How can India benefit from Israel's development model?

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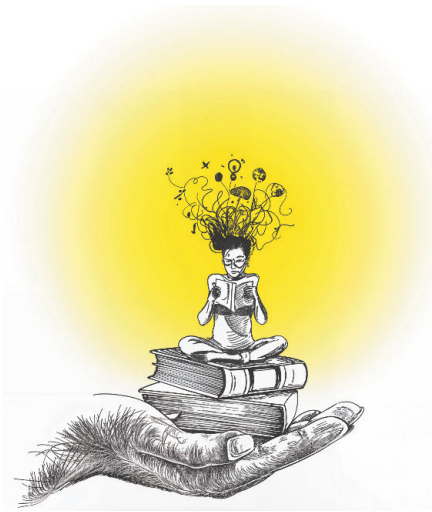
I visited Israel way back in 1991-92. The purpose was to study drip irrigation products. My former Managing Director at Ion Exchange India Ltd. believed water pretreatment equipment for drip irrigation had strong business potential. But on visiting several installations, all I could find were very elementary filtration equipment that we were already making and there was little need for collaboration. But that trip taught me several things that I cannot forget even after 33 years!

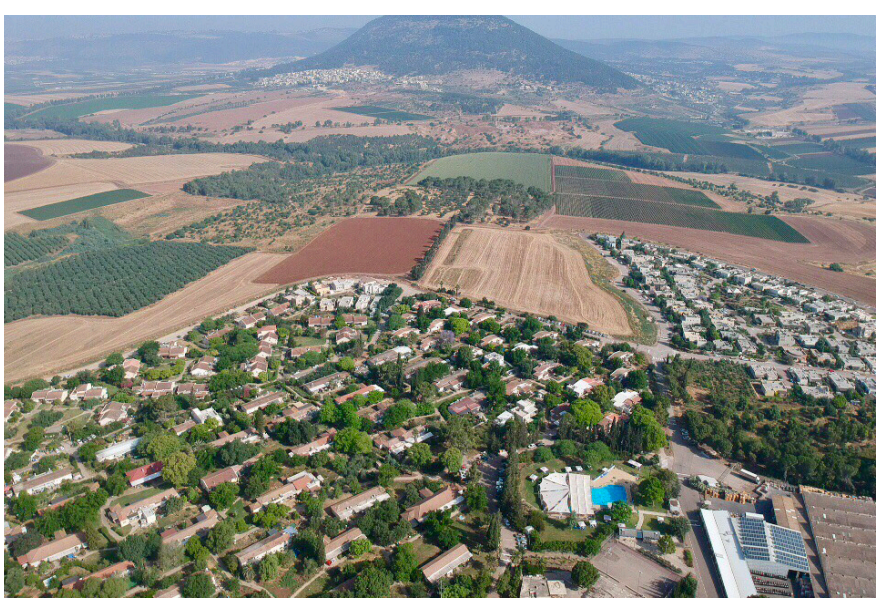
Israel was liberated in 1948, about 43 years before my visit. When Jews entered Israel, all they found was a desert. The average rainfall was 10 inches, while another 10 inches of snow used to fall. There was hardly any cultivable land. The population was about 2 million, and people were invited from all over the world (about 40,000 Indian Jews also migrated but soon realised the huge cultural differences and several came back). I met some travellers who had settled there, married locals and were happy.

During my six-day stay, I met senior officials of several drip irrigation companies and got to know some historical aspects of their society. There were several aspects of co-living which impressed me, and I was introduced to the concept of kibbutz – a collective community.

Farming practices

I was informed that when people from all over Europe, America and other parts of the world moved to Israel, no government existed. But soon a local government was formed, and a group of about 400 families was allotted about 600 hectares of land. They were expected to use their knowledge and develop the fallow, dry lands into agricultural lands. With limited resources, life in the early days was hard. Over a period, however, they developed techniques of farming which started bearing fruit. Some takeaways were eye openers for me. For example, I met an elderly person in a cotton field (in July, the cotton plants were green and about 8 ft tall) who informed me that for the last 45 years he has been only producing cotton on his farm. At the end of the season, he would invert the soil and bury all organic matter one foot deep. In this way, the sandy terrain had been converted into black cotton soil. In India, we are not inclined to think of burying the unwanted part of the crop to improve the soil's organic content. Instead, we burn it and pollute the environment.





Over years, organised farming took roots, and Israel was soon exporting food products.

Water meters, sprinklers and garden equipment

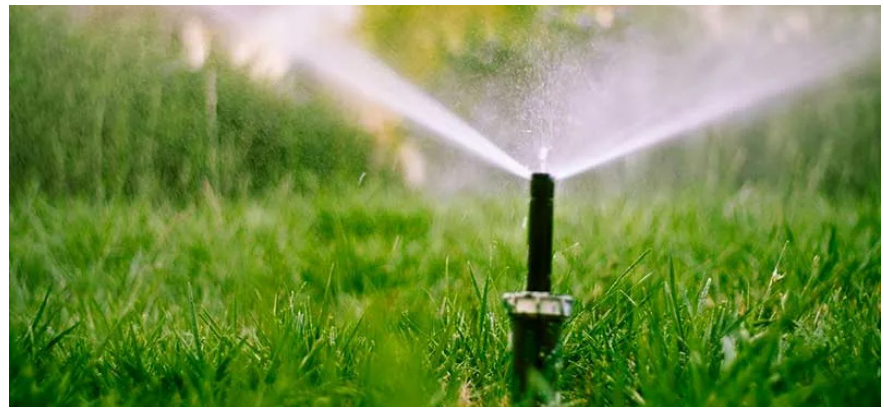
The kibbutz was a self-sufficient entity, equipped with schools and shops. There was a common kitchen for all residents, where food was cooked and served by the same people who were also in charge of cleaning. Their jobs

were rotated amongst themselves. A Managing Director at one told me he would continue on the post for one more year, after which he would be assigned another job. This cooperative living saved huge costs and soon the kibbutz started manufacturing specialized items.

Water meters were one such product. I was amazed to learn that Israel manufactured water meters for almost half of the world. An important engineering plastic with high abrasion resistance was required. Polysulfone was used to manufacture the reduction gear train required to connect the turbine to the pointer needles. In 1992, they used close to 40,000-tonnes of polysulfone for just this application which required high precision abrasion resistant gears. For drip pipes, they used about 100,000-tonnes of polyolefins.

I spent a day at a small manufacturer and saw many designs for delivery of constant water flow through a drip pipe. The problem is not trivial. The pressure of water at one end is high (up to 3-5 kg/cm^2), while at the end of the pipe due to flow through the drippers and pressure drop, the pressure is as low as 1-kg/cm^2. If there is no effort to design the drippers to compensate the effect of pressure on discharge of water, the area at one end would be flooded and the area at the other end will starve for water. There were several designs developed – some of which could be welded inside a pipe emerging from the extruder, and some using an innovative silicone sleeve that would regulate the outlet pressure.

Looking at such a variety of design, I thought to myself, "this man must be employing a few dozen R&D scientists." I was surprised to find that his R&D Department was just one person and that was the design engineer. With a very limited team, the kibbutz



was manufacturing more than a million dollars' worth plastic products. (After all these years, I can remember some names like Irri Dalco and Netafim).

Besides drip irrigation products they also manufactured garden implements like the lawn sprinklers that could slowly change its direction and cover a large circular field. These were exported to Europe and America. They also made products like soaps & detergents, for the local market.

Military service and security

Presently only 1% of Israel's population is directly involved in agriculture. This includes those engaged in manufacture of implements, seeds, fertilisers, trading, packaging, and exporting agri products. Thus, a large population is available for working in industry, education, medicine, science and technology, defence etc.

I found several young people on the road carrying guns. I was told every citizen between the ages of 18-30 had to serve two years in the military. For this, no salary is paid, and parents are expected to support their children in this period. I was told military service is compulsory for every citizen because the country was surrounded by enemies (it still is).

At the airport I could see each passenger was separately interrogated by three different persons. At the end of the interrogation, the three persons cross-checked the answers and confirmed they were consistent. If any discrepancy was found, the passenger could even miss the flight. They were very strict with foreign nationals, and the process could take up to an hour with suspect passengers. No wonder, they have had no hijacking of planes!

Life in a kibbutz

A kibbutz is a self-sufficient body. Every family has their own apartment allotted by the kibbutz, the size determined by the size of the family. Not everyone owned a car, and there was a carpool, which any member could prebook for use.

A person or a family would do the assigned work for the community It was not possible for everyone to become Managing Director of a kibbutz – much depended on his/her capability. One rule that was followed was: "To each one as per his need and to each one as per his capability." An intelligent student could be sent to a college of his choice or for education abroad, all paid for by the kibbutz. The student was free to return to Israel or migrate. Some students did migrate permanently to USA or European countries.

With surplus funds, the kibbutz invested in manufacturing. I saw several drip irrigation units, detergent factories,

food processing units, factories manufacturing components for aircraft, defence equipment, sensors, etc.

How India can benefit

India does not fully utilize her cultivable land, and nearly 30% is lost in borders and passages. By following a cooperative model of kibbutz, we can integrate all the cultivable land of a village in several contiguous pieces, typically 600-1,000 hectares. All landowners would be engaged in its cultivation.

Following advantages can result:

- 30% higher productivity. Better farming practices has potential to reduce labour needs and increase productivity. Each farmer of Israel produces food for 39 persons, while the Indian farmer produces for only 1.5. After accounting for his own consumption, net productivity is only 0.5. This is evident from the fact that about 70% of our population depends on agriculture.
- Savings and ease of procurement of seeds, fertilisers, implements and labour.
- Higher productivity due to monoculture.
- Ease of processing, storage, handling, and marketing.
- Possibility of starting a processing industry locally.
- Beekeeping for additional revenue. Israel, about the size of a district in Maharashtra, produces 3,500-tonnes of honey. While Indian honey production is 125,000-tonnes, with about 160 times the area of Israel, we have the potential to produce 500,000-tonnes annually.
- With common kitchen several differences between communities can be resolved. Proper education can be imparted to all students, and safe & healthy food can be served to all residents.
- Use of agri-wastes for power generation, solar power, drip irrigation (including nutrient supply through drips) can all be practiced at a much larger scale.

A feeling of oneness among citizens can be inculcated. A strong nationalist feeling can be developed amongst residents when they go to same school, learn from the same syllabus, and eat the same food,

Table 1: Cotton productivity (kg lint/hectare)

Country	2019-20	2020-21	2021-22
United States	931	950	987
Brazil	1802	1717	1772
China	1758	1864	1844
India	464	446	466
turkey	1704	1827	1735
Australia	1657	2047	1226
Pakistan	522	445	467
Mexico	1650	1584	1592
Uzbekistan	513	-	994
World	**758**	**760**	**775**

Farming practices

There are stark differences in our farming practices, in the quality and size of produce, and field productivity. For example, in the month of July, I saw apple farms full of apples, and orange farms full of oranges. College students were busy harvesting the fruits. The banana plants produced such large number of fruits that one bunch of bananas could not be lifted by two men. For this reason, two banana plants were planted in a row and the distance between two rows was wide enough to allow movement of a truck to carry the produce. The sunflowers were also very large – typically 50-60 cm in diameter. The size of the seed was proportionately big and was consumed by locals like we consume groundnuts. The productivity of the farm was 3-5 times more than what we see in India. Harvesting of cotton was being done by machines, and productivity was in excess of 180 kg per hectare – four times higher than ours.

Interestingly, the farms that I saw did not need to use synthetic fertilizers. Instead, all the wastewater from cities or villages were collected in one place, treated and analysed for NPK content. It was fortified with missing nutrients and sold to farms at cost. The connection, consumption and payment status could be monitored from a central location. If payment of $11 per m^3 for water was not made, the supply was disconnected.

Solar heating of bathing water was implemented on a large scale, and solar water heaters could be found on all roof tops. It is likely that it has since been replaced by solar photovoltaic cells.

A large-scale collaboration with Israel will improve our farm productivity, get higher yield from the same land and probably spare large manpower for industrial production. It would also improve our economic health. If we go by the same proportion of persons involved in agriculture, only 2-3% of our population should be directly employed in agriculture and another 6% in agricultural activity. There would be huge scope in farm automation, manufacture of machines for processing the crops, storage, handling and distribution. Balance manpower would be available for industrial production.