MCP SERVER | NO CODE | CLOUD HOSTED

Irrigation Water Requirement MCP

Pinpoint the exact amount of water your crops need right now.

Irrigation Water Requirement Calculator determines precise water needs for agriculture, calculating crop evapotranspiration and moisture deficit across different growth phases. It tells you exactly how much water to apply and what the seasonal profile looks like for crops such as Soybeans or Maize.

A+ Quality Score 100/100

irrigation | evapotranspiration | crops | agronomy | water-deficit

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vinkius.com/mcp/irrigation-water-requirement-calculator

SCAN TO VIEW

The infrastructure that powers AI agents in the real world.

Vinkius connects AI to the world's software through secure, enterprise-grade infrastructure — enabling real-world execution at scale, built on the Model Context Protocol (MCP).

Your AI Connections Run Through Vinkius Cloud

The world's largest managed MCP catalog

Vinkius is the cloud infrastructure where AI agents connect to the software your business already runs. We handle the hosting, the security, the credentials, the uptime — you get agents that actually do things.

We operate the world's largest managed MCP catalog. Major SaaS platforms, CRMs, databases, and cloud providers — running, monitored, production-ready. This MCP server is hosted and maintained by the Vinkius Cloud for AI Agents.

> *The agent doesn't manage credentials, doesn't manage uptime, doesn't manage security. Vinkius does.*
>
> — Architecture principle

Four Pillars of the Vinkius Runtime

01 — Security by design

Credentials stay encrypted at rest via AES-256. The AI agent never touches raw keys — they're injected into a sandboxed V8 isolate at runtime. Actions are logged, and connections have an emergency kill switch.

02 — Built on MCP Fusion

This MCP server was built with **MCP Fusion**, the open-source framework (Apache 2.0) that powers the entire Vinkius catalog. Schema-as-firewall strips undeclared fields, compiled PII redaction runs at zero overhead, and cryptographic lockfiles produce git-diffable audit trails.

03 — Deterministic observability

Eight immutable metrics per endpoint: request volume, p95 latency, error rate, active connections, cost attribution. A live payload feed logs every tool call with mutation detection.

04 — Autonomous operations

Servers are deployed, monitored, and patched autonomously. New capabilities and security patches ship weekly. Zero-downtime deployments ensure continuous availability across all managed MCP servers.

AES-256	Ed25519	24h TTL	V8 Isolate
Encryption at rest	PKI vault signatures	Ephemeral session keys	Sandboxed execution

One Token. Instant Access.

Every MCP server on Vinkius is accessed through a **Connection Token**. Tokens are generated in the cloud dashboard and produce a unique MCP endpoint URL. Paste this URL into any MCP-compatible client — no SDK required.

A single token can serve **multiple AI clients simultaneously**, or you can issue separate tokens per client for granular access control. Each token tracks its own request count, last activity timestamp, and can be individually enabled or revoked.

MCP ENDPOINT

```
https://edge.vinkius.com/{token}/mcp
```

Claude · Cursor · VS Code · Windsurf · Grok · Gemini

Security Is the Architecture

Security in Vinkius is not a feature — it's the foundation of the runtime. The gateway enforces multiple independent protection layers between AI agents and third-party APIs.

01 — Ed25519 PKI Vault

Every workspace has an Ed25519 Master Key. Session keys are generated ephemerally (24h TTL) and signed by the Master Key. Credentials never leave the vault boundary.

02 — V8 Isolate Sandboxing

Tool code runs inside isolated-vm V8 isolates with 64 MB memory caps and per-request timeouts. No filesystem access, no network access except through the SSRF-guarded fetch bridge.

03 — SSRF Guard

All outbound HTTP requests are DNS-resolved and validated before execution. Private IP ranges (10.x, 172.16-31.x, 192.168.x, AWS metadata 169.254.x) are blocked at the network layer.

04 — DLP & PII Redaction

A ResponseGuard pipeline intercepts every tool response. Configurable redaction patterns strip sensitive fields (emails, SSNs, card numbers) before data reaches the AI agent.

05 — Cryptographic Audit Trail

Every request is signed into a SHA-256 hash chain with Ed25519 signatures. Events form a tamper-proof, SIEM-exportable forensic record.

06 — Honeytoken Trap System

Phantom credentials are injected into isolated environments. If a honeytoken is used outside Vinkius infrastructure, the server is quarantined instantly.

Emergency Kill Switch

EU AI Act Art. 14(1) Compliant

The kill switch is an **emergency halt** mechanism — not a simple toggle. When triggered, it executes three actions atomically:

01 — Server deactivated

The MCP server is immediately taken offline across the entire cluster.

02 — All tokens revoked

Every connection token is invalidated. Total lockout — reconnection blocked until new tokens are issued.

03 — WebSocket connections killed

Active connections terminated via Redis pubsub broadcast. Propagates to every runtime node in the cluster.

Full Visibility. Zero Guesswork.

The Vinkius cloud dashboard includes a full MCP Governance suite — real-time analytics and security controls for production AI operations.

Control Plane

KPI dashboard with request volume, latency, success rate, token consumption, and AI-generated operational briefings.

Agent Activity

Which AI clients are connecting, how often, and what they're doing — real-time session tracking.

FinOps

Cost tracking per tool, payload compression savings, budget optimization signals, and consumption trends.

Tool Health

Slowest and most error-prone tools, with actionable root-cause insights and performance baselines.

Firewall & DLP

PII redaction activity, sensitive data protection counters, and security event timeline.

Incident Log

Error trends, failure rates, status-code breakdowns, and forensic audit trail access.

> Get started at **cloud.vinkius.com** — connect your AI agent in under 60 seconds.

Irrigation Water Requirement Calculator MCP

3 tools available
Cloud-hosted on Vinkius

Figuring out water needs isn't a guess; it's math. This MCP handles complex agronomy calculations, helping farmers and consultants move beyond simple rainfall predictions. You can calculate specific growth stage demands—like determining the exact deficit when growing Sugarcane or Cotton. Need to know how much water to apply? The tool calculates required irrigation depth and volume based on accumulated deficits and efficiency rates. Plus, you get a complete seasonal view for any supported crop, giving you a full picture of its water needs over the entire cycle. Connecting this MCP through Vinkius lets your AI client run these models directly, turning complex agricultural reports into simple actions.

Core Capabilities

01 — Calculate growth stage water demand

Determines the precise amount of water and moisture deficit for a crop during a specific phase.

02 — Determine irrigation volume needed

Calculates the exact depth and volume of water required to compensate for current deficits, factoring in application efficiency.

03 — Retrieve seasonal water profiles

Generates a complete overview of water requirements for an entire growing season for any supported crop.

One Click on Vinkius — From Prompt to Execution

Available at **vinkius.com/mcp/irrigation-water-requirement-calculator** — connect your AI agent in three steps.

01 You provide the tool with key inputs, like the specific crop type (e.g., Maize), the current growth phase, and local weather data.

02 The MCP runs complex agronomic models to calculate evapotranspiration, water deficit, and necessary adjustments for irrigation depth.

03 Your AI client delivers a clear report showing both the immediate demand and the overall seasonal water requirement profile.

The bottom line is that you get actionable data on exactly how much water your crops need, when they need it, and why.

Built For

This is for agronomists and farm managers who are tired of relying on generalized estimates or juggling massive spreadsheets just to figure out if their crop is going to suffer from water stress. If your job involves optimizing resource usage based on biology, you need this.

Agronomist

They use the tool to calculate phase demands for various crops, ensuring that every stage of growth receives the optimal amount of water.

Farm Manager

They run checks on required irrigation depth and volume using this MCP before authorizing any major watering cycle, minimizing waste.

Water Resource Planner

They retrieve the complete seasonal water requirement profile to manage overall regional water allocations for multiple farms.

What Changes When You Connect

01 Stop wasting resources. By using calculate_irrigation_event_depth, you get a precise volume needed to cover deficits, so you don't overwater and waste energy or money.

02 Know what's coming next. Running get_crop_irrigation_profile gives you the entire season's water roadmap at once, letting you plan for dry spells weeks ahead of time.

03 Target your inputs precisely. The calculate_phase_demand tool locks down the water requirements during critical periods, like when Soybeans are developing their pods.

04 Save hours on spreadsheets. Instead of cross-referencing tables and calculating evapotranspiration by hand, you let your agent run these complex models instantly.

05 Improve yield estimates. Accurate deficit modeling helps you advise clients on optimal timing for intervention, directly impacting potential harvest size.

Real-World Applications

Pre-season planning for Maize

A farm manager wants to know the full scope of water management for their entire field. They ask their agent to run get_crop_irrigation_profile on Maize, which immediately provides the complete seasonal water requirement overview, allowing them to secure early water permits.

Responding to a sudden dry spell

An agronomist notices low soil moisture. They use calculate_phase_demand for Coffee during its flowering phase, which tells them the immediate water deficit and how severe it is right now.

Optimizing current irrigation cycle

A team needs to know if a planned watering session is enough. They input their measured 15mm deficit into calculate_irrigation_event_depth, and the tool returns the required volume for 80% efficiency.

Comparing crops before planting

A consultant needs to advise a client on which crop is best suited for the coming dry season. They run get_crop_irrigation_profile for both Cotton and Sugarcane, comparing their full seasonal water demands side-by-side.

Patterns to Avoid

Guessing irrigation needs

✗ AVOID

Relying on 'a little bit of rain' or simply guessing a fixed amount for every watering event, which leads to either massive waste or crop failure.

✓ INSTEAD

Use calculate_irrigation_event_depth. This tool calculates the exact required depth and volume based on actual accumulated deficits and your application efficiency.

Checking only the current day's forecast

✗ AVOID

Focusing solely on today's weather data, which leaves you blind to potential water stress coming in weeks due to cumulative deficit.

✓ INSTEAD

Check get_crop_irrigation_profile. This provides a complete seasonal view of requirements so you can plan for the whole growing cycle.

Mixing up growth stages

✗ AVOID

Applying general water recommendations instead of adjusting based on whether the crop is in its initial, vegetative, or reproductive phase.

✓ INSTEAD

Always use calculate_phase_demand. It ensures you measure the deficit specifically for the crop's current physiological stage.

The Right Fit

Use this MCP if your planning hinges on precise water accounting—meaning you need to know the difference between simple rainfall data and actual evapotranspiration deficits. If you are managing resources, calculating yields, or making decisions about inputs like fertilizer or irrigation volume, this is essential.

Don't use it if you just need a general weather forecast or basic soil testing results; those fall under different sensor-data tools. Similarly,

if your goal is only to list supported crops without needing calculations, the get_crop_irrigation_profile tool handles that, but for action, you need all three calculation methods. This MCP solves resource *management* problems, not just data retrieval ones.

The Problem with Manual Water Calculations

Today, water planning means opening multiple tabs: a rainfall graph, an evapotranspiration chart, and a separate spreadsheet to track deficits. You spend time manually cross-referencing growth stages against historical data, often having to guess the true moisture deficit because no single dashboard pulls all that complex biology together.

With this MCP, you skip the spreadsheets entirely. Your agent handles the entire process: it takes your crop type and stage, calculates the exact demand, and tells you precisely how much water needs applying. You get an instant, actionable plan.

Calculate Phase Demand

You don't have to guess if a crop is hitting a critical deficit point. Instead of calling the agronomist every time you need to verify water stress levels, your agent runs calculate_phase_demand. It pinpoints the exact moisture gap for that specific stage.

Now you know exactly what needs fixing and when. You move from reacting to problems to proactively managing resources.

Irrigation Water Requirement Calculator (3 Tools)

These tools allow you to calculate everything from a single growth phase's water demand to the complete season’s profile, giving you precise, actionable data for farming.

#	TOOL	DESCRIPTION
01	`get_crop_irrigation_profile`	Retrieves a full, season-long chart showing the expected water needs for any supported crop.
02	`calculate_irrigation_event_depth`	Calculates exactly how deep and in what volume you need to irrigate based on current water deficits.
03	`calculate_phase_demand`	Determines the specific water demand and moisture deficit for a crop at its current growth stage.

See It in Action

Real prompts you can use once this MCP is connected to your AI agent through Vinkius Cloud.

U What is the water demand for Soybeans in the Initial phase if I have 10 hectares and 5mm of rain?

The water demand for the Initial phase of Soybeans is 12 mm, which corresponds to 120 m^3/ha. The water deficit for this period is 7 mm.

U I have a deficit of 15mm. How much irrigation depth do I need with 80% efficiency?

To compensate for a 15 mm deficit with 80% efficiency, you need an irrigation depth of 18.75 mm, which is 187.5 m^3/ha.

U Show me the growth stages for Maize.

The Maize profile includes the following stages: Seedling, Development, Tasseling, and Grain-fill.

Frequently Asked Questions

01 **What crops does the Irrigation Water Requirement Calculator support?**

It supports major crops like Soybeans, Maize, Sugarcane, Coffee, and Cotton. The profile data is available for all listed types.

02 **Does calculate_irrigation_event_depth only calculate volume?**

No, it calculates both the required depth (in mm) and the corresponding volume needed per hectare, factoring in application efficiency.

03 **How do I get a seasonal view of water needs using get_crop_irrigation_profile?**

Just input your crop name. The tool provides a complete profile that charts the expected water usage across all major growth phases for the season.

04 **Can calculate_phase_demand tell me if I need to irrigate now?**

Yes, it calculates the specific water deficit during a phase. This figure is critical input data used by calculate_irrigation_event_depth to determine immediate action.

05 **Is this MCP just for soybeans?**

No, it's designed for multiple crops. It handles the complex calculations necessary for various types like Maize and Cotton as well.

06 **How do I calculate the water deficit for a specific crop stage?**

Use the `calculate_phase_demand` tool. You will need to provide the crop type, the phenological phase, the area in hectares, and the effective precipitation recorded during that period.

07 **Can I calculate the volume of water needed for irrigation?**

Yes, by using the `calculate_irrigation_event_depth` tool. It calculates both the required depth in mm and the volumetric requirement in m^3/ha based on your accumulated deficit.

08 **Which crops are supported by this tool?**

The tool currently supports Soybeans, Maize, Sugarcane, Coffee, and Cotton.

Go Live in 60 Seconds

Get your connection token from **cloud.vinkius.com**, then paste the endpoint URL into any MCP-compatible client.

YOUR MCP ENDPOINT

```
https://edge.vinkius.com/[TOKEN]/mcp
```

CLIENT	WHERE TO CONFIGURE
Claude AI	Profile → Customize → Connectors → "+" → Add custom connector → Paste endpoint
Cursor	Settings → Features → MCP Servers → "+ Add New MCP Server" → Type: SSE → Paste endpoint
VS Code	Ctrl/Cmd+Shift+P → "MCP: Add Server" → add `"irrigation-water-requirement-calculator": { "url": "…" }`
Windsurf	MCP Settings → `mcp_settings.json` → Add endpoint URL
ChatGPT	Settings → Tools & plugins → Add MCP server → Paste endpoint
Gemini	Extensions → Add MCP Server → Paste endpoint URL

ASK AN AI ABOUT THIS

Let your preferred AI explain this MCP server

- Ask ChatGPT
- Ask Claude
- Ask Perplexity
- Ask Gemini
- Ask Grok

READY TO CONNECT

Irrigation Water Requirement Calculator is live on Vinkius Cloud.

Get your connection token, paste it into your AI agent, and start building. No SDK. No deployment. Just results.

Start at cloud.vinkius.com →

vinkius.com · support@vinkius.com

INDEPENDENT PLATFORM DISCLAIMER

DOCUMENT INFORMATION

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MCP Server	Irrigation Water Requirement Calculator MCP
Server ID	`019efc55-b382-73a7-b2c0-b9276c36ddc3`
Platform	Vinkius Cloud for AI Agents
Endpoint	`https://edge.vinkius.com/{token}/mcp`

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