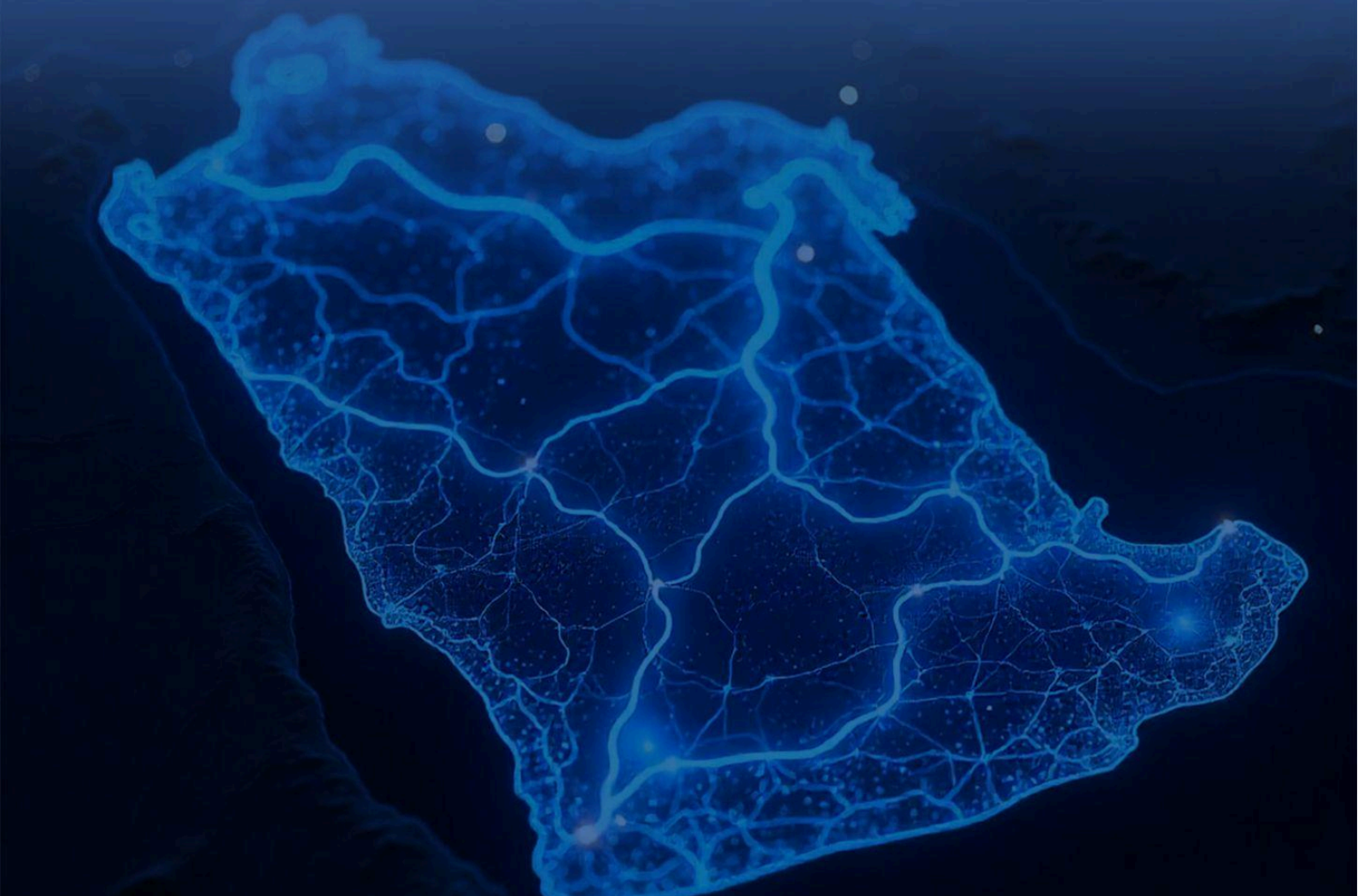
durra.ai
AI Guards Every Drop!

GPIW 2025

Research Report

Durra.ai – AI-Powered National Digital Twin of Water for Saudi Vision 2030



www.durra.ai | +966 58 041 1817 | az@durra.ai

durra.ai
AI Guards Every Drop!

40%
Water Loss

Agriculture consumes over **80% of the Kingdom's freshwater**, and **up to 40% is lost** through inefficient irrigation.

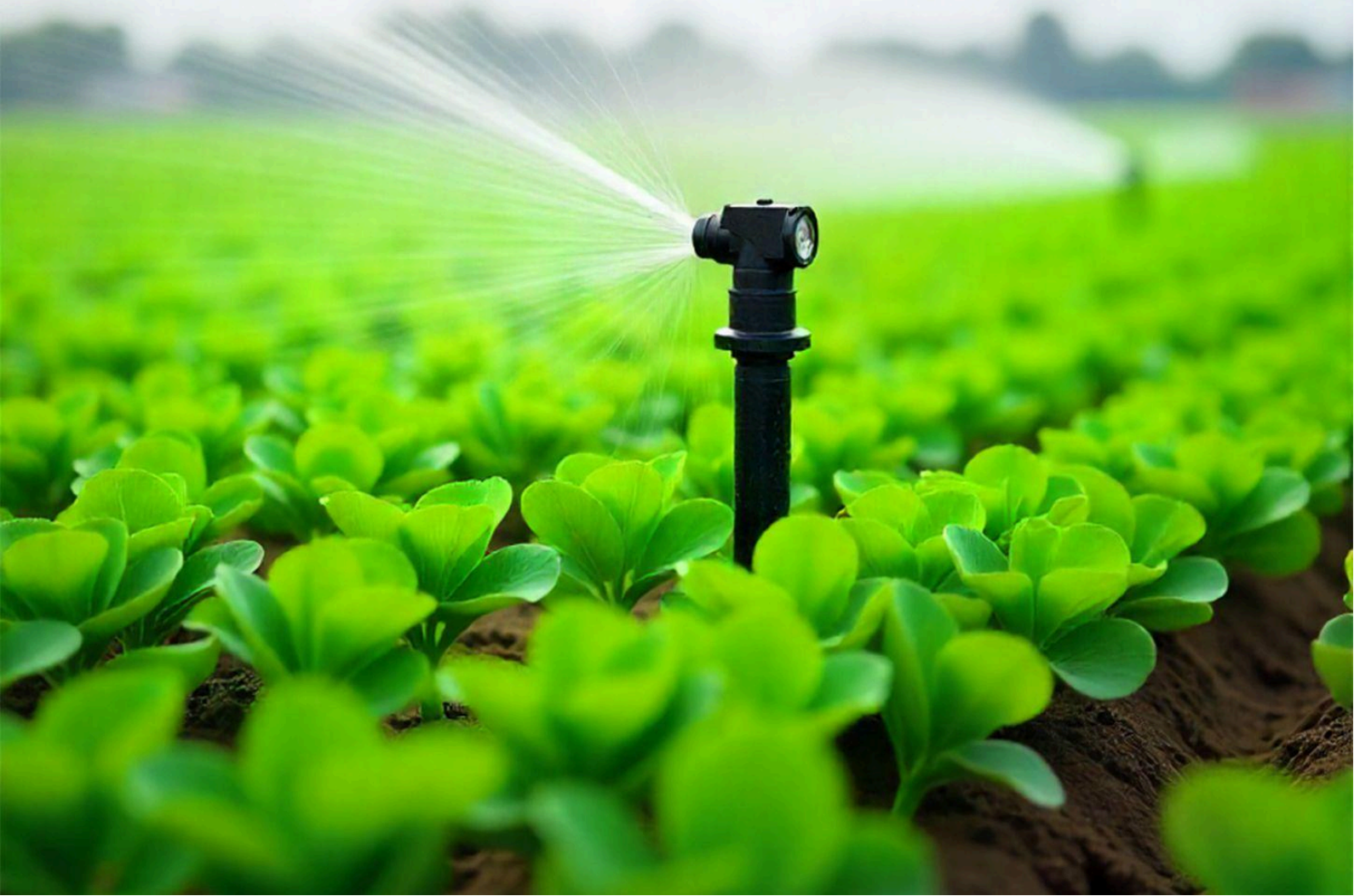


Table of Contents

1. Executive Summary

Saudi Arabia is facing a critical water crisis. Farming uses more than **80% of the country's freshwater**, and **up to 40% is wasted** through inefficient irrigation. Most of this water comes from underground aquifers that cannot be replaced once they are depleted. To cover the gap, the Kingdom depends on desalination and wastewater treatment, which are **very costly** and consume large amounts of energy. This threatens food security, raises national costs, and reduces long-term sustainability. In leading countries, irrigation losses are **below 15%**, showing the scale of the opportunity for improvement.

Durra.ai is a breakthrough solution that is among the first projects globally to build a National Digital Twin of Water, delivered in two phases:

Phase 1 – Smart Irrigation

Irrigation is chosen first because it is the largest user and the largest source of waste. By combining satellite images, soil sensors, and weather forecasts with advanced AI, Durra.ai gives farmers clear advice on when and how much to irrigate. This saves 20–40% of water, lowers pumping and fertiliser costs, and raises yields by 20–30%. Farmers see benefits in the first season, which builds trust and generates valuable data for scaling.

Phase 2 – National Water Twin

Building on this foundation, Durra.ai will expand in three steps:

- **Integration** – connect aquifers, desalination, reuse, and cities into one national system.
- **Prediction** – use AI to forecast demand, risks, and stress across all water sources.
- **Simulation** – allow policy makers to test "what-if" scenarios before investing, avoiding costly over-expansion of desalination and treatment plants.

With **€300K in seed funding**, Durra.ai will launch Saudi pilots in **2025**. By **Years 2–3**, the platform will scale to 20+ farms. By **Year 5**, it will evolve into a full National Digital Twin of Water, serving both farmers and policy makers.

The Team

Durra.ai is driven by a team with the skills to deliver both short-term farm adoption and long-term system integration:

- **Dr. Abrar Zafar – Digital Transformation & Strategy:** 30+ years leading large-scale digital projects across healthcare, telecom, and government. Brings expertise in platform design, regulatory compliance, and aligning Durra.ai with Saudi Vision 2030.

- **Dr. Saad bin Qaisar – AI & IoT Systems:** Specialist in AI and Internet of Things with experience in real-time monitoring and machine learning. Ensures Durra.ai's core AI engine is scientifically rigorous, scalable, and practical.

- **Denis O'Grady – Large-Scale Agronomy:** Over 10 years managing commercial farms in GCC and Europe, including at Elite Agro UAE. Provides practical knowledge of irrigation, crop management, and adoption at a commercial scale.

- **Dr. Walter Luyten – Biotech & Sustainability:** Scientist with expertise in soil health, nutrient recovery, and circular resource systems. Strengthens Phase 2 with modules for fertigation, soil carbon, and resource recovery.

By uniting expertise in technology, agronomy, and sustainability, the team is uniquely positioned to deliver measurable results at the farm level and scale up to a national system of water governance.

Durra.ai directly supports Saudi Vision 2030 and positions the Kingdom as a global leader in AI-powered water management.

2. Problem Statement

Saudi Arabia's Water Crisis

Water scarcity is one of the most pressing challenges facing Saudi Arabia today. The Kingdom is one of the most water-stressed countries in the world, with limited rainfall, high temperatures, and growing demand from both population and economic development. Unlike some regions that can rely on rivers or renewable groundwater, Saudi Arabia depends mainly on non-renewable water reserves and energy-intensive desalination. This creates a situation where **agriculture, food security, energy use, and sustainability are deeply linked**.

Understanding the depth of this crisis requires looking at four interconnected issues: how much water agriculture consumes and wastes, how dependent the country is on fossil aquifers, how costly desalination has become, and how Saudi irrigation compares with international best practice. Together, these factors illustrate both the severity of the problem and the opportunity for transformational change.

1. Agriculture's share of water (80% use, 40% waste)

Agriculture is by far the largest consumer of water in Saudi Arabia, using more than 80% of all freshwater withdrawals. However, traditional irrigation methods such as flood irrigation lead to huge inefficiencies, with up to 40% of this water lost through evaporation, seepage, and over-watering. This level of waste makes farming the single biggest stress on Saudi water resources.

2. Dependence on non-renewable aquifers

Most of the water used in Saudi agriculture comes from underground aquifers that are fossil reserves — ancient water stores that cannot be naturally recharged at the rate they are being used. Once these aquifers are depleted, they will not return. Over-extraction has already caused falling groundwater levels in many regions, threatening the long-term viability of both farming and rural livelihoods.

3. Rising desalination costs and energy strain

To meet demand, Saudi Arabia relies heavily on desalination and wastewater treatment. While these technologies provide essential water, they are very costly and highly energy-intensive. Desalination is estimated to consume more than 10% of Saudi Arabia's electricity, increasing both operating costs and carbon emissions.

As demand grows, so does the financial and environmental burden, creating an unsustainable cycle.

4. Global comparison with international best practice

Globally, agriculture accounts for around 70% of freshwater use. Leading countries with advanced irrigation systems — such as Israel, parts of California, and Australia — keep irrigation losses below 10–15% through drip irrigation and precision scheduling. In contrast, Saudi Arabia loses up to 40%, more than three times higher than the best practice. This gap shows not only the severity of the challenge but also the scale of the opportunity: even partial improvements could save billions of cubic metres of water each year.

3. Current State of the Art

Existing Solutions

1. Precision irrigation tools

At the farm level, companies such as **Netafim, CropX,** and **HydroPoint** provide precision irrigation technologies. These typically use **hardware sensors** in the soil and connect them to **software dashboards** that help farmers decide when to irrigate. In Saudi Arabia and the wider MENA region, some startups also offer soil-monitoring devices or basic decision-support tools. These systems can improve efficiency on individual farms, but they remain **hardware-dependent and fragmented**.

Their limitations

While these tools have their strengths, they share three important limitations:

- **Siloed**: Plant- and city-level twins cover only one part of the water cycle (e.g., an urban network), while farm-level tools look only at single fields. They cannot provide an end-to-end view across agriculture, aquifers, desalination, reuse, and cities.

- **Hardware-heavy:** Precision irrigation depends on expensive sensors installed farm by farm. This raises adoption costs and slows scaling, especially in resource-limited settings.

- **Not scalable:** Current solutions cannot be connected into a unified national picture. Farmers, utilities, and policymakers each see only a fragment of the reality. This makes it difficult to plan investments, coordinate allocation, or avoid waste.

2. Plant- and city-scale digital twins

Around the world, digital twins are already being applied in water management, but mostly at a plant or city level. For example, some utilities in Europe have built city-scale digital twins to track leaks, optimise pumping, and manage distribution networks. Singapore has also deployed a city-wide twin to support urban drainage and supply. These solutions are valuable, but they are limited in scope. They focus

on urban or industrial water systems, not on agriculture, which is the largest consumer of water in Saudi Arabia.

Gap for a national-scale solution

There is a clear gap between farm-level tools and city-scale twins. What is missing is a solution that can:

- Address agriculture first, where the water use and waste are greatest.
- Build up a national intelligence layer step by step, from farms to aquifers, desalination, reuse, and cities.
- Provide value to both farmers (clear, immediate advice) and policy makers (scenarios for long-term planning).
- Be software-led and data-driven, reducing dependence on costly hardware.

No country has yet deployed such a fully integrated **National Digital Twin of Water**. This is the innovation gap that **Durra.ai** is designed to fill.

4. Innovation: The Durra.ai Approach

Durra.ai is designed as one of the first National Digital Twins of Water, developed in two clear phases. This approach directly tackles the biggest problem first (irrigation waste in agriculture) and then expands step by step to cover the whole water cycle.

Phase 1 – Smart Irrigation (largest user + fastest ROI)

Agriculture is the largest consumer of water in Saudi Arabia, using more than 80% of freshwater withdrawals, compared with a global average of ~70% (FAO, World Bank). Yet, up to 40% of this water is wasted through inefficient irrigation methods such as flood irrigation, whereas international best practice keeps irrigation losses below 15% (Israel, California, Australia). This gap represents both a national crisis and an opportunity for rapid improvement.

Durra.ai begins with smart irrigation because it delivers the fastest and most visible return on investment:

- By combining satellite images, soil and salinity sensors, and weather forecasts with AI models (LSTM forecasting and XGBoost optimisation), Durra.ai gives farmers simple advice: when and how much to irrigate.
- This immediately reduces over-watering, lowers pumping energy use, and cuts fertiliser waste.
- Results are measurable within one growing season: saving 20–40% of irrigation water, increasing yields by 20–30%, and reducing costs.
- Farmers benefit directly, creating trust and adoption. At the same time, every irrigation cycle builds a valuable national dataset on crops, soils, and climate responses, forming the foundation for scaling.

This starting point is both strategic and practical: it focuses on the area of greatest water stress and provides the quickest path to farmer buy-in, unlike city twins or research models that have little immediate benefit for growers.

Phase 2 – National Water Twin (integration, prediction, simulation)

Building on the adoption and datasets from Phase 1, Durra.ai expands into a full National Digital Twin of Water, developed in three steps:

1. Integration

- Connect aquifers, desalination plants, wastewater reuse, and urban demand into one national system.
- Overcome the silos that limit current solutions (city twins only cover urban utilities, and farm tools only cover individual plots).

2. Prediction

- Use advanced AI to forecast demand, water stress, and risks across all sectors of the water cycle.
- This allows proactive planning, not just reactive management.

3. Simulation

- Give policy makers the ability to run “what-if” scenarios before committing billions in investments.
- For example, testing the impact of crop shifts, new desalination plants, or water tariff changes.
- This ensures sustainable allocation and avoids costly over-expansion of high-energy desalination or wastewater plants.

By moving step by step from farm adoption to national planning, Durra.ai becomes a living intelligence layer for Saudi Arabia’s water security.

Why This Two-Phase Model Ensures Adoption and Scaling

Durra.ai's staged approach goes beyond the state of the art in three important ways:

1. Biggest impact first

- Unlike plant/city twins (urban focus) or precision irrigation tools (farm-by-farm), Durra.ai begins with agriculture — the largest water user (80%) and largest source of waste (40%).
- This ensures maximum savings and immediate results.

2. Fast ROI and farmer trust

- Phase 1 provides clear economic benefits within one season (lower costs, higher yields).
- Farmers adopt because they see value quickly, solving one of the biggest barriers to new technologies.

3. Scalable intelligence layer

- Each Phase 1 user builds a proprietary Saudi dataset (crop–soil–climate interactions).
- This "data moat" cannot be easily replicated by global vendors and becomes a strategic national asset.
- Phase 2 uses this foundation to expand into full system integration, prediction, and simulation, moving beyond anything available in today's market.

4. National and global leadership

- No country has yet deployed a fully integrated, nation-scale water twin.
- By following this phased model, Saudi Arabia can be the first mover, setting a benchmark for other water-stressed nations across MENA, Africa, and Asia.

Why Durra.ai Surpasses the Current State of the Art

- **City/Plant twins** → Urban only, no agriculture. Durra.ai covers farms first, then scales to national water systems.
- **Precision irrigation tools** → Hardware-heavy, fragmented, expensive to scale. Durra.ai is software-led, partner-friendly, and SaaS-based.
- **Research models** → Theoretical, not operational. Durra.ai delivers real-time advice to farmers and policy simulations to decision makers.
- **Overall:** Current solutions are siloed. Durra.ai connects the entire water cycle into one predictive, scalable platform.

5. Technical Approach

Durra.ai is built as a multi-layered intelligence system that collects, analyses, and optimises water and crop data. It is designed to provide practical advice to farmers today and strategic planning tools for policy makers tomorrow.

Durra.ai System Layers

Fusion layer (data collection and cleaning)

- Brings together satellite images, soil and salinity sensors, local weather forecasts, and farmer input (crop type, planting date, growth stage).
- Checks for errors (e.g., faulty sensors) and merges all data into a clear, reliable farm profile.

Prediction layer (forecasting water needs)

- Uses advanced forecasting methods to predict how much water a crop will lose in the coming days.
- Looks at rainfall, temperature, humidity, soil moisture, and crop conditions.
- In practice: this means Durra.ai can tell a farmer, “Your field will need 15 mm of water in the next 48 hours.”

Optimization layer (practical scheduling)

- Turns forecasts into actionable irrigation plans.
- Optimises when and how much water should be applied to save energy, avoid over-irrigation, and prevent soil salinity.
- Example: “Irrigate in two shorter cycles at night instead of one long cycle in the afternoon” — reducing evaporation and electricity costs.

Data Sources

Durra.ai is unique because it combines multiple streams into one platform:

- **Satellite imagery:** tracks crop growth, soil moisture, and stress.
- **IoT sensors:** monitor soil moisture, salinity, and temperature on the ground.
- **Weather forecasts:** anticipate rainfall, heat, and humidity.
- **Farmer input:** adds local knowledge about crops and farming practices.

This integration makes Durra.ai more accurate and scalable than solutions that depend only on hardware sensors or on research models.

Scientific Validation

Durra.ai's impact will be measured through Paired-Plot Trials, a gold-standard method in agricultural research:

1. **Control plots** use the farmer's normal irrigation method.
2. **Treatment plots** use Durra.ai recommendations.

Measurements include:

- Exact water use (calibrated meters).
- Soil conditions (moisture, salinity).
- Yields (harvest weight).
- Energy use (pump electricity/fuel).

Results are compared to calculate water savings, crop yield improvement, and water-use efficiency. Statistical tests confirm accuracy.

This ensures that reported savings **(20–40% less water, 20–30% higher yields)** are scientifically credible and transparent.

Continuous Learning

Durra.ai is a learning system that becomes more accurate each season:

- Every cycle records the recommendation, the action, and the outcome.
- These records create a unique dataset linking Saudi crops, soils, and climates to results.
- At the end of each season, the system is retrained with this new data, improving forecasts and recommendations.
- Agronomists review anomalies and feed their expertise back into the system, ensuring human oversight.

This means Durra.ai does not remain static — it adapts to climate change, local crop varieties, and farmer practices, creating a Saudi-specific intelligence layer that global competitors cannot easily replicate.

Summary

Durra.ai combines multi-source data, advanced forecasting, scientific validation, and continuous learning. It gives farmers immediate, easy-to-use advice that saves water and increases yields, while building a national dataset that enables Saudi Arabia to plan water resources at scale.

This technical approach ensures Durra.ai is innovative yet practical, credible, and scalable, surpassing current siloed and hardware-heavy solutions.

6. Experience & Past Projects

The Durra.ai team brings combined expertise in agriculture, hydroponics, and advanced feasibility studies. Below are examples of past projects that demonstrate our proven track record in high-impact agricultural initiatives.

Project 1: Hydroponics Mega Farm

Comprehensive Investment Study for Establishing an Agriculture Project Using the Hydroponics Farming Technology for Almarai.

Client: Almarai

Size: Mega project with a plan to build the largest hydroponic farm in the region – 560 hectares (5.6 million m^2) with a production capacity of 300,000 tons per year

Products: Standard Tomatoes, Cherry Tomatoes, Cucumber, Romaine Lettuce, Green Bell Pepper, Colored Bell Pepper, Strawberries

Role: Assessment of the investment concept, market research, demand and supply analysis, seasonal assessment, distribution strategy, marketing strategy, product analysis, pricing strategy, and scenario analysis

Project 2: Hydro Fresh Premium Vegetables

Comprehensive Market Study for Establishing an Agriculture Project Using Hydroponics Technology to Produce Premium Vegetables

Client: Hydro Fresh

Size: 180,000 m^2

Products: Cherry Tomatoes, Iceberg Lettuce, Looseleaf Lettuce, Butterhead Lettuce, Packaged Salad

Role: Product analysis, concept assessment, potential business model development, target segment analysis, competitor analysis, marketing strategy, distribution strategy, and pricing strategy

Project 3: Soil-less Agriculture

Comprehensive Feasibility Study Plan for Establishing a Soil-less Agriculture Project Using Aeroponic Farming Technology

Client: BANA United Trading Co.

Size: 11,611 m^2, with a production capacity of 840 tons per year

Products: Cherry Tomatoes, Iceberg Lettuce, Looseleaf Lettuce, Butterhead Lettuce, Kale, Baby Spinach

Role: Location analysis, market assessment, product selection, operational model, technical requirements, manpower planning, technology assessment, and financial feasibility across multiple scenarios (hydroponic, aeroponic, aquaponic)

Project 4: Leafy Greens Vertical Farming

Comprehensive Market Assessment on Leafy Green Crops in Saudi Arabia

Client: Scene Investments

Size: Vertical Farming – 1,000 Aeroponic Towers

Products: Premium Leafy Green Crops

Role: Product analysis, concept assessment, business model development, target segment analysis, competitor analysis, marketing strategy, distribution strategy, and pricing strategy

Additional Projects

Alongside these detailed studies, the team has supported other projects in the region, including:

1. EL-MIGA Sudan Market Launch – Bafarat (2023)
2. Hydroponic Project Feasibility Study – Makkah Land, Waadi Nauman (2023)
3. Comprehensive Market Study for Establishing an Agriculture Project Using Aeroponics Technology – VARM (2020)
4. Comprehensive Market Study for Establishing an Agriculture Project Using Hydroponics Technology – Almarai (2019)
5. Comprehensive Investment Plan for Establishing an Agriculture Project Using Aeroponics Technology – BANA United Trading Co. (2017)

7. Impact

The potential impact of Durra.ai is both immediate at the farm level and strategic at the national level. Its phased design ensures that results are practical, measurable, and grounded in the realities of Saudi agriculture.

Water Savings

Saudi farms lose a significant share of irrigation water to over-application, evaporation, and inefficient distribution. By using a combination of satellite imagery, soil sensors, and weather forecasts, Durra.ai can provide farmers with tailored irrigation advice that matches the actual needs of their crops. Early modelling and international literature suggest that this approach could reduce irrigation volumes by 20–40%. The exact savings will depend on farm practices, soil conditions, and crop type, but even at the lower end of this range, the result would be significant, given that agriculture already consumes over 80% of the Kingdom's freshwater.

Yield Gains

Improved irrigation is not only about saving water; it also helps crops perform better. Applying water at the right time and in the right amount reduces stress on plants and can increase their productivity. Based on controlled trials in other regions and initial testing in Saudi Arabia, yield improvements in the range of 20–30% are realistic. These gains mean that farmers could harvest more food from the same land while using less water, creating a double benefit for both food security and resource efficiency.

Cost Reduction and Farmer Return on Investment

Farmers stand to benefit financially in two ways: by cutting unnecessary costs and by improving yields. Reduced pumping hours lower energy bills, while more efficient water use decreases fertiliser leaching and input waste. Because Durra.ai is delivered as a software service and does not require heavy upfront investment in hardware, its cost remains very small compared with the value of the savings it generates. Importantly, farmers can begin to see results within a single season. This quick return is vital in building trust and encouraging adoption at scale.

Energy Use and Greenhouse Gases

Water, energy, and climate are closely connected. Every litre of water pumped requires energy, and every unit of fertiliser applied contributes to greenhouse gas emissions. By cutting irrigation volumes and optimising fertiliser application, Durra.ai can reduce both electricity and diesel consumption and fertiliser-related emissions. On a larger scale, more efficient use of water resources can reduce pressure to expand energy-intensive desalination plants, which are among the biggest contributors to Saudi Arabia's water-related carbon footprint.

Environmental Benefits

The environmental benefits extend beyond water and energy. Over-irrigation often leads to fertiliser runoff, chemical pollution, and the build-up of salts in soils. These problems degrade farmland and damage downstream ecosystems. By recommending only the water that is truly needed, Durra.ai helps reduce chemical runoff, maintain soil fertility, and protect long-term land productivity. These benefits may not be visible in a single season but will accumulate over years of sustained use.

National Data Asset

One of the most strategic impacts of Durra.ai is the dataset it generates. Each irrigation cycle contributes to a growing record of how Saudi crops, soils, and climates interact. Over time, this creates a proprietary national database that improves the accuracy of recommendations and supports broader food and water security planning. Unlike global solutions that rely on generic models, this Saudi-specific dataset will become a long-term national asset.

Alignment With National and Global Goals

Durra.ai directly supports the objectives of Saudi Vision 2030, especially in the areas of sustainable water use, food security, and environmental stewardship. Beyond national goals, it contributes to global Sustainable Development Goals (SDGs), including SDG 2 (Zero Hunger), SDG 6 (Clean Water and Sanitation), and SDG 13 (Climate Action). By aligning with both local and global frameworks, Durra.ai strengthens Saudi Arabia's leadership role in sustainable innovation.

8. Market & Scaling

The Addressable Market in Saudi Arabia

Saudi Arabia is the natural starting point for Durra.ai because it faces one of the most pressing water challenges in the world and because agriculture is the largest consumer of water in the Kingdom. The country has more than 1.5 million hectares of cultivated land, spread across wheat, barley, dates, vegetables, and forage crops. Not all of this land is equally suitable for digital twin technology at the start. Based on crop type, farm size, and readiness to adopt new technology, around 500,000 hectares of high-value crops and large commercial farms are considered the serviceable market for Phase 1. At current software-as-a-service (SaaS) pricing models, this represents a near-term market of over $200 million. This figure is realistic because it focuses on farms with the scale and incentive to invest in efficiency, rather than assuming immediate adoption across all land.

Expansion to MENA and GCC

The challenge of water scarcity is not unique to Saudi Arabia. Across the Middle East and North Africa, agriculture consumes the majority of freshwater and faces similar inefficiencies. Countries such as Egypt, Morocco, and Sudan also manage millions of hectares of farmland under increasing water stress. Within the Gulf Cooperation Council (GCC), nations like the UAE and Oman are expanding agriculture in arid climates, with heavy reliance on desalination and groundwater pumping. Together, these markets account for over 5 million hectares of farmland that could benefit from Durra.ai within five years. If even a portion of this land adopts the platform, the addressable market could exceed $1 billion. The drivers of this expansion include rising government investment in sustainable agriculture, international pressure to reduce water waste, and the demonstrated results of early Saudi pilots.

Adoption Strategy

Scaling Durra.ai requires more than technology; it requires building trust, demonstrating value, and aligning with national strategies. Our adoption approach is therefore designed around three key pillars:

1. Farmer-first onboarding

Farmers are at the centre of Durra.ai's design. The platform offers an Arabic-first, voice-enabled interface that is easy to use in rural settings. A dedicated Farmer Success Team will provide training and support, ensuring that farmers not only understand the recommendations but see immediate benefits in lower costs and improved yields. Adoption begins with early adopters who are willing to test, but word-of-mouth and proven results will drive broader trust.

2. Agribusiness pilots

Large-scale agribusinesses and food companies are natural partners because they manage significant land, have the financial resources to invest in innovation, and are directly impacted by water inefficiency. Working with these organisations allows Durra.ai to prove its impact at scale, build strong case studies, and refine the technology in real-world settings. These pilots create reference customers that can inspire adoption across the sector.

3. Agency partnerships

For a national digital twin to succeed, collaboration with government bodies is essential. Durra.ai will work closely with the Ministry of Environment, Water and Agriculture (MEWA), the Saudi Water Authority, and universities to ensure integration with national data systems and alignment with water policies. These partnerships are not only important for credibility but also create pathways for scaling from farm-level adoption to a true national intelligence layer.

Summary

Durra.ai's market opportunity is both large and urgent. In the near term, Saudi Arabia alone represents a market worth $200M, focusing on 500,000 hectares of serviceable land. In the medium term, expansion across the MENA and GCC could bring the opportunity to over $1B as adoption grows. By combining farmer-first onboarding, agribusiness pilots, and government partnerships, Durra.ai is positioned to scale realistically — first by proving its value on Saudi farms, and then by becoming the benchmark for water-smart agriculture across the region.

9. Team

The strength of Durra.ai lies not only in its technology but also in the diverse expertise of its leadership team. Each member brings a different set of skills that together cover the full journey, from digital transformation and artificial intelligence to agronomy, sustainability science, and farmer adoption.

Dr. Abrar Zafar – Digital Transformation & Strategy

Dr. Zafar brings over 30 years of international experience in leading large-scale digital transformation projects across various sectors, including healthcare, telecommunications, and government. His expertise is in building scalable platforms, ensuring compliance with complex regulations, and aligning innovation with national strategies such as Saudi Vision 2030. For Durra.ai, he provides the strategic direction, oversees partnerships with ministries and agencies, and ensures that the platform is not just a technical tool but a national system that integrates policy, business, and farmer needs.

Dr. Saad bin Qaisar – AI & IoT Systems

Dr. Qaisar specialises in artificial intelligence and Internet of Things (IoT), with a track record of developing real-time monitoring and predictive analytics systems. He leads the design of Durra.ai's core AI engine, selecting the right models for forecasting crop water needs and optimising irrigation schedules. His role ensures that Durra.ai's predictions are not just academic but practical, reliable, and continuously improving. With his expertise, the platform can combine satellite data, IoT sensors, and weather forecasts into clear, farmer-friendly recommendations.

Denis O'Grady – Large-Scale Agronomy & Irrigation Operations

Denis has more than 10 years of experience managing commercial farms in the GCC and Europe, including serving as Farm Manager at Elite Agro in the UAE, one of the region's largest agribusinesses. His strength lies in understanding the practical realities of irrigation, soil management, and large-scale farm operations. For Durra.ai, Denis ensures that the system is designed for real-world farming conditions, bridging the gap between high-tech solutions and daily agricultural practices. His insights are vital for proving adoption in Saudi farms and ensuring that recommendations are workable in large commercial settings.

Dr. Walter Luyten – Biotech & Sustainability

Dr. Luyten is a scientist with deep expertise in biotechnology, soil health, and circular resource systems. His role is to expand Durra.ai beyond water scheduling into broader sustainability modules, such as fertiliser optimisation, nutrient recovery, and soil carbon monitoring. These modules are crucial for Phase 2, where the focus moves from farm-level irrigation to full integration of the water cycle and long-term environmental benefits. His presence ensures that Durra.ai is not only saving water but also contributing to healthier soils and more sustainable ecosystems.

Why This Mix of Expertise Matters

This team represents a rare combination of skills:

- Strategy and digital transformation (Abrar) to align with Vision 2030.
- AI and IoT engineering (Saad) to power the intelligence behind the system.
- Commercial agronomy (Denis) to ensure practicality at scale.
- Sustainability science (Walter) to connect water use with long-term soil and environmental health.

Together, the team covers every layer of Durra.ai's ambition — short-term farm adoption, long-term national integration, and international scaling. This balance of expertise gives evaluators confidence that Durra.ai is not just an idea, but a project that can be executed and sustained.

10. Our Partners

جامعة الملك عبدالله للعلوم والتقنية
King Abdullah University of Science and Technology

KAUST (King Abdullah University of Science and Technology)

Durra.ai collaborates with KAUST, one of the Kingdom's leading centers of excellence in science and technology. This partnership reinforces our commitment to innovation and provides credibility by aligning with a globally recognized research institution.

Farmonaut®
Satellite Based Crop Health Monitoring

Farmonaut

Farmonaut is a trusted player in agricultural technology, known for advancing digital tools that support smarter farming. Partnering with Farmonaut strengthens Durra.ai's positioning in precision agriculture and reflects our focus on practical, farmer-friendly solutions.

PROVEYE

Proveye

Proveye brings a reputation for delivering advanced agricultural intelligence. By partnering with Proveye, Durra.ai connects with proven expertise that supports the platform's goal of scaling reliable, high-impact solutions for sustainable water management.

11. Milestones & Roadmap

Year	Milestone	Description & Activities	Expected Outcomes
Year 1 (2025)	Saudi pilots (paired-plot trials)	- Begin controlled pilot trials in selected Saudi farms. - Use paired-plot methodology (farmer-managed vs. Durra.ai-managed) to validate water savings, yield improvements, and energy reductions. - Collect high-quality soil, crop, and weather data. - Provide training and support through a Farmer Success Team.	- Demonstrate measurable results: water savings of 20–40%, yield gains of 20–30%. - Build trust with farmers. - Generate the first Saudi-specific dataset that will strengthen the AI engine.
Years 2–3 (2026–2027)	Rollout to 20+ farms, early adopters	- Expand adoption to at least 20 commercial farms across Saudi Arabia, focusing on high-value crops and large-scale producers. - Establish partnerships with agribusinesses and integrate more IoT sensors and weather stations. - Enhance software features based on pilot feedback.	- Prove the commercial viability of Durra.ai. - Develop paying customers and a recurring revenue base. - Enrich the dataset across different regions and crops. - Position Durra.ai as a trusted tool in Saudi agriculture.
Years 3–4 (2027–2028)	Expansion into MENA and agency integration in Saudi Arabia	- Extend operations into neighbouring markets such as Egypt, Morocco, Sudan, and the GCC, where water scarcity is severe. - In Saudi Arabia, begin integration with national	- Regional footprint established with strong reference cases in Saudi. - Agency partnerships create the bridge from farm-level operations to national-level planning.

		agencies (MEWA, Saudi Water Authority). - Link farm data with aquifer, desalination, and reuse datasets.	- Recognition as a regional leader in smart irrigation and water management.
Year 5 (2029)	Full National Digital Twin of Water	- Launch the complete national platform that connects agriculture, aquifers, desalination plants, reuse systems, and urban demand into one integrated system. - Provide real-time monitoring and “what-if” policy simulations for decision makers. - Offer national dashboards and reporting tools.	- Saudi Arabia becomes the first country in the world to deploy a full National Digital Twin of Water. - Enables smarter allocation of water resources. - Reduces reliance on costly desalination. - Positions the Kingdom as a global leader in AI-driven water governance.

12. Conclusion

Durra.ai is ambitious because it tackles the most urgent and difficult part of Saudi Arabia's water challenge — agriculture — while building towards something that no country has yet achieved: a fully integrated National Digital Twin of Water. Most existing solutions are either farm-level tools that focus only on single fields or city-scale digital twins that manage urban networks. These approaches remain siloed, hardware-heavy, and limited in scope. Durra.ai goes beyond the state of the art by combining multi-source data (satellite, IoT sensors, weather, and farmer input), advanced AI forecasting and optimisation, and a scalable software-led platform. This creates not only immediate results for farmers but also a foundation for a national intelligence layer that serves government and society at large.

The two-phase approach ensures both practicality and scalability. Phase 1, Smart Irrigation, is designed for immediate impact at the farm level, where more than 80% of Saudi Arabia's freshwater is consumed and up to 40% is wasted. By giving farmers clear and timely irrigation advice, Durra.ai can reduce water use, cut costs, and improve yields within the first growing season. This quick return is essential for building trust, securing adoption, and creating a growing base of farmer users. At the same time, every irrigation cycle generates valuable data on crops, soils, and climate conditions in Saudi Arabia.

Phase 2, the National Water Twin, builds on this base. By integrating aquifers, desalination plants, reuse systems, and urban demand into the platform, Durra.ai expands from farm-level recommendations to full system-wide planning. With predictive models and "what-if" simulations, it allows policy makers to explore scenarios, avoid costly over-investment in desalination or treatment plants, and make better decisions about water allocation. In this way, Phase 1 ensures bottom-up adoption and measurable results for farmers, while Phase 2 delivers top-down intelligence for national strategy.

For Saudi Arabia, Durra.ai represents an opportunity to lead globally in AI-powered water governance. No other country has yet deployed a nationwide digital twin that integrates the full water cycle. By pioneering this model, the Kingdom can demonstrate how emerging technologies can address food security, climate resilience, and sustainable resource use in one of the most water-stressed environments in the world. This leadership would not only support the goals of Vision 2030 but also position Saudi Arabia as a model for other countries in the Middle East, Africa, and beyond that face similar challenges.

Durra.ai is therefore more than a technology project. It is a strategic platform for national sustainability, bridging farmers and policy makers, delivering immediate savings, and enabling long-term planning. With its phased approach, strong team, and alignment with national priorities, Durra.ai has the potential to transform Saudi Arabia's water future and set a global benchmark for sustainable water management in arid regions.