



WATER NAVIGATOR

WaterNavigator Team Member



Heeyeon



Hojun



Jaehyun



Nahyung



Hyunseo

Problem

Ethiopian
Farmer

02



Jaehyun

International Organization

02



Nahyung

Ethiopian
Farmer

02



Jaehyun

International Organization

02



Nahyung

Egyptian Government Officials



에티오피아-이집트의 계속되는 물분쟁

중동·아프리카의 주요 수자원 분쟁

자료: 세계은행, 세계자원협회

에티오피아 vs 이집트

나일강 상류의 에티오피아가 7월부터 르네상스댐(GERD)에 물을 채우자
나일강 하류의 이집트가 수자원 부족, 경제 타격 등을 우려해 반발

이스라엘 vs 팔레스타인

서안지구를 점령한 이스라엘이 관개 농업에 치중해 요르단강 수량 감소.
팔레스타인에 일평균 물 사용 할당량 제시

터키 vs 이라크·시리아

터키가 티그리스·유프라테스강 상류에 댐과 수력 발전소를 속속 건설하자
농업용수 및 식수 부족에 직면한 이라크와 시리아 등이 반발

Hojun

International Organization

02



Nahyung



내전에 가뭄까지… "에티오피아서 반년간 225명 굶어죽어"

송고 2024-01-17 15:57

잠비아 최악의 가뭄에 1.3조 원조 요청

입력 2024-04-17 20:31:33 수정 2024.04.17 20:31:33 송주희 기자

1억명이 가뭄으로 삶이 위태... 동부아프리카 덮친 기후변화

이준성 기자✉ / 기사승인 : 2023-04-28 13:33:43

최빈국 내에서 계속되는 물분쟁



중동·아프리카의 주요 수자원 분쟁

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농업용수 및 식수 부족에 직면한 이라크와 시리아 등이 반발

Water Infrastructure Optimization Platform

데이터 기반 분석을 통해 에티오피아 지역 내에 수자원이 부족한 지역에
가장 효과적으로 새로운 우물을 설치할 수 있는 최적의 위치를 추천합니다.



01

제공 서비스

- 다중 공간 데이터를 기반으로 선정된 최적 우물 설치 후보지
- 현장 설치를 위한 기술적 제안이 포함된 맞춤형 보고서
- 분쟁 가능 지역 또는 생태 민감 지역에 대한 사전 경고 기능

02

기대 효과

- 주민들의 물 수집 시간 단축
- 가뭄에 대한 회복력 향상
- 소규모 농업 및 가축 사육의 물 접근성 개선
- NGO 및 정부의 데이터 기반 의사 결정 지원

Water Navigator, Target Users

주요 고객층

최빈개발국 내 최적의 수자원 인프라(우물)
설치 위치를 파악하고자 하는 **국제·공공 조직 관계자**



GREEN
CLIMATE
FUND

Green Climate Fund



Unicef Wash



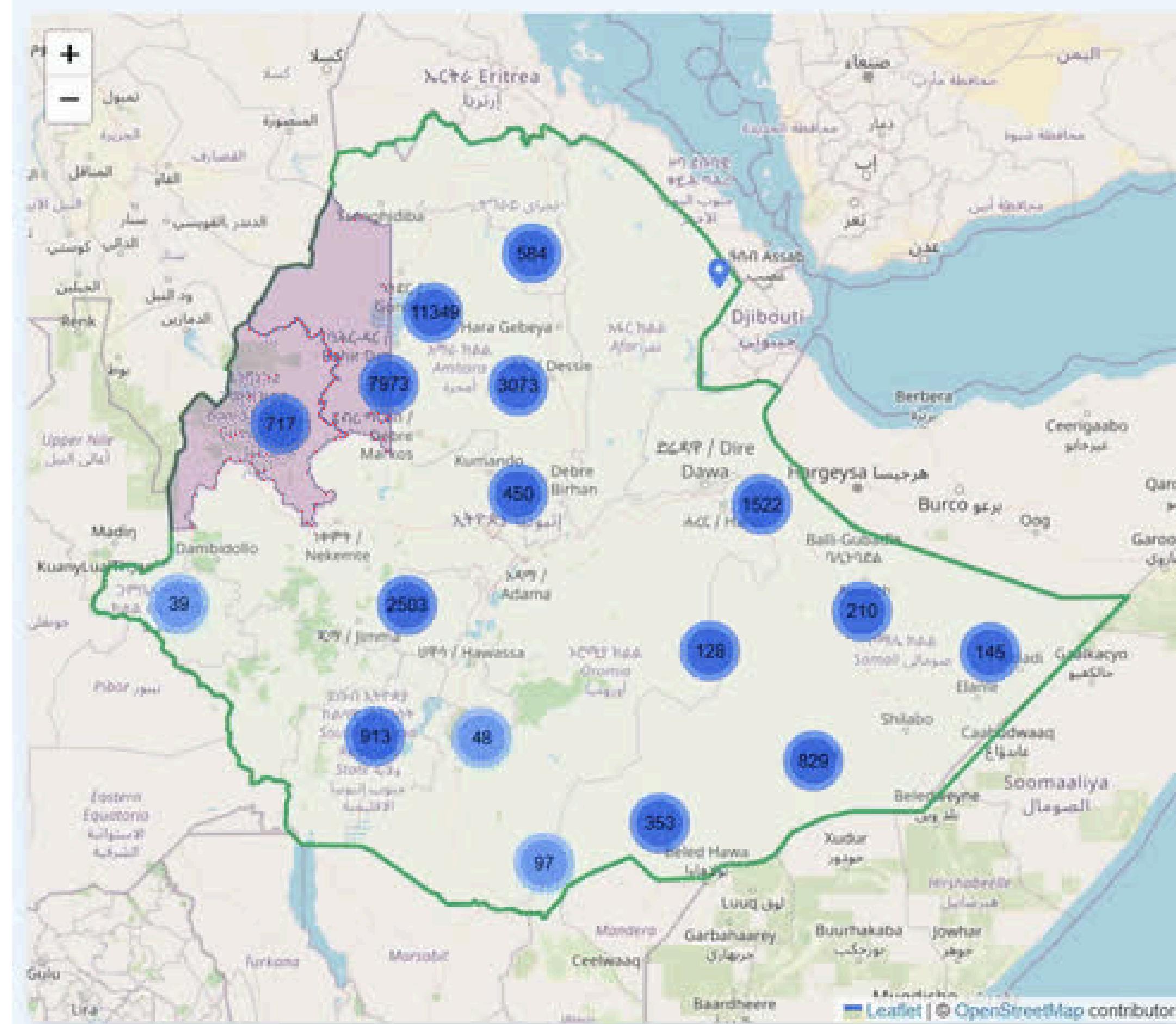
World Vision

주요 수혜층

최빈개발국 내 수자원 인프라를 통해 수확량을 증가·
유지하고자 하는 **농업 종사자**



United Nations
Development Programme



Filter

Count

Ethiopi

Region

View A

Core Analysis

Run Analysis

Start Analysis

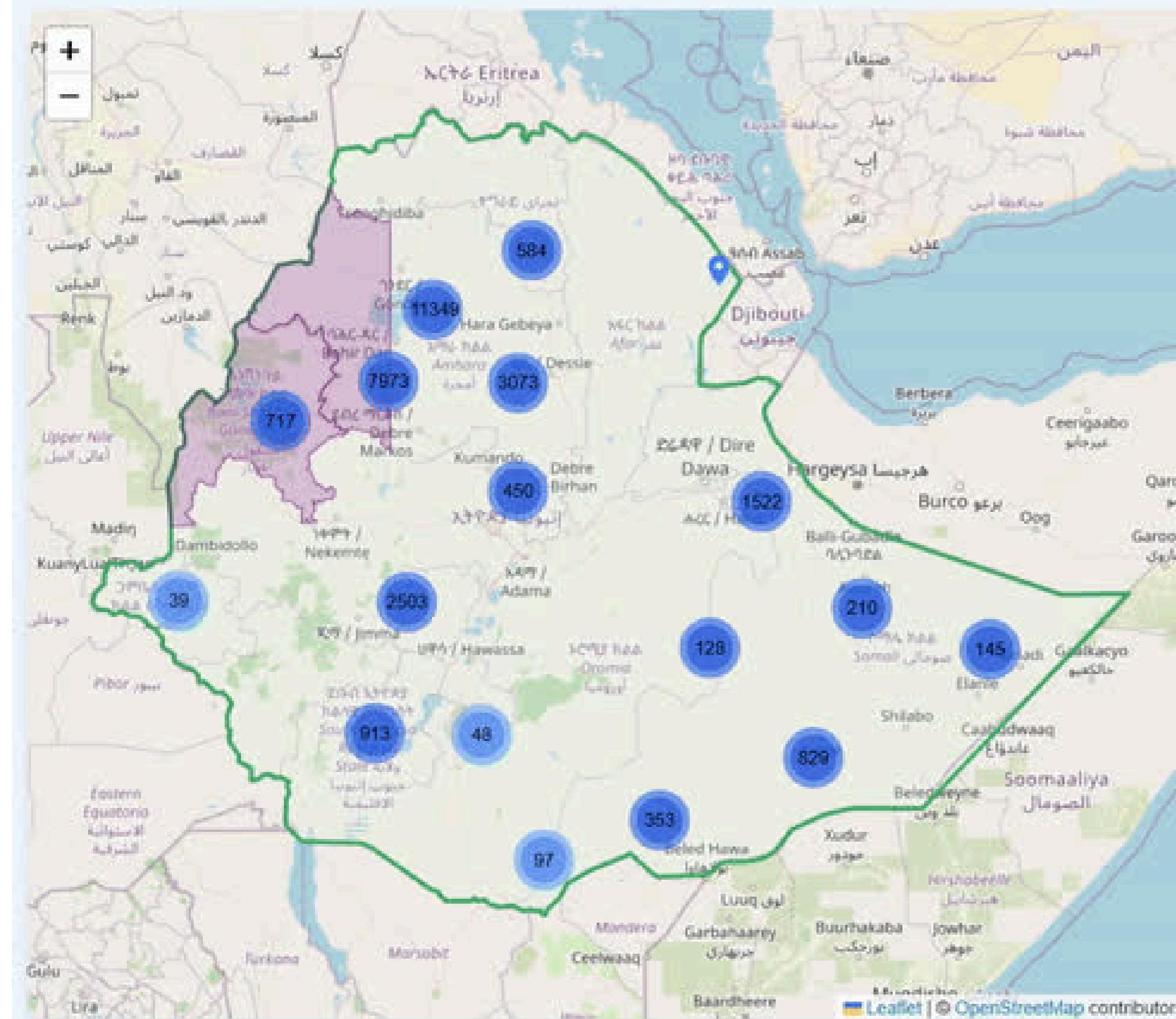
Legende

Existing Water Point

 Recommended Site

30,934

1



Filter

Count

Ethiopi

Region

View A

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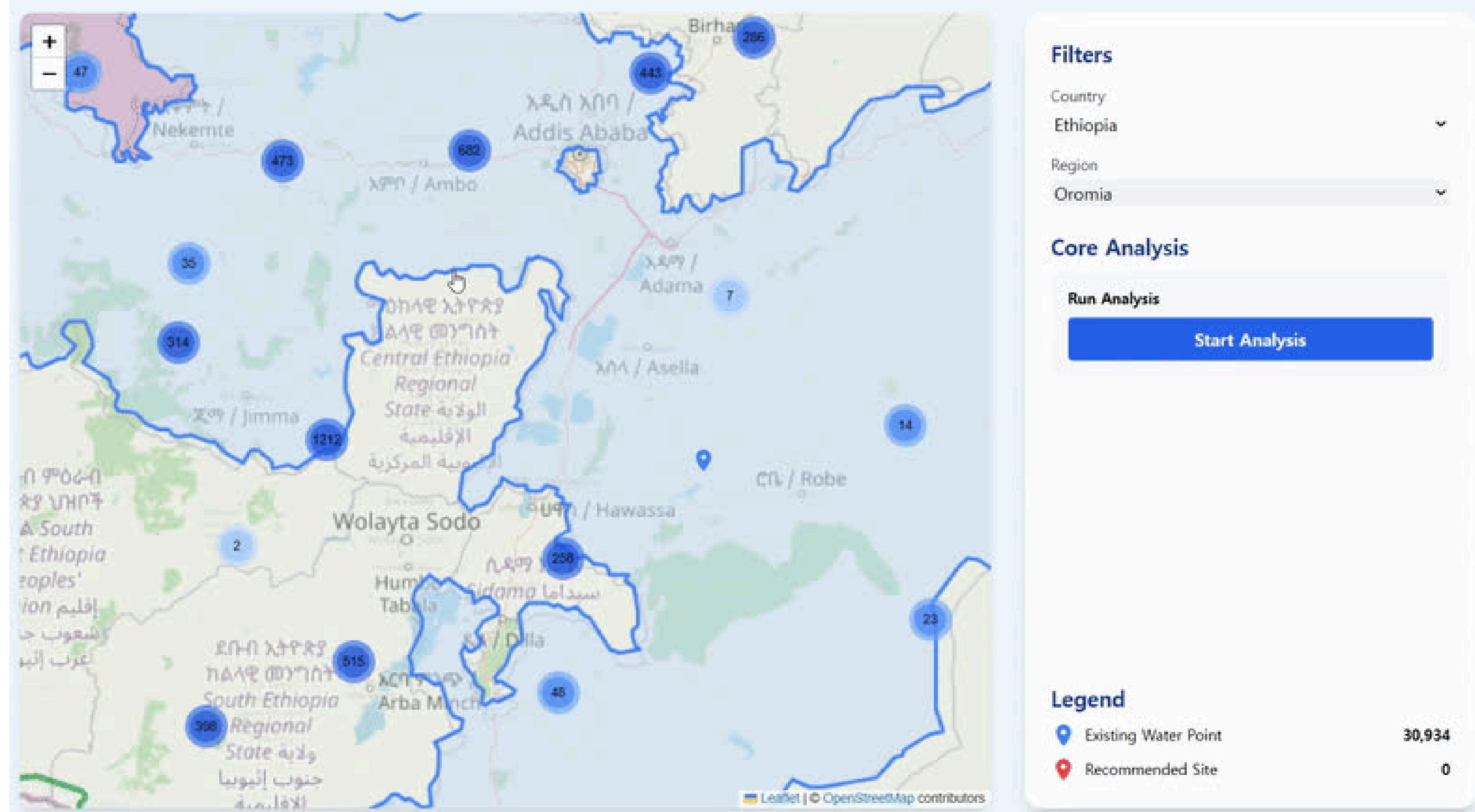
Legend

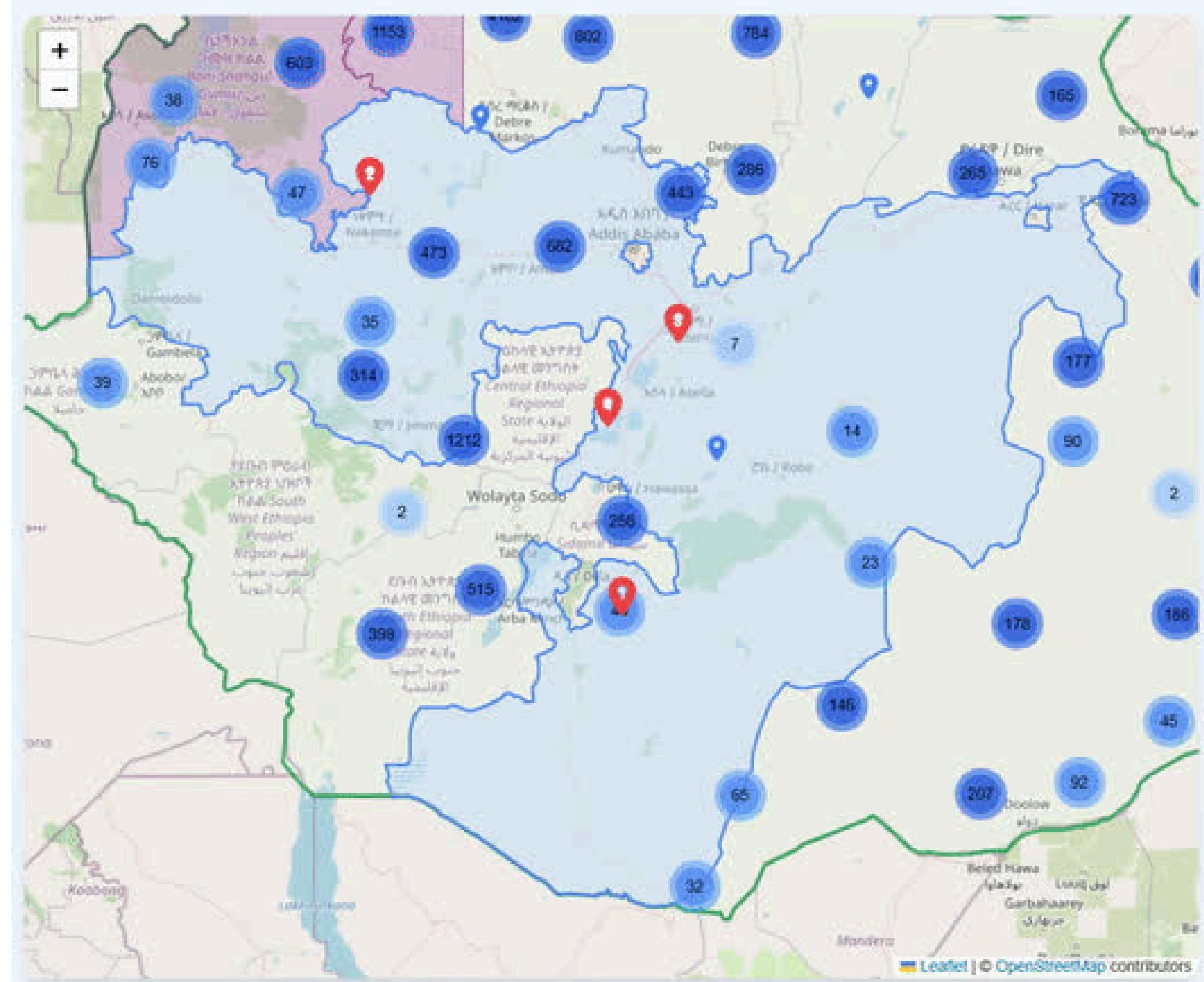
Existing Water Point

 Recommended Site

30,934

1





Filters

Country

Ethiopia

Region

Oromia

Core Analysis

Analysis Results

Candidate Sites

Found 4 candidate sites.

- 1 Lat: 5.91, Lon: 38.65
- 2 Lat: 9.43, Lon: 36.52
- 3 Lat: 8.20, Lon: 39.13
- 4 Lat: 7.49, Lon: 38.53

Generate Report

Legend

Existing Water Point

Recommended Site

Our Service

3 8.20 °N, 39.13 °E
Dodota (Arsi Zone)

- Population: 255 persons/km²
- 22.6 km from existing well
- Rift Valley basalt, I-M/H
- Potential for dual drinking/livestock use

4 7.49 °N, 38.53 °E
Shala (West Arsi Zone)

- Population: 283 persons/km²
 - Very High groundwater rating, >18 km from wells
 - Recurrent drought & IPC Phase 2-3
- sciencedirect.com, amazon.com

Low (Diplomatic) – Closed inland basin.

Caution (Health) – High fluoride/salinity potential, requires budgeting for filters.
[researchgate.net](https://researchgate.net/profile/pmcncbunlmnhgov), pmcncbunlmnhgov

Very Low (Diplomatic) – Closed lake basin.

Medium (Local) – Overlaps with pastoralist migration routes, requires usage rules & management committee.
ejolassau.edu.et

3. Why These Four Locations?



Maximize Socio-Economic Benefit

Average population of 255 persons/km², located 18–55 km from existing well networks, avoiding "redundant investment" risk.

High Probability of Groundwater Success

All four sites are on fractured basalt aquifers (I-M/H) or rated "Very High," predicting ≥80% drilling success rate.

Urgent Drought and Water Needs

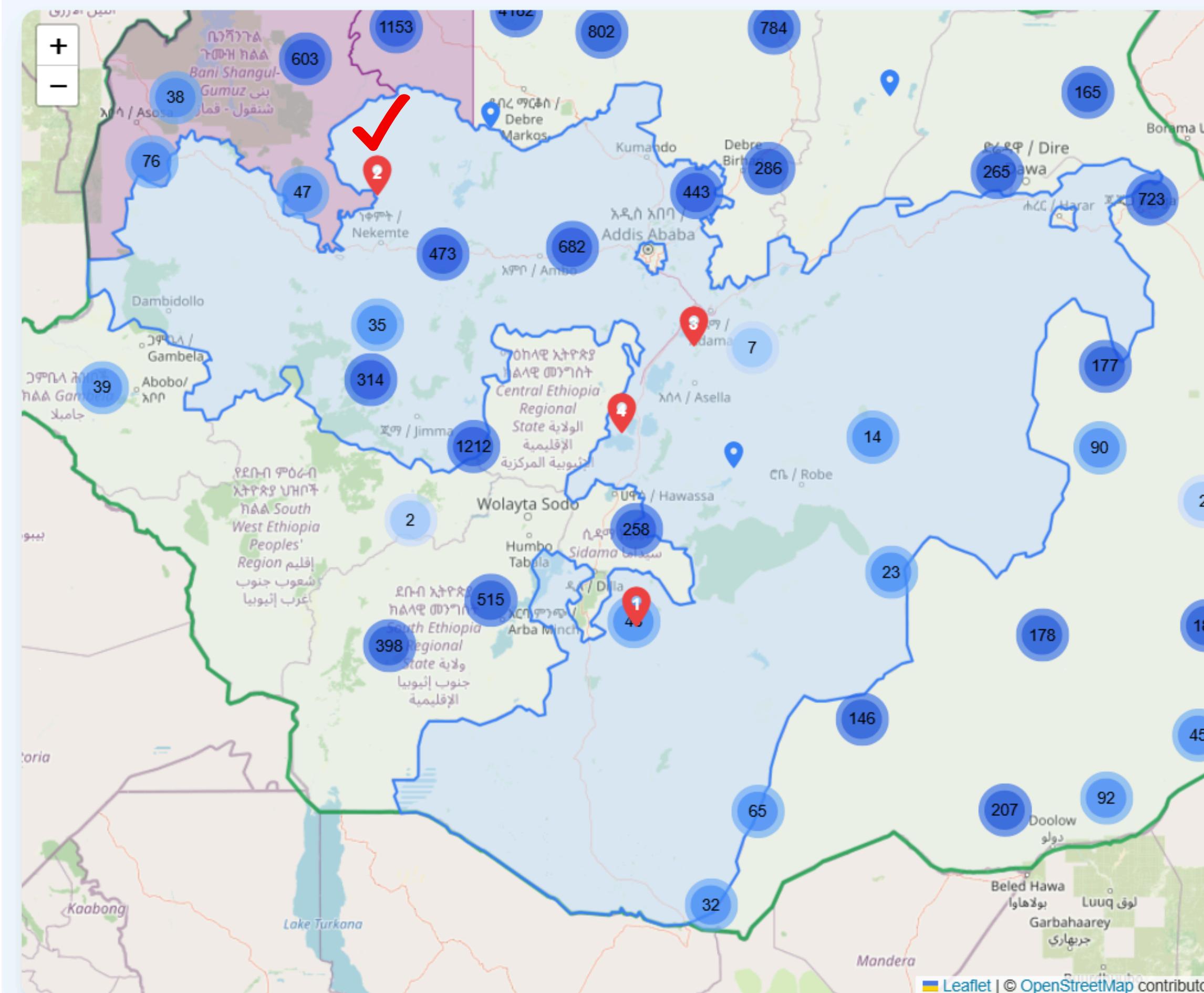
Hambela, Ankasha, Dodota, and Shala are all in water-stressed areas with a Drought Index of 0.0 or IPC Phase 2-3.

Minimize Land Conflict

Geo-Wiki value of 0 indicates communal pastureland/grassland or park buffer zones, not private cropland/settlements, reducing compensation burdens.

4. Integrated Conflict & Threat Assessment

TYPE	LOCATION	RISK SUMMARY	RECOMMENDED RESPONSE
Transnational Water	Ankasha (Blue)	Monitored by Egypt/Sudan for "new upstream"	Publish real-time water level/abstraction data to



Filters

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Ethiopia

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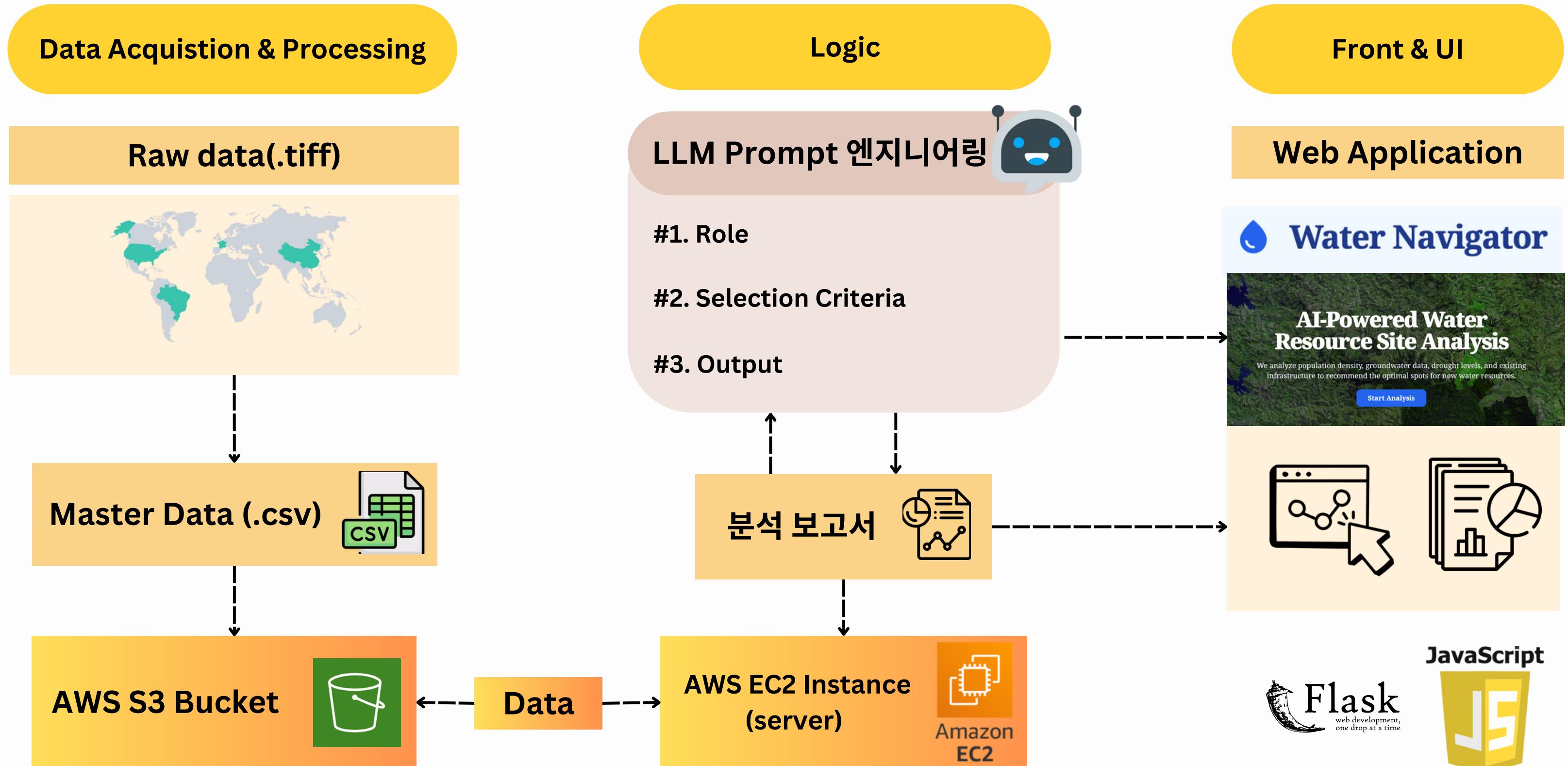
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Generate Report

Legend

Existing Water Point

Recommended Site

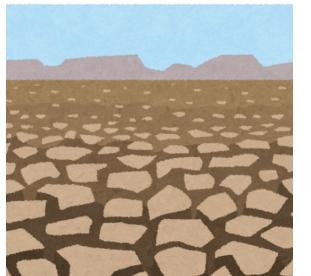




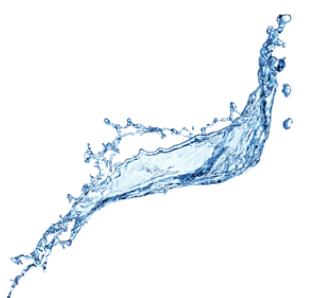
농경지 면적



수자원 위치



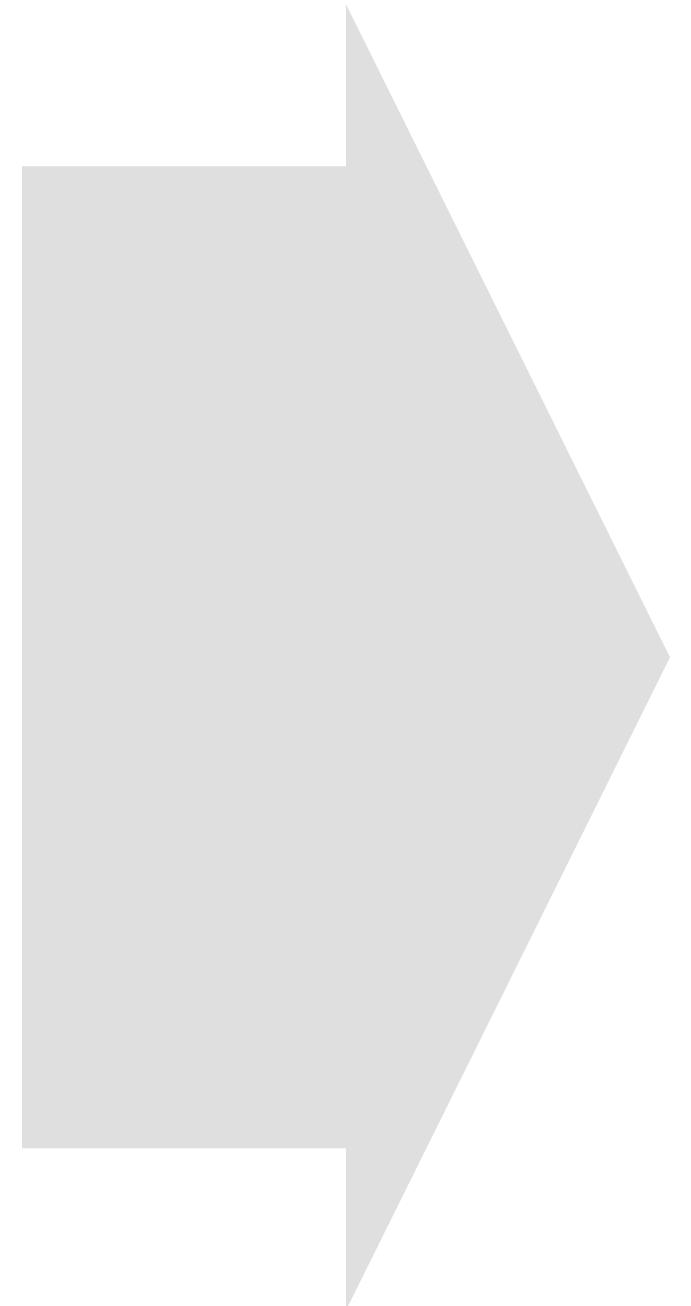
가뭄 수치



지하수 위치



인구 밀도



추천 위치



추천 근거

기대 효과

of water resource investments and build resilient supply chains for a water-secure future through precise, data-driven insights.

Success Stories



Ministry of Water, Rivia

Drought-Prone Region Project



"Water Navigator's analysis was pivotal. We located three new high-yield wells in a region battling severe drought. Their data-driven approach saved us months of guesswork."



Global Aid Foundation

Rural Water Access Program



"The platform's insights were incredible. We optimized our budget by focusing on locations with the highest probability of success, bringing clean water to 5,000 more people."



AgriCorp Inc.

Sustainable Farming Initiative



"Essential for our sustainability goals. We identified optimal sites for irrigation infrastructure, ensuring long-term water security for our new plantations."



THANK YOU

<http://3.38.213.71:8877/>

1. Evaluation Framework Summary

STEP	DESCRIPTION	WEIGHT
① Eligibility Filter	<ul style="list-style-type: none"> • Outside 10 km radius of existing wells • Groundwater potential \geq I-M/H (or 'Very High') • Land Use: Cropland/Settlement value = 0 • Drought Index \leq 1.0 (Extreme) or \geq 9.0 (Low Urgency) 	—
② Quantitative Score	Population 30% · Groundwater 30% · Drought 20% · Land Use 20% (0–1 scale)	100%
③ Quality Assurance	Technical/financial feasibility (drilling success, water quality, solar panel area, accessibility)	Supplementary
④ Conflict Risk	Transnational water conflict, local/ethnic disputes, environmental regulations	Narrative

2. Detailed Candidate Site Analysis

#	COORDINATES / ADMIN AREA	KEY SELECTION RATIONALE	POTENTIAL CONFLICT/ENVIRONMENTAL RISK
1	5.91 °N, 38.65 °E Hambela Wamena (Guji Zone)	<ul style="list-style-type: none"> Population: 296 persons/km² 54.5 km from existing well Genale-Dawa basalt aquifer, I-M/H rating → 1–5 L s⁻¹ yield expected scirp.org, etd.aau.edu.et Persistent drought/fodder shortage area 	Medium – Genale-Dawa basin extends to Kenya/Somalia, requiring future negotiations for irrigation expansion. Past disputes over well ownership among pastoralists. earthisland.org
2	9.43 °N, 36.52 °E Ankasha (Awi Zone)	<ul style="list-style-type: none"> Population: 230 persons/km² Upper Blue Nile, I-M/H geology sciencedirect.com Drought Index 0.0 → Highest priority need 	High – New abstraction in Blue Nile basin maintains tension with Egypt/Sudan. Diplomatically sensitive area linked to GERD operation/filling schedule. apnews.com , carnegieendowment.org , sciencedirect.com
3	8.20 °N, 39.13 °E Dodota (Arsi Zone)	<ul style="list-style-type: none"> Population: 212 persons/km² 22.6 km from existing well Rift Valley basalt, I-M/H Potential for dual drinking/livestock use 	Low (Diplomatic) – Closed inland basin. Caution (Health) – High fluoride/salinity potential, requires budgeting for filters. researchgate.net , pmc.ncbi.nlm.nih.gov
4	7.49 °N, 38.53 °E Shala (West Arsi Zone)	<ul style="list-style-type: none"> Population: 283 persons/km² Very High groundwater rating, >18 km from wells Recurrent drought & IPC Phase 2-3 sciencedirect.com, amazon.com 	Very Low (Diplomatic) – Closed lake basin. Medium (Local) – Overlaps with pastoralist migration routes, requires usage rules & management committee. ejol.aau.edu.et

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4. Integrated Conflict & Threat Assessment

TYPE	LOCATION	RISK SUMMARY	RECOMMENDED RESPONSE
Transnational Water Conflict	Ankasha (Blue Nile)	Monitored by Egypt/Sudan for "new upstream development" post-GERD.	Publish real-time water level/abstraction data to international platforms (NBI, AU-WRG).
Linked Basin Negotiations	Hambela Wamena	Future water allocation negotiations needed for downstream irrigation in Somalia/Kenya.	Register project with IGAD water working group, pursue trilateral MOU.
Local Pastoral/Ethnic Conflict	Hambela & Shala	Armed clashes documented over borehole ownership and access control.	Establish well management committee, including traditional (Gadaa) decision-making processes.
Water Quality & Health Risk	Dodota	High fluoride/salinity → risk of dental/skeletal fluorosis.	Include budget for RO/Activated Alumina filters ($\text{CapEx} + \text{OpEx} \approx 0.5 \text{ US\$/L}^{-1}$).

5. Overall Recommendations

Implementation Priority

Ankasha ↔ Hambela Wamena (equal urgency/benefit) → conduct parallel feasibility studies. Dodota & Shala as second phase.

Diplomacy & Data Transparency

Ankasha project to stream real-time abstraction/level data to the Nile Basin Initiative portal.

Local Participation

Mandate community well management committees + traditional elder consultation for the two pastoralist sites (Hambela, Shala).

Water Quality Management

Budget for fluoride removal filters at Dodota, with annual water quality monitoring.

Long-Term Monitoring

Install IoT flow/level sensors + satellite uplink at all 4 sites for public dashboard transparency.

LLM prompting Input Dataset

데이터 항목	설명	주요 활용 목적
인구 데이터	행정 구역별 인구 밀도 및 분포	수요 중심의 우선순위 설정
기존 수자원 인프라	기존 우물, 펌프, 급수 시설의 위치 정보	공급 공백(10km 이상 거리) 지역 식별
지하수 수위	지질 정보 기반 지하수 잠재성 점수	우물 굴착 성공 가능성 평가
농경지 면적	토지이용 지도상 경작지 및 정착지 범위	비경작지 또는 공공용지 우선 탐색
가뭄 수치	복합 가뭄 지수(CDI)	물 부족 시급성 반영, 취약 지역 가중치 부여