



WATER SHIELD
FOREST PROTECTION



ADAPTATION



SUSTAINABLE



STRATEGIC

WATER SHIELD

STRATEGIC CLIMATE ADAPTATION PROGRAM

FOR THE FOREST PROTECTION OF MEDELLÍN

ENVIRONMENTAL MISSION

RESILIENCE AND A GREEN FUTURE

WATER SHIELD

- Adaptación Climática
- Protección Forestal
- Respuesta Temprana

Sandra Medina Medina
COBM Firefighter

- Santiago Hernández
COBM Firefighter

Carlos Alberto Betancur
COBM Firefighter



WATER SHIELD

FOREST PROTECTION



RESILIENCE



ADAPTATION



SUSTAINABILITY

STRATEGIC CONTENT

CLIMATE ADAPTATION PROGRAM 2026 OPERATIONAL PLAN

01

THE CLIMATE CRISIS IN THE
ABURRÁ VALLEY

05

PILLAR 1: NETWORK OF
STRATEGIC WATER POINTS

09

GOVERNANCE MODEL: WATER
SHIELD REGIONAL
ROUNDTABLE

13

IMPLEMENTATION TIMELINE
AND STRATEGIC MILESTONES

02

THE OPERATIONAL CHALLENGE
OF CRITICAL TOPOGRAPHY

06

PILLAR 2: SHIELD
WAREHOUSES AND TACTICAL
DECENTRALIZATION

10

CO-FINANCING AND
COMMITMENT OF STRATEGIC
PARTNERS

14

MEASURABLE IMPACT:
TOWARD A RESILIENT
MEDELLÍN

03

IDENTIFICATION OF THE
STRUCTURAL WATER-SUPPLY
GAP

07

PILLAR 3: SPECIALIZED
HILLSIDE MOBILITY

11

COMMUNITY STRENGTHENING:
WILDLAND FIRE BRIGADES

15

CONCLUSION AND REQUEST
FOR INSTITUTIONAL ACTION

04

WATER SHIELD: A PARADIGM
SHIFT

08

PILLAR 4: AERIAL SHIELD AND
TECHNOLOGICAL
COORDINATION

12

FOUR-STAGE RESPONSE
PROTOCOL



WATER SHIELD

FOREST PROTECTION



ADAPTATION



PROTECTION



GEOLOGY

The Climate Crisis in the Aburrá Valley

Context of Environmental Vulnerability and Strategic Risk



Escalating Threat

More than 400 hectares are lost annually to fires. The intensification of dry seasons places our vital ecosystems at critical risk.



Social Impact

Deterioration of air quality for 2.5 million inhabitants and compromising the geological stability of hillsides in relation to mass movements.



Critical Response

The guardian hills (El Volador, Nutibara, Picacho) require an urgent reduction in response time given the recurrence of fires.



WATER SHIELD

FOREST PROTECTION



TOPOGRAPHY



RESPONSE



PROTECTION

The Operational Challenge of Critical Topogra

Analysis of Structural Limitations and Response Times in Medellín



Critical Response

The average response time is 60 minutes, exceeding effectiveness standards given the rapid spread of wildland fires.

01



Limitations

Extreme difficulty in interface zones and a lack of dedicated water infrastructure at difficult-to-access locations.

02



Hills at Risk

- El Picacho & El Volador
- Cerro Nutibara
- Pan de Azúcar
- Santa Elena Corridor

03



Gap Analysis

The urban network does not reach higher elevations, creating a structural gap that Water Shield seeks to close permanently.

04



WATER SHIELD

FOREST PROTECTION



TOPOGRAPHY



STRUCTURE



VULNERABILITY



STRUCTURAL

WATER-SUPPLY GAP IDENTIFIED



Hillside Limitations

The urban aqueduct does not reach higher elevations. Water tanker trucks face mobility restrictions and a lack of filling points in elevated areas.



External Dependence

The current network depends on remote supplies and dispersed natural sources, which are insufficient for large-scale emergencies.



Dedicated Water Network

It is urgent to establish a strategic, decentralized network independent of the urban network to guarantee an agile response in high-risk areas.



WATER SHIELD

FOREST PROTECTION



ADAPTATION



RESILIENCE



GOVERNANCE

WATER SHIELD: A Paradigm Shift

From Reactive Response to Proactive Climate Adaptation

🎯 PROGRAM VISION

We redefine the approach by transitioning from simply responding to fires toward a comprehensive climate adaptation strategy. It is not only about supplies, but about strengthening installed capacity and community governance.

🌍 IMPACT AND COMMITMENT

Aligned with the 2050 Climate Action Plan and the C40 Network, the program positions Medellín as a benchmark in territorial resilience, transforming physical assets into strategic tools for a sustainable future.



WATER SHIELD
FOREST PROTECTION



INFRASTRUCTURE

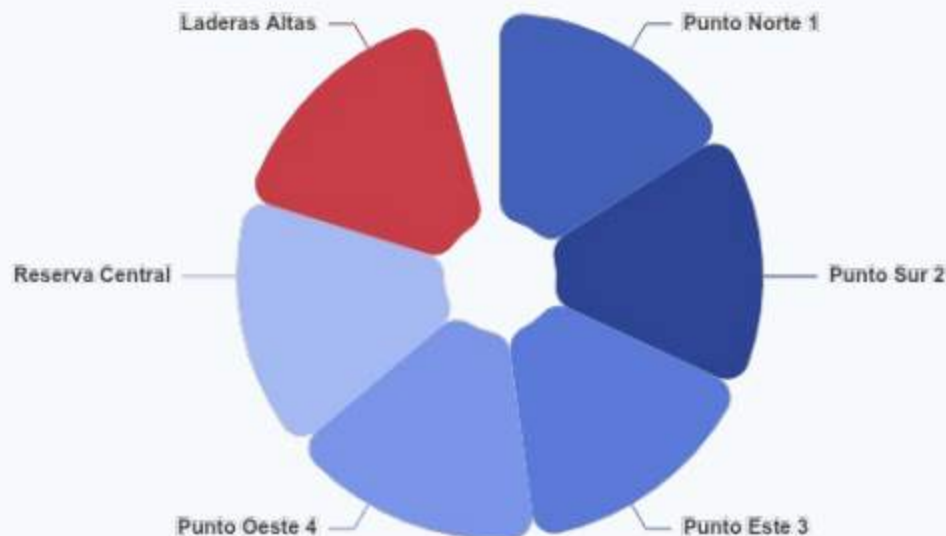


RESPONSE



INTEROPERABLE

PILLAR Network of Strategic Water Points



■ Punto Norte 1 ■ Punto Sur 2 ■ Punto Este 3 ■ Punto Oeste 4 ■ Reserva Central
■ Laderas Altas



Technical Advantage

Water decentralization minimizes dependence on tanker trucks. Through 2.5" Storz couplings, we optimize firefighting at critical difficult-to-access locations.

TOTAL CAPACITY

50k Gal

ACTIVE TANKS

10 Points

Permanent coordination with EPM, rural aqueduct systems, and rainwater collection systems to guarantee continuous filling.

* Technical standards based on Q4 2025 emergency management protocols.



WATER SHIELD

FOREST PROTECTION



LOGISTICS



TERRITORY



BRIGADES

PILLAR 2: TACTICAL DECENTRALIZATION

Shield Warehouses

SATELLITE CENTERS

We establish five strategic locations in Santa Elena, AltaVista, San Cristóbal, Guardian Hills, and Alto de Las Palmas for an immediate response.



PROXIMITY

TOTAL COVERAGE

PHYSICAL CAPACITY

Equipment with motor pumps and PPE that serve as the physical core for the operation of local Community Wildland Fire Brigades.



TACTICAL

LOCAL ACTION



WATER SHIELD

FOREST PROTECTION



MOBILITY



HILLSIDE



RESPONSE

Pillar 3: Specialized Hillside Mobility



Interface Doctrine

We implement an operational doctrine differentiated from the urban response, designed specifically for the corridor wildland-residential interface of the Aburrá Valley.

"Total versatility in critical terrain"



Required Adapted 4x4 Fleet

- ✓ **2 Wildland Water Tankers:** Robust capacity for large-scale fires.
- ✓ **4 Rapid-Attack Pickups:** Agile for narrow roads and steep slopes.
- ✓ **2 Versatile UTVs:** Full access to trails and difficult-to-traverse areas.





Pillar 4

Aerial Shield and Coordination



Strategic Aerial Availability

A system providing 50 annual hours with a helicopter bucket for inaccessible areas, maximizing response capabilities in difficult terrain.



Integration with SIATA

Institutionalization of the ground-air protocol with the Early Warning System to optimize early detection.



Role of Liaison Officers

Medellín Firefighters lead ground-air coordination, ensuring fluid communication and efficient joint operations.





WATER SHIELD

FOREST PROTECTION



COOPERATION



SUSTAINABILITY



METROPOLITAN



Governance Model: Water Shield Regional Roundtable

A cooperative structure that distributes technical and financial responsibilities to address metropolitan fire risk:

- ✓ **Mayor's Office & DAGRD - Fire** **Operational Leadership (\$1.500M)**
- ✓ **Government of Antioquia** **Model Scalability (\$500M)**
- ✓ **CORANTIOQUIA** **Ecological Recovery (\$200M)**
- ✓ **Regional Coordination (\$800M)**
- ✓ **EPM** **Logistical Support (\$300M)**
- ✓ **ISA / ISAGEN** **Technological Monitoring (\$305M)**

 **CO-FINANCING**

 **CLIMATE ADAPTATION**

TOTAL PROPOSED INVESTMENT

\$3.605.000 COP

Interinstitutional commitment to forest protection.



Proposed Co-Financing and Strategic Commitment

WATER SHIELD REGIONAL ROUNDTABLE

Medellín
Mayor's
Office

Leadership and unified operational command

\$1.500.000.000

AMVA

Regional coordination and impact mitigation

\$800.000.000

Departmental
Government

Scalability of the model to other subregions

\$500.000.000

EPM

Water supply and logistical support

\$300.000.000

CORANTIOQU
IA

Environmental authority and risk maps

\$200.000.000

ISA / ISAGEN

Protection of transmission lines

\$305.000.000

© JUSTIFICATION

Collective investment builds robust institutional capacity, essential for resilience and the protection of vital infrastructure.

✓ Critical Assets

- Replicability: Scaling by the Departmental Government.
- Operability: EPM water-supply support.
- Connectivity: ISA/ISAGEN monitoring.



WATER SHIELD

FOREST PROTECTION



COMMUNITY



RESPONSE



CERTIFIED



Technical Training

Community Strengthening Wildland Fire Brigades



First Line of Defense

Formation of 10 volunteers per prioritized sector, strengthening the early-warning and immediate-response network for vegetation fires.



Certification and Coordination

A 40-hour technical training cycle led by Firefighters and DAGRD, integrating the Community Action Boards (JACs) to ensure community ownership.



Infrastructure Custody

Responsibility for Shield Warehouse keys and valves, guaranteeing activation in less than 10 minutes from detection of an incipient fire.





WATER SHIELD
FOREST PROTECTION



"The focus is on early intervention, drastically reducing response times and minimizing the impact of fire."



DETECTION



BRIGADE

RESPONSE

Response Protocol In 4 Key Stages

1

Community Report

Detection and georeferenced reporting by the community.

2

Parallel Activation

Simultaneous alert to the DAGRD Central Office and Wildland Fire Brigade.

3

Initial Response

Action in <10 min with Shield Warehouse equipment and Water Points.

4

Escalation

Mobilization of the Shield Fleet in less than 15 minutes.



Simultaneous communication integrated between the community and o



WATER SHIELD

FOREST PROTECTION



12 MONTHS



TERRITORIAL



RESILIENCE

Implementation Timeline

Strategic roadmap toward a Medellín more resilient to climate change.



MONTHS 1-2

Phase 1: Diagnosis and Partnerships

- ✓ Establishment of Regional Roundtable.
- ✓ Signing of Framework Agreement.
- ✓ Fire recurrence map.
- ✓ Identification of water sources.



MONTHS 3-8

Phase 2: Physical Capacity

- ✓ Installation of 10 Water Points.
- ✓ Implementation of 5 Shield Warehouses.
- ✓ Specialized mobility fleet.
- ✓ Protocols with EPM and aqueduct systems.



MONTHS 4-12

Phase 3: Ownership and Completion

- ✓ Aerial Shield agreement.
- ✓ Community Wildland Fire Brigades.
- ✓ Execution of two drills.
- ✓ Final indicator report.





WATER SHIELD

FOREST PROTECTION



RESPONSE



ECOSYSTEMS



SOCIAL

Measurable Impact: Toward a Resilient Medellín



Reduction in Response Time

Response will move from 60 minutes to less than 15 minutes, protecting lives and property along the urban edge.



Protection of Key Ecosystems

Goal of reducing affected hectares by 40%, preserving Andean forests and connectivity.



Optimization of Water Resources

Prioritization of rainwater for emergencies, relieving pressure on the potable water supply.



SOCIAL BENEFIT

Protection for rural aqueduct systems and the communities of Santa Elena and San Cristóbal.



WATER SHIELD
FOREST PROTECTION



PROTECTION



RESILIENCE



GOVERNANCE

Conclusion and Request for Institutional Action

Water Shield is not simply an acquisition of equipment, but the installation of the climate adaptation capacity that the territory needs to overcome the historical gap in wildfire response.

FORMAL REQUESTS:

- Adopt Water Shield as a priority program within the Risk Management Plan.
- Authorize detailed studies of territorial and hydraulic suitability.
- Convene the formal establishment of the Water Shield Regional Roundtable.
- Define installed-capacity indicators for comprehensive evaluation.

"We do not replace what exists. We install what is"

