ABU DHABI SUSTAINABILITY WEEK

WORLD FUTURE ENERGY SUMMIT

ADSW ADVISORY COMMITTEE INSIGHTS REPORT

FOOD AND WATER

2025

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Contents

Foreword

The world finds itself at a pivotal juncture for food and water security in 2025. Much-needed innovations are emerging, but stark challenges temper the optimism they bring. Global hunger remains alarmingly high – about 735 million people faced chronic hunger in 2022, up by more than 120 million from pre-pandemic levels.[1] Water scarcity is also intensifying; by 2025 an estimated 1.8 billion people will live in absolute water scarcity, and two-thirds of the world's population could be under water stress.[2]

It's also increasingly clear that not all communities benefit equally from innovation. Smallholder farmers across Africa and Asia, who produce a significant share of our food, often lack access to improved seeds, digital tools or capital. Many water-stressed regions still depend on antiquated infrastructure. Equity and inclusion in these solutions remain paramount concerns.
With so much change underway, how are farmers, water managers, policymakers, and innovators navigating the current landscape? What are their top priorities and the obstacles they face? Most importantly, what must happen next to ensure that sustainable food production and water access stay on track for all, despite climate impacts? Abu Dhabi Sustainability Week (ADSW) – hosted by Masdar – recognizes that solving the interconnected food and water crises within a viable timeframe will require unprecedented collaboration at every level. Every stakeholder, from government agencies and multilateral donors to agritech startups, research institutions, and community leaders, has a role to play and a unique perspective to contribute.

Each year, ADSW convenes a series of Advisory Committees on key sustainability topics. These sessions gather leaders from across business, academia, and public service for open, transparent dialogue about what is happening on the ground, what innovations or trends they are witnessing, and what they believe should happen next. The 2025 ADSW Advisory Committee on Food & Water brought together experts from around the world to exchange insights on strengthening food and water security in this decisive decade.

This Insights Report separates the committee's candid discussions into major themes and observations, from accelerating technology adoption in food and water systems to reforming water pricing, increasing water security, mobilizing finance and public procurement, expanding water reuse and integrated resource management, and building climate-resilient and alternative food systems. The aim is to provide a clear-eyed snapshot of where we stand in 2025 and a roadmap of priority actions needed to ensure food and water security for all in the face of climate challenges and other pressures.

Assessing the Role and Impact of Technology

Technology remains central to efforts to ensure that everyone can access clean, safe, and nutritious food and water without creating an unsustainable burden on local nature or the global climate. Security, access, transmission, treatment, desalination, and agriculture—the introduction of new technologies opens avenues for rapid progress, addressing age-old problems surrounding systems that provide the most basic human needs.

However, the focus has noticeably shifted in the last year. Organizations are becoming more interested in how they can make the best use of already proven technologies, rather than constantly eyeing the emerging tech of tomorrow.

"The technology to massively improve outcomes around food and water is there, or nearly there," one committee member noted increasingly, we're focused more on the adoption and facilitation aspects, rather than further development."

While technological breakthroughs ideal for supporting better food and water scenarios are happening with increasing regularity, their impact is still not uniform. Reaching the Global South, particularly Africa, continues to be challenging. The "places that need it most are often the places that get it the least," said one expert, begging the question what will it take to change the mindset of global financiers from one of hesitancy to seeing Africa as an investment opportunity ready for more serious and sustained capital flows.

More specifically, the availability of technology, even in developed economies, does not automatically make it attractive as an investment. One committee member explained while major utilities and larger farming companies are eagerly embracing smart agriculture and water innovations, smaller entities still struggle to tackle the issue of upfront capital investment. "Farming is risky," a committee member said. "Farmers are exposed to a lot of factors they can't control, such as shifting global market conditions and geopolitics. So, you can forgive them for not wanting to take on a new technology that they might view as another big risk."

More should be done to empower smaller players within the food and water value chains. This could take the form of supportive government policies (low-interest loan vehicles specifically for tech adoption purposes, for example) or the formation of "ecosystem approaches" where multiple actors play complementary roles in deploying new technology.

In one model, NGOs or government extension agents handle farmer outreach and training, while private companies supply the technology, and local cooperatives help aggregate demand. The Agriculture Innovation Mission for Climate (AIM for Climate) initiative is an example of this. The UAE-US led coalition has brought together governments, development banks, and philanthropic initiatives like the Gates Foundation to mobilize over $1 billion for scaling climate-smart agriculture technologies. "It only worked because we got everyone in the same room," explained a committee involved in the coalition. "Researchers, investors, national ministries – they were able to design large-scale programs to get tools like AI-driven weather forecasting into farmers' hands." Such models illustrate the power of convening stakeholders to collaboratively accelerate tech adoption at scale and at pace.

Equally important is that technology solution providers also need to fully understand their audience. When pitching to smaller buyers who often operate on thin margins, it is essential to have a fundamental grasp of the business case, to present a wholly realistic return on investment timeline and communicate the intrinsic benefits of the technology in terms relevant to the local context. Indeed, technology has become so context-specific that, to be effective, solutions must be tailored to local conditions, e.g., soil, climate, culture, and accompanied by education. Investing in soft infrastructure like agricultural extension services, farmer field schools, and data-sharing platforms is just as important as the hardware.

Technology can indeed be a game-changer for food and water outcomes across the world, but only if we address the adoption gap with contextual clarity and provide greater support for those who need it most.

> **AI is the driving force behind humanized healthcare provisions. This is the epitome of "prevention is better than cure" If we can gain a comprehensive understanding of an individual's health through AI and treat them proactively, that will stop more serious problems developing. This produces better outcomes for the individual, and everyone else because it lessens the pressure on the healthcare system.**

Commoditizing Water

"Everyone agrees that water is precious, but we're still having a hard time putting a price on it," one committee member acknowledged. This is a particularly pressing point, as the undervaluing of water in the Middle East and elsewhere is consistently undermining efforts to conserve it.

Across the GCC, for example, decades of cheap groundwater and desalinated water have led to inefficient farming practices and overuse of aquifers. The UAE is now confronting the legacy of that approach. About 60 percent of Abu Dhabi's water use comes from groundwater, much of it used on farms, and at current rates, it will be largely depleted or unusable without treatment in the next 8-15 years.

Despite the looming scarcity, the continuing use of subsidies has entrenched farmers' views that water is an unlimited good, giving them little to no incentive to invest in conservation across their operations. Farmers often acknowledged that a new water-saving technology would be a suitable fit for them, but expressed no interest in adopting it, given the lack of commercial benefit it would bring. "Without setting an appropriate price on water that values it properly as a commodity, technological adoption will always remain low," as one member starkly put it. "In fact, if new technologies can improve water access, it might even lead to more water being unnecessarily consumed, because it is still viewed as being free."

Introducing or improving water pricing mechanisms could, conversely, be a game-changer. This approach would quickly change behavioral mindsets among farmers and other groups who benefit from water subsidies. Once valued properly, such actors would quickly mobilize their resources to limit their water wastage and embrace conservation efforts that promised a viable ROI.

There are options for implementing such a change, though it would be politically sensitive and almost guaranteed to experience pushback from all groups currently benefiting from subsidized water. One option is tiered or progressive pricing, where a basic amount of water for essential needs is provided affordably, but usage beyond that incurs higher charges.

Creating water markets is another potential avenue, with Australia referenced as a success story. Australian farmers now receive an allocation of water and can choose to use it or sell it to others.3 This has led to more sustainable behaviours, where a farmer might determine that selling part of their water share is more profitable than growing a low-value, water-intensive crop. This market mechanism puts a price on water scarcity and lets water flow towards higher-value uses. It has made water a tradable commodity – in a sense, farmers now treat water like a crop itself, and they carefully weigh their options on how best to use it.

Regardless of the mechanisms used – whether flat subsidies are replaced with targeted incentives or are simply removed – making water a commodity with a tangible value is essential for safeguarding its appropriate use.

> **We've had instances where we tell a potential customer that we can reduce their water consumption by 90 percent and they simply say: 'We don't care, water is free'. A sustainable water future will never happen until we price it sensibly, thereby putting a value on it.**

Pushing for Water Security

Even if water is not valued as formally as it should be, water security is a topic that is never far from the minds of governments and climate experts, particularly in the context of the Middle East and other water-scarce regions.

Though groundwater aquifers are being rapidly depleted, there has been monumental progress being made in the field of desalination. In the UAE, the past 10 years have seen a wholesale pivot from thermal desalination (boiling seawater) to membrane-based reverse osmosis (RO) systems. Thanks to the UAE's combination of abundant solar resources, access to cheap capital, and consistent political support, RO has become a clear winner in terms of cost and emissions, providing potable water at a rate of 50 US cents per cubic meter, with less than an eighth of the CO2 emitted by thermal desalination.

Despite the ascendancy of RO, there is still plenty of room for further innovation and improvement in other areas of desalination. One committee member highlighted their company's view that decentralized thermal desalination has a vital role to play in utilizing industrial waste heat to produce ultrapure water for sectors such as chemicals, data centers, food & beverage production, and more. This decarbonized, circular, and affordable solution is another instance of how competing technological advancements can prompt sustainability gains in tangentially related areas.

While impressive, the technological strides achieved to make desalination affordable and sustainable in the UAE do not make it a globally replicable and scalable solution for water security. Instead, it is one of many tools in the expanding toolkit, acknowledging that it is quickly becoming more versatile and attractive across a broader range of water scenarios.

The issue of reusing wastewater remains concerning to committee members. They cited economic and technical hurdles. In one case study, Abu Dhabi attempted to substitute a significant share of the city's water supply with treated wastewater for non-drinking uses such as landscaping, but encountered cost and quality issues, forcing them to pause the program. Costs became higher than using desalinated water, even though it is of much higher quality than treated wastewater. Clearly, issues around treatment, transportation, and storage remain in unlocking the full potential of wastewater.

Solutions to this revolve around the smart integration of water sources. Blending moderately treated effluent with desalinated water could achieve a suitable quality for certain uses at lower overall cost than ultra-treating the effluent alone. Another suggestion was to produce different grades of water. If utilities supplied a dual network (high-grade water for kitchens, lower grade for toilets and gardens), cities could cut freshwater demand substantially. In agriculture, partial desalination produces brackish water used for certain salt-tolerant crops instead of using full RO desalination. These approaches recognize that matching water quality to need and having "the right water quality at the right place," as one committee member put it, can unlock scalable efficiencies.

Another source of encouraging progress is the capturing of "new" water sources, such as stormwater and atmospheric water (water pulled from air). These should still be considered niche solutions, as they contribute some water but at a much higher cost compared to desalinated water, which remains by far the cheapest bulk source in water-scarce coastal regions. However, in off-grid or remote situations, these technologies can be valuable and may quickly see more frequent use as their technical capabilities improve while their associated costs lessen.

Issues around water reuse, water quality, and integrated management boil down to a call for maximizing efficiency and alignment in the water cycle. Every drop of water – whether from rain, river, sea, or tap – should be considered for how it can be used and reused optimally. This requires more intelligent application of technical solutions alongside institutional cooperation (more supportive policies, collaborative agreements, data sharing). Many of the building blocks are already in place; the challenge is bringing them together under coherent management. "It's not just about securing more water," one committee member stated. "We need smarter water."

> **Our mandate is to supply water at the lowest cost. But the cheapest approach isn't automatically going to be the right fit for every scenario, in every country. It's contextual, it's about understanding what you're trying to achieve. If you want long-term water security, you need to find the right technological approach to balance cost, emissions, access and conservation.**

Mobilizing Investment

Transforming food and water systems at scale will require vast amounts of capital in ways that reshape markets to favor sustainability and inclusion. Creative approaches to finance and public procurement can unlock systemic change.

Traditional financing for agriculture and water infrastructure has often fallen short, especially in emerging markets. Private investors perceive smallholder agriculture or rural water projects as high-risk and low-return. While significant, public budgets and development aid are spread thin, particularly considering major withdrawals such as the recent disbanding of around 80 percent of USAID programs.[4] Bridging this investment gap calls for innovative financing models and partnerships – a key dialogue focus.

One powerful tool is public procurement and structured demand to drive investment. In Africa, governments collectively spend over $2 billion each year on food for schools, hospitals, and other public institutions. Yet much of this money goes to imported food rather than local produce, as the imports are cheaper due to the structural efficiencies of the developed economies where they are produced. If even a portion of that procurement were redirected to home-grown food, such structured demand could provide a stable market for millions of small farmers and encourage companies and banks to invest in structured markets backed by government contracts.

Better coordination of investment efforts is also needed. In the UAE, for example, multiple public and private entities are investing in food and water projects, but not always in a coordinated way. This can lead to fragmentation and uncertainty for innovators seeking funding. Greater clarity is needed on "where and what [technologies] to invest in," a committee member said, to best align with the UAE's national sustainability targets, saying that would help direct capital to the most impactful areas. The role of government in de-risking and incentivizing the private sector is significant. When governments, developers and clean tech providers all have slightly different agendas, even well-meaning investors can find it hard to navigate the sustainability space, dissuading them from taking risks. Clear policy signals, such as national roadmaps for agritech investment, or the introduction of subsidies for sustainable tech investments, help create a pipeline of bankable projects. More broadly, streamlining investment priorities at a high level would signal to the market what is needed, encouraging larger and more coordinated flows of capital.

> **Fixing markets is as important as fixing production. When you fix market imbalances, you solve a host of other issues, as producers will immediately want to improve their production methods as soon as they see a stable, viable profit outlet.**

Building Climate-Resilient and Alternative Food Systems

Climate change is profoundly altering the context in which our food systems operate. To ensure food security moving forward, we need to build food systems that are resilient to climate shocks and open to alternative sources of nutrition. This involves both climate-proofing traditional agriculture and accelerating novel approaches to producing food, from controlled-environment farming to plant-based and cellular proteins. Emerging innovations in food tech as well as strategies to diversify and adapt agricultural practices are crucial to this.

One example is the rise of alternative proteins and novel foods. A surge of startups and research focused on producing proteins without conventional farming are cultivating meat in bioreactors, fermenting dairy proteins without cows, or harvesting plant proteins from unique sources like aquatic plants and algae. In the UAE's Food Tech Challenge program, a startup is growing "water lentils" (Duckweed) in brackish water to produce a protein-rich powder. These water lentils require no arable land and can thrive in non-fresh water, making them a promising climate-resilient crop.

However, many alternative protein technologies are still expensive and not yet at scale. "It's still cost prohibitive in a lot of cases," one committee member noted. "There is also the issue of consumer acceptance, the so-called yuck factor. Culturally and psychologically, people can be hesitant to embrace foods like insect protein flour or lab-grown meat."

While allowing time for these alternatives to slowly gain mass-market acceptance, traditional agriculture must be made more climate-resilient through efforts like the Agriculture Innovation Mission for Climate (AIM for Climate). This global initiative was launched by the United States and the UAE to accelerate innovation in climate-smart agriculture and food systems. By COP29 in November 2024, the coalition secured over $29 billion in funding, supporting nearly 130 projects with over 800 partners. These projects focus on assisting smallholder farmers, reducing methane emissions, and advancing technological innovations in farming. Early warning systems and tailored advisories, e.g., telling a farmer when to sow their crop to avoid an impending drought, or using low-earth orbit satellite monitoring to detect locust swarms, can make a huge difference in yields for farms operating under the threat of climate stresses.

Controlled-environment agriculture (CEA) – like greenhouses and vertical farms – can act as a potential buffer against climate volatility, given their ability to consistently achieve high yields with a fraction of the water needed in open-field farming. If the water subsidy/pricing landscape in the Middle East shifts towards commoditizing water as the committee hopes, these approaches will become even more attractive. The trade-off is the higher energy use for cooling and lighting, which underscores the importance of clean energy integration, such as using solar panels for vertical farms.

Clean cooking is also an important part of resilient food systems as the final step of the food value chain and one intimately connected with health and the environment. A staggering 2.3 billion people still rely on inefficient, polluting fuels like firewood, charcoal, and kerosene for cooking. This causes thousands of deaths per year from indoor air pollution and drives deforestation and carbon emissions. Transitioning to clean cooking solutions (electric or gas stoves, biogas, improved biomass stoves, etc.) is a win-win for climate and development.

Diversification and innovation are key to a climate-resilient food future. Clinging to the status quo (few staple crops, rain-fed monocultures, heavy meat consumption) is a recipe for increased vulnerability as climate conditions change. By contrast, exploring alternatives – whether new crops, new farming systems, or new protein sources – spreads risk and creates flexibility.

Even if alternative proteins are not a large part of the food supply today, the tech is advancing rapidly, and some products are nearing price parity with traditional foods. For instance, plant-based milks (oat, soy) have gained significant market share, and lab-grown meat prices have dropped from thousands of dollars per burger to under $10 in pilot trials.[5]

> **"Clean cooking has been getting a lot of international attention on the global level at COP and other conferences. It's an opportunity to increase food security, to address climate injustice, and to put the spotlight on the wider food systems in place around the world.**

Key Takeaways

Technology access and adoption matter: Promising food and water technologies are emerging across the world, but adoption lags due to economic and policy barriers. Training, affordable financing, and proper incentivization are all crucial to allow existing innovations to reach those who need them most.

Value water to drive efficiency: Water must be properly recognized as the precious resource it is. Current subsidies and under-pricing of water disincentivize conservation efforts. Reforming water pricing and introducing creative incentives, such as tiered tariffs or tradable water rights, can encourage more efficient use.

Create integrated water systems: Water security isn't purely about supplying water at the lowest cost; it's about ensuring long-term access, efficiency, conservation, and appropriate quality levels. RO desalination has proven its value in the Middle East, but comprehensive water security for the region and the world will rely on the intelligent integration of complementary technologies that get the "right water to the right place."

Mobilize investment and use public procurement as a lever: Transformative change in food and water systems needs massive investment, which can be accelerated by smart public policy. Blended finance and multi-stakeholder initiatives are directing capital to where it's needed. At the same time, governments can reshape markets via procurement.

Embrace innovation for climate-resilient food systems: With climate threats mounting, the committee urged a two-pronged approach: climate-proof conventional agriculture and scale up alternative food sources. This means adopting climate-smart practices to protect yields, while also exploring alternative proteins and novel production methods.

About the ADSW Advisory Committees

The committees are designed to foster candid discussions that break down silos between sectors and regions. Participants include CEOs and senior executives of international companies, government policymakers, leading researchers, and technology innovators. This diversity ensures a wide range of perspectives. In closed-door sessions, members share insights, highlight key challenges, and propose actionable solutions and areas for collaboration. Discussions are held under the Chatham House Rule, allowing participants to speak openly about successes and setbacks, learn from one another, and identify common ground. The dialogue is intentionally forward-looking and focused on practical outcomes.

Insights from the committees help shape ADSW's content, direction, and related initiatives. Recommendations are distilled into official reports such as this one and shared with a broader audience to inspire continued dialogue and action. These findings often inform the agendas of ADSW summits, panels, and workshops, and may guide Masdar and its partners in developing new initiatives or advancing policy advocacy aligned with the committee's conclusions. In past years, the committees have contributed to meaningful outcomes, from catalyzing cross-border partnerships to introducing new topics into global forums such as the World Future Energy Summit.

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ABU DHABI SUSTAINABILITY WEEK

About Abu Dhabi Sustainability Week

Abu Dhabi Sustainability Week (ADSW) is a global platform supported by the UAE and its clean energy leader, Masdar, to address the world's most pressing sustainability challenges through crucial conversations accelerating responsible development and fostering inclusive economic, social and environmental progress.

For more than 15 years, ADSW has convened decision-makers from governments, the private sector and civil society to advance the global sustainability agenda through dialogue, cross-sector collaboration and impactful solutions. Throughout the year, ADSW conversations and initiatives facilitate knowledge sharing and collective action that will ensure a sustainable world for future generations.

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WORLD FUTURE ENERGY SUMMIT

About the World Future Energy Summit

The World Future Energy Summit is the leading global event for clean energy and sustainability, bringing together innovators, business leaders, policymakers, and investors to turn ambition into action.

Over three days, the international exhibition and conference addresses the most pressing challenges of our time—clean energy, climate change, sustainable cities, water security, waste management, green finance, and the transformative power of artificial intelligence.

By uniting almost 42,000 attendees from public, private, and non-profit sectors, it serves as a critical bridge between bold policy and real-world solutions.

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References

[1] Reuters, With 735 million people hungry, UN says world is 'off track' to meet its 2030 goal, 12/07/2023
https://www.reuters.com/world/with-735-mln-people-hungry-un-says-world-is-off-track-meet-its-2030-goal-2023-07-12/#:~:text=July%2012%20%28Reuters%29%20,the%20United%20Nations%20on%20Wednesday
[2] UNEP, As shortages mount, countries hunt for novel sources of water, 17/01/2024
https://www.unep.org/news-and-stories/story/shortages-mount-countries-hunt-novel-sources-water#:~:text=By%202025%2C%201,be%20grappling%20with%20water%20stress
[3] Farm Institute, Selling environmental water allocations makes good sense
https://www.farminstitute.org.au/selling-environmental-water-allocations-makes-good-sense/
[4] BBC, More than 80% of USAID programmes 'officially ending', 10/03/2025
https://www.bbc.co.uk/news/articles/cdx2401vn5ro
[5] Forbes, Making Meat Affordable: Progress Since The $330,000 Lab-Grown Burger, 08/03/2022
https://www.forbes.com/sites/lanabandoim/2022/03/08/making-meat-affordable-progress-since-the-330000-lab-grown-burger/