for its people from less than optimal agricultural land conditions or water availability. Israel, therefore, can be a natural partner for India to supply technology and farming practices that can produce more from less natural resources. Israel can supply technology, not only bio-technology, but also best-practices for water usage, and building efficient value chains. Indeed India will need all these to meet its rising demand in the face of climate change.

A common thread connecting India and Israel is a deep commitment to higher education in plant and agricultural sciences, and the belief that only through advanced education and research can future food security needs be met.

ii. **Uniqueness of Food Security**

Unlike other action areas discussed in India-Israel bilateral meetings, food security is distinctive in the way it relates to business, academia, and governments in the following ways:

1. The agenda of food security is not only profit-based, but also has implications for socio-economic policies, as food availability and production affects everyone in the world.
2. The timescale for return on investment is much longer than for other technologies (e.g. cyber security), at least when considering the seed/crop aspect of food security. For example, technology used to develop hybrid seeds and genetically modified strains, which have been incredibly significant in their positive impact on global food security, started through long-term funding from government research programs.

Given these distinctions, it is clear that any major movement in food security must be multidisciplinary at its base. As such, it should involve academia, business and government, and other foundations with a long-term commitment.

iii. **Focus Areas**

The following section will present different foci that arose as having significant importance in the joint discussions, and conclusions in each category.

Focus: Small Scale Farmers

Small scale farmers make up about 85% of India's agricultural holdings cultivating about 44 percent of area; and their personal food security is often in a vulnerable/unstable state. Farmers are dependent on factors from unpredictable climate and land degradation, to expensive inputs and technologies, and challenging government policies which inhibit long-term planning. Any long-term food security solution in India has to adopt inclusive development of constituent rural, smallholder farmers to make the solution sustainable. Taking these challenges into consideration, the forum considered possible opportunities that can be applied through business, academia, and government.

One of the goals the forum put forward is to keep the small scale farmer economically viable through encouraging "frugal innovation" (i.e. low-tech, low-cost technologies). By having affordable technologies, farmers may be able to have better farming and market information, higher yields, and improved food security.

A tangible example is based on the case study brought forth by Milk Mantra. Milk Mantra has developed improved packaging for milk which ensures that the milk stays fresh longer. This freshness guarantee reduced the need to boil the milk, thereby keeping higher nutrient levels. The business model of Ethical Milk Sourcing developed by Milk Mantra, incorporating the empowerment of small scale dairy farmers, adoption of frugal technology, and improved supply networks, enables an economically viable model that serves the entire chain, and increases local food security needs. Similar ideas relating to post-harvest processing need to be considered.

Extension services are an important resource for many small-scale farmers, as they provide trainings, support, and resources. They are provided by government and many NGOs, and used by many Indian farmers. These services have been proven to be helpful in increasing food security and empowering local farmers, and it is

important that are available to as many small-scale farmers as possible while remaining continuous and economically viable.

Focus: Improvement in Crop Nutrition and Yields

From the beginning of the Green Revolution to today, great improvements have been made in food production in terms of yields per acre, having significant impacts in alleviating food insecurity. As modern technology continues to improve, the Forum believes that the next major food security improvements must be to take the following areas into consideration:

1. Biofortification: as more food is grown, it must also provide higher nutritional value to ensure a healthy population. Specifically, biofortified crops help the rural poor population - who often do not have access to commercially fortified foods - to obtain necessary nutrients in their diet.
2. Yield per water unit: in the face of growing water scarcity, declining quality, climate uncertainties, and higher prices, water is crucial for increasing food production. As a leader in drip-irrigation, Israel has been effective at addressing some of the challenges with water scarcity in agriculture. A complementary approach, though as mentioned above with longer term impact, is the development and adoption of water-efficient crops.
3. Reduction of field- and post-harvest crop loss: crop loss is a major problem for all farmers, big and small. They are caused by poor infrastructure, poor temperature management, low levels of technology and low investment in the food distribution systems. Measurements aimed at reduction of field crop loss such as low producing crops or crops that are not picked in time, inefficient growing methods, as well as post harvest crop losses such as rotting and poor storage and packaging.

In the long term, it is important to remember that the seed is key to improved food security, however, improved seeds depend on the combination of technology, research, policy, and the long-term investments by governments and academic institutions.

Specifically, two sectors especially need to be considered: 1. Fruits and Vegetables; 2. Proteins, with an emphasis on milk production and derivatives.

Focus: India-Israel Joint Cooperation

The relationship between India and Israel has been strong since the establishment of diplomatic relations and rests on economic, military and strategic partnerships that are manifested through interactions between governments, businesses and academia. Strong academic and private business partnerships, as well as government initiatives such as the Israeli Centers of Excellence, have been established in different Indian states to promote agriculture and postharvest trainings and best practices.

The forum concluded that full and broad solutions, solutions that perhaps begin in biology, but develop out to diverse fields, must be sought. Therefore, this is an excellent opportunity to engage businesses for more extensive involvement, to ensure more short-range success stories. As Israeli agricultural technology such as drip irrigation and seed development have successful track records, there is a need for long-term Israeli

presence in India to really understand the specific Indian needs - in the various regions - in order to develop appropriate solutions. This scenario will be mutually beneficial to both Israeli and Indian business ventures.

Action Items

The Forum has agreed on the following Action Items:

1. A call for a new long-term funding initiative that will fund solution-aimed ideas. The funding should come from large industries with the research carried out by academics. The funding should involve little governmental bureaucracy (and hinderance) and focus on long-term funding (4 years) with long-term goals for impact. An infrastructure could be developed based on a combination incorporating mechanisms of the Binational Agricultural Research and Development Fund (BARD) and the Binational Industrial Research and Development Fund (BIRD) currently funding joint US-Israel projects.
2. A need to develop actionable deliverables from an industry perspective. This could involve collaborations between Indian and Israeli companies to bring Israeli innovation to India, and provide market access in India to Israeli companies.
3. Continued meetings of Indian and Israeli experts to further define the food security priority fields for the different sectors in both countries.
4. The Manna Center at Tel Aviv University, in conjunction with the Forum, should develop and manage a network of Indian Postdocs in Israel who are working on food-security related research to prepare them both for returning to India and for being ambassadors of the Israeli Ag/biotech industry.
5. Centers of Excellence (CoE): Israel has already chalked out plans for opening 20-25 agriculture CoEs in India, which will be established in the already agri-developed states in India. As such, a case needs to be built for opening at least two CoEs in more under-developed states in Eastern India, Odisha could be a specific example where a CoE could yield quick results.
6. Impact analyses must be carried out to evaluate the contribution of the various actions. As such we call for programs leading to joint applied economic projects between Israeli and Indian agencies.

A specific mapping and implementation of these items should be discussed in the next Forum.