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Rooted in precision: Ram Lisaey on scaling Israeli water-tech for thirsty world

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In an era of deepening groundwater crises across Asia and Africa, Israelâ??s desert-honed innovations offer a compelling blueprint for sustainable farming. At the heart of this transformation is precision irrigationâ??pioneered by Netafimâ??which has redefined how crops can thrive with minimal water. But beyond drip systems, Israelâ??s integrated approach now includes root-zone moisture sensing, AI-driven scheduling, and large-scale treated wastewater reuse. In this exclusive AgroSpectrum interview, Ram Lisaey, Head of Global Agronomy at Netafim, shares how these technologies are being adapted for high-evapotranspiration regions from Maharashtra to the Sahel.

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shares how these technologies are being adapted for high-evapotranspiration regions from Maharashtra to the Sahel.

He explains why real-time soil data is more powerful than rainfall averages, and why AI is usefulâ??but not always essentialâ??for farmers. Drawing on decades of field experience, Lisaey offers insights on training models, policy frameworks, and publicâ??private partnerships that have scaled Israeli water-tech in low-income regions. As groundwater depletion accelerates, his message is clear: sustainable irrigation must move from theory to field, one root zone at a time.

What are the key Israeli technologies (e.g., precision irrigation, moisture sensors, AI-integrated decision platforms) that directly reduce groundwater extraction in agriculture?

Israelâ??s arid climate and chronic freshwater scarcity have long driven the country to pioneer groundbreaking water-saving technologies.Â At the forefront is precision irrigationâ??most notably drip irrigation, a game-changing innovation by Netafim. By delivering water and nutrients directly to the root zone of each plant, this method minimizes evaporation, runoff, and percolation losses, dramatically reducing water use compared to conventional flood or sprinkler systems.ÂMicro-sprinklers, a variant suited for specific soil types and crop patterns, offer similar efficiency gains.

Complementing this is a growing ecosystem of root-zone moisture sensors, such asÂNetafimâ??s GrowSphere and platforms developed by CropX, which provide farmers with real-time data on soil moisture dynamics. These sensors empower more responsive and accurate irrigation, preventing overwatering and optimizing application timingÂ Israeli firms are also experimenting with AI-integrated irrigation platforms that combine sensor data, satellite imagery, weather forecasts, and plant physiology models to generate predictive watering schedules. While these systems show promise, their full value propositionâ??particularly for smallholdersâ??remains under evaluation.

Beyond field-level technologies, Israel has made major strides inÂlarge-scale wastewater treatment and reuse, recycling nearly 90 per cent of its municipal wastewater for agriculture. This provides a reliable, year-round water source that significantly reduces pressure on freshwater and groundwater reserves. Desalination, led by companies like IDE Technologies, plays a complementary role, supplying potable water to cities and thereby freeing up more natural freshwater for food production. At a systems level, water management software and analytics platforms further enhance efficiency by helping farmers monitor usage, diagnose inefficiencies, and fine-tune irrigation strategies across large-scale operations.

How effective are Israeli root-zone moisture sensing systems (e.g., from companies like CropX or Saturas) in improving water-use efficiency at scale?

Israeli root-zone sensing systems have ushered in a new era of precision and responsiveness in irrigation management. By delivering real-time, granular data on soil moisture, these tools enable dynamic adjustments to irrigation schedulesâ??far superior to traditional methods based on fixed timers or visual cues, which often result in overwatering.ÂThe result is a measurable reduction in water waste, as farmers gain the ability to irrigate only when and where itâ??s needed, minimizing deep percolation and runoff. Field studies have shown water savings of 20 per cent to 50 per cent without any compromise in yield.

Equally important is the impact on nutrient efficiency. Maintaining optimal soil moisture levels enhances nutrient uptake by crops, contributing to better plant health and potentially reducing fertilizer inputs. These systems are also highly scalableâ??whether used on smallholder plots or across industrial-scale farms.ÂWireless sensor networks and cloud-based platforms allow for remote monitoring and control, making real-time irrigation optimization possible across diverse geographies.Â The data collected feeds into broader decision-support tools, enabling continuous refinement of irrigation strategies and giving farmers deeper insight into the precise water needs of different crops and soil profiles.

What role is artificial intelligence playing in predictive irrigation scheduling, and how do Israeli platforms like SupPlant or Tal-Ya Water Technologies differentiate themselves?

Artificial intelligence is poised to play a transformative role in irrigation management, shifting systems from reactive, sensor-based models to proactive and predictive water scheduling.Â Israeli platforms are at the forefront of this shift, using machine learning to synthesize a wide array of data sourcesâ??including weather forecasts, historical crop performance, satellite imagery, soil profiles, and crop phenology. These AI-driven tools can anticipate a plantâ??s water needs days or even weeks in advance, optimizing irrigation strategies tailored to specific crops, soils, and microclimates.

However, the cost-benefit equation for such systems remains under scrutiny. The technology itself is not prohibitively complex or expensive, but its added value may be marginal for many growers, particularly smallholders who already achieve substantial water savings with simpler sensor-based approaches. In many cases, the hyper-optimization that AI enables does not translate into significant enough gains to justify adoption. Nonetheless, the promise of continuous learningâ??where

algorithms improve over timeâ??and the use of intuitive, user-friendly interfaces make these platforms increasingly accessible. For large-scale operations or regions facing acute water stress, predictive AI scheduling may eventually become an indispensable tool.

To what degree are Israeli innovations in treated wastewater reuse (e.g., Shafdan model) helping reduce dependence on groundwater in agriculture?

Israeli innovations in treated wastewater reuse have become a global benchmark for reducing agricultural dependence on groundwater. Nowhere is this more evident than in theÂ Shafdan model, a pioneering example of circular water management at scale. Israel currently recycles nearly 90 per cent of its municipal wastewater for agricultureâ??the highest reuse rate in the worldâ??thanks to decades of policy support, infrastructure investment, and public-private collaboration.

At the heart of this system, the Shafdan wastewater treatment facility nearÂ *Tel Aviv treats urban effluent and recharges it into the coastal aquifer, where it undergoes natural filtration through Managed Aquifer Recharge (MAR).* This dual process not only yields high-quality irrigation water suitable for all crop types, but also helpsÂ stabilize aquifer levels and protect against seawater intrusion. As a result, farmers gain a year-round, drought-resilient water source, sharply reducing pressure on Israelâ??s limited freshwater reserves.

This model does more than conserve groundwaterâ??it creates a sustainable water cycle where waste becomes a strategic resource. Over time, the system has also proven economically viable, with reliable infrastructure and water quality standards that make recycled water both safe and attractive for agricultural use. In a water-stressed world, Israelâ??s wastewater reuse paradigm offers a blueprint for climate-resilient farming.

How have Israeli groundwater innovations been localized for high-evapotranspiration regions in Africa or South Asia?

Israeli groundwater-saving innovations have been effectively localized for high-evapotranspiration (ET) regions across Africa and South Asia, thanks to a thoughtful blend of technological adaptation and on-the-ground capacity building.Â *Companies like Netafim have played a pivotal role in tailoring drip irrigation systems to meet the needs of smallholder farmers, developing affordable, low-pressure solutions that function without electricity by harnessing gravity and elevation. These systems are often customized to suit local crop varietiesâ??such as rice, cotton, and region-specific vegetablesâ??by adjusting emitter spacing and irrigation schedules.*

Beyond irrigation hardware, Israeli know-how in water harvesting and storageâ??including rainwater collection systems, lined farm ponds, and underground reservoirsâ??has proven critical in areas with seasonal rainfall and erratic monsoons. Equally relevant is Israelâ??s expertise in saline water management, where practices like selective crop breeding, blending saline groundwater with fresh sources, and small-scale desalination have been adapted to help farmers in brackish or coastal zones.

However, technology alone isnâ??t enough. A major driver of successful localization has been intensive capacity building, including farmer training in precision irrigation and soil moisture monitoring, as well as â??training of trainersâ? programs that equip local extension workers to multiply impact. Demonstration farms serve as real-world testing grounds, building trust by showing how these solutions perform under local agro-climatic conditions.Â Together, these strategies reflect Israelâ??s commitment not just to exporting tools, but to co-creating sustainable water management systems in partnership with the Global South.

Are there examples of successful transfer models?

Two flagship initiatives exemplify how Israeli water-saving agri-tech has been successfully scaled in low-income regions: theÂ *Indiaâ??Israel Centres of Excellence and the MASHAV programs in Sub-Saharan Africa*.

In India, the Centres of Excellenceâ??jointly established across multiple statesâ??function as innovation hubs where Israeli technologies are demonstrated, adapted, and disseminated. These centers focus on precision irrigation, protected cultivation, fertigation, and integrated water management, all customized to suit Indiaâ??s diverse agro-climatic zones. Thousands of farmers, extension workers, and agri-entrepreneurs are trained annually, creating a ripple effect of knowledge transfer and adoption.

Meanwhile,Â Israelâ??s development agency MASHAV has been instrumental across Africa in promoting climate-resilient agriculture and efficient water use. Its programs blend technology transfer with expert training in areas such as drip irrigation, water harvesting, and saline water management. In drought-prone dryland zones, MASHAV initiatives have strengthened food security and water resilience by equipping farmers with practical, low-cost irrigation techniques and conservation strategies tailored to harsh environmental conditions.

Together, these programs illustrate Israelâ??s long-term, partnership-driven approach to agricultural developmentâ??rooted not just in exporting technology, but in building local capacity and context-specific solutions.

What lessons can be drawn from Israeli partnerships (e.g., MASHAV programs, India-Israel Centres of Excellence) in scaling water-saving agri-tech in low-income regions?

Israeli partnershipsâ??particularly throughÂ *MASHAV programs in Africa and the Indiaâ??Israel Centres of Excellenceâ??have offered vital lessons in scaling water-saving agri-tech across low-income regions*. At the core of their success is a demand-driven approach, ensuring technologies align with the actual needs and priorities of local farmers rather than imposing one-size-fits-all solutions.Â *Netafim has played a pivotal role in many of these collaborations, not just as a technology provider but as a long-term partner in knowledge transfer and system design.*

Demonstration farms and field pilots are critical in this context, allowing farmers to see the tangible benefits of precision irrigation and water-efficient practices under real-world conditions. These initiatives succeed not by isolating technology, but by taking a holistic approachâ??integrating agronomy, post-harvest value chains, and market access to ensure economic viability.

Importantly, lasting impact requires long-term engagement, not just short-term interventions. Public-private collaborationâ??betweenÂ MASHAV, Netafim, local governments, and farming communitiesâ??has proven essential to sustaining innovation and scaling it responsibly. Finally, successful adoption hinges on addressing socio-economic realities, from affordability and access to credit to cultural farming practices, all of which must be factored into design and delivery.

What financing or incentive mechanisms (e.g., public-private partnerships, carbon-linked irrigation credits) have proven effective in scaling Israeli water-tech abroad?

Scaling Israeli water-tech in global markets, particularly in developing regions, depends on a diverse set of financing and incentive mechanisms designed to reduce risk, encourage adoption, and align commercial and development goals. Â Publicâ??private partnerships (PPPs) have proven especially effectiveâ??combining the innovation and efficiency of Israeli firms like Netafim with the enabling support of host-country governments, which may contribute land, infrastructure, or policy frameworks.Â These partnerships often act as springboards for broader ecosystem development.

Development aid and concessional loans from agencies such as the World Bank, African Development Bank, and USAID further expand opportunities. Many MASHAV-backed initiatives leverage these funds to support water infrastructure and agri-tech deployment. Meanwhile, export credit guarantees from Israeli and international agencies help reduce financial risk for companies entering new or unstable markets.

Emerging models such as impact investing and blended financeâ??which merge private capital with public or philanthropic fundingâ??are also gaining traction. These structures appeal to investors seeking both financial returns and measurable social or environmental outcomes, such as improved water efficiency or smallholder resilience.Â One particularly innovative approach on the horizon is carbon-linked irrigation credits, which recognize that reducing energy-intensive groundwater pumping also reduces emissions.Â Though still in early stages, such schemes could create new revenue streams for farmers adopting efficient irrigation systems.

On the ground,Â local government subsidies, tax incentives, and â??pay-for-performanceâ? modelsâ??where financial returns are tied to verified water savings or yield improvementsâ??can further drive adoption.Â These layered financing strategies are essential to turning Israeli water-tech into globally scalable solutions, especially in resource-constrained regions.

Can Israelâ??s experience with desert agriculture and saline water farming inform long-term strategies to reduce freshwater groundwater dependence globally?

Israelâ??s decades-long journey in overcoming acute water scarcity offers a powerful roadmap for regions seeking to reduce dependence on freshwater groundwater sources. Its experience proves that necessity can drive radical agricultural innovationâ??from drip irrigation and wastewater reuse to saline water farming. What sets Israel apart is its holistic approach to water management, integrating multiple strategies such as efficient irrigation, desalination, policy enforcement, and treated wastewater reuse into a coherent national framework.

One of Israelâ??s most impactful contributions is its demonstration that saline and non-conventional water sourcesâ??once dismissed as unusableâ??can be leveraged productively for agriculture. Through extensive crop selection and breeding programs,Â *Israeli researchers have developed salt-tolerant and drought-resilient varieties that make farming viable even in brackish or arid environments. This has redefined the potential of desert and coastal regions around the world.*

Equally important is the economic viability of Israelâ??s arid-zone agriculture. Far from being subsistence-based, these farming systems are market-oriented, export-ready, and technologically advancedâ??challenging the long-held assumption that deserts are unproductive by default. Underpinning this success is a robust network of policies and regulatory frameworks governing water pricing, quality standards, and infrastructure development.

Finally, Israelâ??s proven ability to transfer and adapt its technologies across geographiesâ??through partnerships, training programs, and demonstration farmsâ??shows that its model is not only effective, but exportable.Â*For countries in Africa, South Asia, or the MENA region, the Israeli experience serves not just as inspiration, but as a practical template for water-secure, climate-resilient agriculture.*

What role can Israeli institutions play in building regional groundwater resilience alliances with countries in the MENA, South Asia, and Sub-Saharan Africa?

Israeli institutions are uniquely positioned to spearhead regional alliances aimed at strengthening groundwater resilience across MENA, South Asia, and Sub-Saharan Africaâ??regions facing mounting water stress and climate volatility. With deep expertise housed in universities like Ben-Gurion University of the Negev and Technion, as well as national bodies like MASHAV and the Water Authority, Israel can offer critical knowledge in hydrogeology, managed aquifer recharge (MAR), and sustainable groundwater abstraction techniquesÂ This expertise is already being applied domestically and can be adapted through joint R&D initiatives that address the distinct hydrogeological challenges of partner nations.

Capacity-building is another critical avenue where Israel can leadâ??through specialized training programs, workshops, and study tours for water managers, engineers, and policymakers. By grounding theory in practice, pilot projects and demonstration farms showcasing efficient groundwater managementâ??including in transboundary aquifer systemsâ??can foster trust and prove shared benefits. In parallel, Israeli legal and technical experts can offer guidance on establishing policy frameworks, such as abstraction permitting, pollution controls, and water quality standards.

Equally important is the role of Israeli institutions in facilitating publicâ??private partnerships, connecting cutting-edge water-tech firms with governments, NGOs, and local enterprises to scale solutions on the groundÂ On the diplomatic front, Israelâ??s experience in regional water cooperation equips it to host or mediate multilateral dialogues on shared aquifers, especially critical in geopolitically sensitive zones like the Middle East.Â Finally, all of this must be embedded within broader climate adaptation strategies, recognizing that changing precipitation patterns and rising temperatures will increasingly shape groundwater recharge dynamics. Through these multiple channels, Israel can act not just as a technology provider, but as a strategic ally in global groundwater resilience.

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