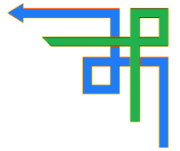


SECRETARIADO
DO FUNDO ESPECIAL
DE DESENVOLVIMENTO DE ATAÚRO



GOVERNMENT POLICY PRIORITIES (GPP) ***Prioridades Política Governu (PPG)***

PROPOSAL

**Development of Water Security and Basic
Sanitation for Community
Of Ataúro**

PPG Nú. 20

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1. Executive Summary

Prioridades Política Governu (PPG) No. 20 proposes a five-year **Water Security and Basic Sanitation Programme for Ataúro for the period 2027–2031**. The programme is designed to address persistent water shortages, limited and seasonal freshwater sources, damaged water-supply infrastructure, insufficient rainwater storage, inadequate water treatment, poor sanitation, unsafe septic and faecal-sludge management, and limited solid-waste collection and disposal services.

Ataúro has no permanent rivers and depends mainly on seasonal springs, groundwater, household rainwater harvesting and the Maquer and Berau water-supply systems. Some coastal wells are affected by saltwater intrusion, while several communities remain dependent on small storage tanks, purchased water or water transported from other areas during the dry season. Damage, leakage and inadequate storage within the existing networks reduce the reliability of supply. These conditions affect households, schools, health facilities, agriculture, tourism, businesses and the wider environment, while placing a disproportionate burden on women, children, vulnerable households and remote communities.

The programme will establish an integrated and diversified water-security system through the rehabilitation of existing networks, protection of freshwater sources, increased rainwater storage, development of additional water sources, improved treatment and monitoring, expanded sanitation and strengthened operation and maintenance. Its main components include:

- Rehabilitation and expansion of the Maquer water-supply system;
- Rehabilitation and expansion of the Berau water-supply system;
- Protection of springs, groundwater and catchment areas;
- Decentralised household, community and institutional rainwater-harvesting systems;
- Construction of a rainwater-catchment dam or storage reservoir;
- Development of a desalination project;
- Drinking-water treatment and quality monitoring;
- Household sanitation and Water Sanitation and Hygiene (WASH) facilities in schools, health centres and public locations;
- Septic inspection, desludging and faecal-sludge management;
- Integrated solid-waste collection, treatment and controlled disposal; and

- Strengthened institutional coordination, operator capacity, maintenance and public reporting.

The Maquer water-supply system will receive an estimated **USD 700,000 in 2027**, with the principal rehabilitation and expansion works expected to be completed during that year. The Berau water-supply system will receive **USD 1.5 million**.

Feasibility studies for the **Rainwater-Catchment Dam and Storage Reservoir Project** and the **Desalination Project** will begin in 2027. The dam component is estimated at **USD 4 million**, comprising USD 1 million for feasibility, hydrological, geological, environmental and design studies and USD 3 million for construction, treatment and distribution connections. The desalination component is estimated at **USD 6.3 million**, including USD 800,000 for feasibility, marine, energy and design studies and USD 5.5 million for the plant, renewable or hybrid energy system, seawater intake, brine outfall, storage and network connections.

Subject to technical feasibility, environmental and social approval, confirmed land access, independently verified designs, lifecycle-cost assessment and available financing, procurement and phased implementation of the dam and desalination components will commence from 2028 onward. The feasibility studies will determine the preferred locations, technologies, capacities, environmental safeguards, operating arrangements and final implementation schedules.

By 2030, the programme aims to achieve:

- Reliable access to safe water for at least **90% of households**;
- Improved sanitation for at least **90% of households**;
- Functional water, sanitation and handwashing services in all schools and health facilities;
- All **19 aldeias** verified as open-defecation free;
- At least **95% compliance** with applicable drinking-water-quality standards;
- Regular solid-waste services for at least **80% of households, public institutions and registered businesses**;
- At least a **50% reduction** in water-collection time in targeted communities;
- At least a **70% reduction** in uncontrolled dumping and open waste burning; and
- At least **90% annual functionality** of major water infrastructure.

The programme will be implemented through a hybrid delivery model combining Government leadership, specialised consultants and contractors, institutional partnerships and community participation. A Programme Steering Committee will provide strategic

oversight, while a Programme Management Unit will coordinate programme planning, procurement, financial management, safeguards, monitoring and reporting. *Autoridade Administrativa Ataúro* (AAA), *Fundo Especial de Desenvolvimento de Ataúro* (FEDA), relevant national institutions, suco authorities and community representatives will support local implementation, consultation and service management.

The total estimated additional budget request for 2027–2031 is **USD 24,824,000**. This comprises a programme subtotal of **USD 23.2 million** and a physical and price contingency of approximately **7%, equivalent to USD 1.624 million**.

Year	Estimated additional budget
2027	USD 4,419,000
2028	USD 6,827,000
2029	USD 6,928,000
2030	USD 4,580,000
2031	USD 2,070,000
Total	USD 24,824,000

The programme’s overall inherent risk is assessed as **High** because it involves complex engineering, remote-island logistics, major capital investment, environmental sensitivities and long-term operation and maintenance obligations. With the proposed feasibility studies, staged approval process, technical verification, environmental safeguards, financial controls and maintenance arrangements, the overall residual risk is expected to reduce to **Medium**. The recurrent financial risk associated with desalination may remain **Medium–High** until actual energy consumption, production costs and affordability are confirmed.

Implementation progress will be monitored through monthly technical and operational reports, quarterly consolidated programme reports and annual public performance reporting. An independent mid-term evaluation will be conducted in **2029**, followed by a final evaluation in **2031**, covering programme effectiveness, equity, cost-effectiveness, environmental performance, infrastructure functionality, financial sustainability and value for money.

Approval is requested for PPG No. 20 as a coordinated five-year programme, including the additional financing envelope of **USD 24.824 million**, commencement of the dam and desalination feasibility studies in 2027 and phased capital implementation from 2028 where technical, environmental, financial and operational requirements have been satisfied.

2. Definition of the Policy Problem

2.1 Problem Statement

Ataúro encounters a serious and persistent challenge in ensuring sufficient, safe, reliable and affordable water throughout the year. The problem affects households, schools, health facilities, agriculture, tourism, businesses and the wider natural environment.

The island has no permanent rivers, receives relatively low and uneven rainfall and has a limited number of reliable freshwater sources. Many smaller springs are seasonal and may dry up during prolonged dry periods. Coastal wells are vulnerable to saltwater intrusion, making them unsuitable or unsafe for drinking, particularly during the dry season. Household rainwater harvesting is practised, but most systems operate at a small scale and have insufficient storage capacity to meet demand when rainfall is delayed or the dry season is prolonged.

Existing water-supply systems

Ataúro currently depends mainly on two principal water-supply systems.

The **Berau system**, established in 2004, supplies areas including Vila Maumeta, Beloi and Biqueli. However, significant sections of its pipeline are damaged, leaking or broken and require rehabilitation or replacement.

The **Maquer system** supplies Maquer, Atecru, Adara and Arlo. It also requires rehabilitation, source protection, increased storage and expansion to additional underserved communities.

Communities such as Iliana, Douro and Fatu'u depend heavily on household rainwater storage. When storage tanks become empty during prolonged dry periods, families may need to purchase or transport water from Adara, Beloi or other communities. Smaller springs used in Macadade, Maquili, Vila Maumeta and Beloi are generally seasonal, lack regular maintenance and do not have adequate treatment systems. Communities may therefore need to boil water before drinking it.

Insufficient strategic water storage

Ataúro currently lacks large-scale infrastructure for capturing and storing wet-season runoff. Significant volumes of rainwater may be lost because runoff flows rapidly toward the coast and the island has limited strategically located storage facilities.

A **rainwater-catchment dam**, off-stream reservoir, lined storage basin, check-dam system or combination of decentralised reservoirs may increase dry-season water availability. However, no preferred site, engineering solution or storage capacity has yet been confirmed.

The proposal therefore requires a comprehensive feasibility study before a final investment decision is made.

The study must determine whether sufficient rainfall, catchment yield, geological stability, land availability and environmental conditions exist to justify construction. It must also assess evaporation, sedimentation, dam safety, downstream risks, water treatment and the cost of connecting stored water to communities.

Lack of a rainfall-independent water source

Ataúro's dependence on rainfall and seasonal freshwater sources creates significant exposure to drought and climate variability. **Desalination** could provide a supplementary source that is independent of rainfall and may be particularly useful for coastal population centres, public institutions, tourism facilities and emergency dry-season supply.

However, desalination can involve high energy and operating costs and requires specialised equipment, chemicals, membranes, trained operators and dependable maintenance. Seawater intake and concentrated brine discharge may also affect sensitive marine and coastal ecosystems.

A detailed feasibility study is therefore required to determine:

- the most suitable technology;
- appropriate production capacity;
- the preferred location;
- renewable or hybrid energy options;
- seawater-intake arrangements;
- brine treatment and disposal;
- capital and lifecycle costs;
- affordability;
- environmental impacts; and
- institutional capacity to operate the plant.

Water-quality risks

Ataúro does not yet have a comprehensive island-wide system for water treatment, water-safety planning or routine quality monitoring. Water from seasonal springs, wells, household tanks and damaged distribution networks may be exposed to microbiological or chemical contamination.

The lack of systematic testing makes it difficult to confirm whether water is safe at the source, during distribution or at the point of consumption. Poor household storage and handling may create additional contamination risks.

Consequences for households and economic development

Water insecurity affects household health, income, education and productivity. Families spend time collecting, transporting, purchasing, storing and treating water. Women and girls often carry a disproportionate share of water collection, household hygiene and care responsibilities.

Children may miss school because they are required to help collect water. Water shortages also constrain agriculture, livestock production, fisheries-related activities, construction, tourism accommodation, restaurants and small businesses.

Ataúro had 10,295 residents and approximately 2,052 households in 2022. The population is projected to continue increasing, reaching approximately 11,473 by 2030. Population growth, settlement concentration in coastal areas and tourism development will increase demand for water, sanitation and waste services.

Inadequate sanitation and hygiene

While some households connected to water networks have basic toilets and septic tanks, many households, especially in remote areas, still lack safe and appropriate sanitation.

Rudimentary latrines and open defecation continue in some communities. Public toilets may remain unusable because water supply is irregular. This demonstrates that sanitation infrastructure cannot function sustainably without dependable water, cleaning arrangements, responsible operators and maintenance funding.

Women, girls, older persons and persons with disabilities face particular difficulties where toilets are unsafe, inaccessible, lack privacy or are located far from homes and public facilities.

Septic, wastewater and faecal-sludge risks

Septic tanks are sometimes constructed too close to houses, wells or other water sources. Poor location, inadequate design, leakage and lack of inspection increase the risk of contaminating groundwater and soil.

Ataúro does not yet have an island-wide system for:

- septic-tank registration and inspection;
- scheduled desludging;
- safe transport of faecal sludge;

- sludge treatment;
- wastewater monitoring; or
- safe final disposal.

This creates serious health and environmental risks, particularly because the island depends on limited and fragile freshwater resources.

Limited solid-waste management

Solid-waste management remains extremely limited. One collection vehicle primarily serves Vila Maumeta, Beloi and nearby areas. There is no complete island-wide system for collection, separation, recycling, composting, treatment and controlled final disposal.

In communities without regular services, waste is commonly burned or dumped in open areas. Burning plastics, batteries and other hazardous materials creates toxic smoke, respiratory-health risks and fire hazards. Uncontrolled waste can contaminate soil and groundwater and enter beaches, coral reefs and marine ecosystems.

Core policy problem

The policy problem is not simply a shortage of pipes, tanks or toilets. It is the absence of an integrated, diversified and climate-resilient system that combines:

- Protection and management of existing freshwater sources;
- Rehabilitation of principal water networks;
- Adequate rainwater harvesting and storage;
- Strategic surface-water storage;
- Supplementary desalinated-water production;
- Water treatment and quality monitoring;
- Household and public sanitation;
- Septic and wastewater management;
- Solid-waste services;
- Institutional responsibility;
- Community participation; and
- Sustainable operation and maintenance.

Government intervention is necessary because households and communities cannot independently finance, regulate or operate the major infrastructure and specialised services required.

2.2 Strategic Alignment

2.2.1 Timor-Leste Strategic Development Plan 2011–2030

The Strategic Development Plan identifies access to clean water and improved sanitation as essential for public health, rural development, employment, economic activity and the sustainable use of water resources. It establishes the national objective that all citizens should have access to clean water and improved sanitation by 2030.

PPG No. 20 supports this commitment through:

- Rehabilitation and expansion of rural water systems;
- Construction of reservoirs and storage;
- Development of additional water sources;
- Improved treatment and monitoring;
- Household and community sanitation;
- Technical support and training;
- Institutional capacity-building; and
- Sustainable operation and maintenance.

The rainwater-catchment dam and desalination components strengthen this alignment by increasing storage, diversifying supply and improving resilience to drought and seasonal water shortages.

2.2.2 Programme of the IX Constitutional Government 2023–2028

The Programme of the IX Constitutional Government prioritises widespread, safe and sustainable access to water for household consumption, agriculture, commerce and industry. It also supports improved sanitation, wastewater treatment, drainage, technical training, institutional capacity and climate-resilience mechanisms.

The proposed programme responds directly by:

- creating a coordinated water-security plan;
- developing new and alternative sources;
- rehabilitating and expanding distribution systems;
- strengthening water treatment;
- improving sanitation and wastewater services;
- training operators and technicians;
- introducing climate-resilient infrastructure; and

- protecting long-term operation and maintenance funding.

2.2.3 Ataúro Strategic Development Plan 2026–2030

Plano de Desenvolvimento Estratégico de Ataúro (PEDA) has a vision to transform Ataúro into a clean, innovative, natural, developed, organised and healthy island. Under **Priority 2: Infrastructure Development**, it identifies water and sanitation as essential services for improved living conditions, economic development, resilience and public-service delivery.

PEDA specifically prioritises:

- rehabilitation of the Maquer water-supply system;
- rehabilitation and expansion of the Berau water-supply system;
- rainwater harvesting;
- water treatment;
- water-storage infrastructure;
- sanitation in rural communities;
- an appropriate waste-disposal facility; and
- a regulated solid-waste collection and disposal system.

PEDA targets completion of the Maquer rehabilitation by 2027 and the Berau rehabilitation and expansion by 2028.

The proposed rainwater-catchment dam and desalination project are **additional strategic investments beyond the existing PEDA baseline**. Their inclusion reflects the need to diversify Ataúro's future water supply, but their implementation remains conditional on feasibility, environmental acceptability and value for money.

2.2.4 Sustainable Development Goals

The programme is principally aligned with **SDG 6: Ensure availability and sustainable management of water and sanitation for all**.

It supports:

- **Target 6.1:** safe and affordable drinking water;
- **Target 6.2:** adequate sanitation and hygiene and ending open defecation;
- **Target 6.3:** improved water quality and wastewater treatment;
- **Target 6.4:** water-use efficiency and reduced water scarcity;
- **Target 6.5:** integrated water-resource management;
- **Target 6.6:** protection of water-related ecosystems;

- **Target 6.a:** cooperation and capacity-building for water harvesting, desalination, wastewater treatment, recycling and reuse; and
- **Target 6.b:** community participation in water and sanitation management.

The programme also contributes to SDGs 3, 4, 5, 11, 12, 13, 14 and 17 through improved health, education, gender equality, resilient communities, responsible waste management, climate adaptation, marine protection and partnerships.

3. Objectives and Expected Results

This section assumes a five-year implementation period from **2027 to 2031**, with the principal service targets achieved by 2030 and consolidation, final evaluation and preparation of the next phase completed in 2031.

3.1 Policy Objectives

Objective 1: Expand reliable access to safe water

By December 2030, increase reliable access to sufficient, safe and affordable water to at least **90% of Ataúro households**, with progress toward at least 95% coverage by the end of 2031.

Objective 2: Rehabilitate and expand the Maquer system

Complete priority rehabilitation and expansion of the Maquer water-supply system, including source protection, pumping, treatment, storage and distribution, with the principal system operational by the end of 2027 and follow-up extensions undertaken thereafter.

Objective 3: Rehabilitate and expand the Berau system

Complete rehabilitation and expansion of the Berau water-supply system, including replacement of damaged pipelines, improved abstraction, storage, treatment and distribution, with the principal system operational by the end of 2028.

Objective 4: Develop a rainwater-catchment dam and storage reservoir

Complete a comprehensive feasibility study, environmental and social assessment and preferred-option design in 2027.

Subject to approval, commence phased construction from 2028 onward to capture and store wet-season runoff and improve dry-season water availability.

The study will establish:

- Preferred site or sites;

- Catchment and storage yield;
- Storage capacity;
- Infrastructure type;
- Safety requirements;
- Environmental and social impacts;
- Distribution arrangements;
- Capital and operating costs; and
- Implementation schedule.

Objective 5: Develop a desalination project

Complete a desalination feasibility study in 2027 and, subject to approval, commence phased implementation from 2028 onward.

The feasibility study will determine:

- Suitable technology;
- Plant capacity;
- Location;
- Energy source;
- Intake and brine-disposal arrangements;
- Treatment and storage requirements;
- Environmental safeguards;
- Affordability;
- Lifecycle cost; and
- Appropriate ownership and operating model.

Objective 6: Expand decentralised water supply and storage

By December 2030, install or upgrade household, community and institutional rainwater-harvesting and decentralised water systems in all priority drought-prone and underserved communities.

Objective 7: Improve drinking-water quality

By December 2030, establish treatment and routine monitoring systems so that at least **95% of samples from regulated drinking-water systems** comply with applicable standards.

Objective 8: Expand sanitation and hygiene

By December 2030:

- at least 90% of households will use improved sanitation;
- all schools, health facilities and priority public institutions will have functional WASH services; and
- all 19 aldeias will be verified as open-defecation free.

Objective 9: Establish safe septic and wastewater management

By December 2030, establish technical standards, inspection, scheduled desludging, faecal-sludge transport and safe treatment or disposal arrangements for household, public and commercial septic systems.

Objective 10: Establish integrated solid-waste management

By December 2030, provide regular solid-waste services across all five sucos, covering at least 80% of households, public institutions and registered businesses.

Objective 11: Strengthen operation, maintenance and governance

By December 2031, ensure that all major water, sanitation, dam, desalination, wastewater and waste-management assets have:

- Designated ownership;
- Trained operators;
- Preventive-maintenance plans;
- Annual operating budgets;
- Spare-parts arrangements;
- Service standards;
- Emergency-response procedures; and
- Annual performance reporting.

3.2 Expected Results

3.2.1 Short-Term Outputs: 2027–2028

By the end of the first two years, the programme will deliver:

1. An island-wide household, infrastructure and service baseline covering all five sucos and 19 aldeias.
2. A consolidated inventory and map of water sources, pipelines, reservoirs, sanitation facilities, septic systems and waste assets.
3. An approved Ataúro Water Security and Basic Sanitation Investment and Management Plan.
4. Completion of the Maquer priority rehabilitation and commencement of follow-up extensions.
5. Completion of the principal Berau rehabilitation and expansion works.
6. A complete feasibility study for the rainwater-catchment dam or alternative storage-reservoir system.
7. A complete feasibility study for the desalination project.
8. Preferred dam or reservoir site and design identified.
9. Preferred desalination location, technology, capacity and energy model identified.
10. Environmental and social assessments and required licensing processes initiated or completed.
11. Procurement of approved dam and desalination works commencing from 2028.
12. Initial decentralised water and rainwater-storage systems installed.
13. Routine water-quality testing introduced.
14. Priority household, school, health-facility and public sanitation improvements commenced.
15. A solid-waste service plan, route network and facility design approved.

3.2.2 Medium-Term Outcomes, 2029–2031

The programme is expected to achieve:

- At least 90% household access to reliable and safe water by 2030;
- At least 90% household access to improved sanitation by 2030;

- All 19 aldeias verified as open-defecation free;
- All schools and health facilities with functional water, toilets and handwashing facilities;
- At least 95% compliance with drinking-water standards;
- At least a 50% reduction in water-collection time in targeted communities;
- At least 80% solid-waste service coverage;
- At least a 70% reduction in open waste burning and uncontrolled dumping;
- At least 90% annual functionality of major water assets;
- An approved rainwater dam or storage facility constructed or substantially completed;
- A desalination pilot or first operational phase commissioned;
- Integration of additional stored and desalinated water into the wider supply system; and
- Approved operators, maintenance plans and budgets for all major systems.

3.2.3 Long-Term Impacts

The long-term impacts will include:

- Reduced water insecurity and drought vulnerability;
- Reduced waterborne and sanitation-related disease;
- Improved dignity, safety and quality of life;
- Reduced unpaid water-collection burdens on women and girls;
- Improved school attendance;
- Stronger agricultural, tourism and business productivity;
- Improved reliability of schools and health facilities;
- Reduced groundwater contamination;
- Reduced pollution of beaches, coral reefs and marine ecosystems;
- Greater resilience to population growth and climate variability; and
- Measurable progress toward national 2030 commitments and SDG 6.

3.3 Key Performance Indicators (KPIs)

No.	KPI	Baseline	Target
1	Households with reliable year-round access to safe water	Complete baseline not available	90% by 2030; 95% by 2031
2	Maquer system rehabilitation and expansion	Existing system requires improvement	Principal works complete by 2027
3	Berau system rehabilitation and expansion	Damaged and leaking infrastructure	Principal works complete by 2028
4	Rainwater dam/reservoir feasibility study	No approved study	Completed and approved in 2027
5	Preferred dam/reservoir site and design	Not identified	Confirmed by end-2027
6	Dam/reservoir construction	No strategic facility	Implementation begins in 2028; completion date set by approved study
7	Additional rainwater-storage capacity	To be established	Quantified target approved in 2027
8	Desalination feasibility study	No comprehensive study	Completed and approved in 2027
9	Desalination technology, site and capacity	Not selected	Confirmed by end-2027
10	Desalination implementation	No programme-scale system	First phase begins from 2028
11	Desalinated-water production	To be established	Production target approved after feasibility
12	Drinking-water samples meeting standards	No routine island-wide system	At least 95% by 2030
13	Households using improved sanitation	Complete baseline not available	90% by 2030; 95% by 2031
14	Aldeias verified as open-defecation free	To be verified	All 19 by 2030
15	Schools and health facilities with functional WASH	Several facilities inadequate	100% by 2030
16	Households and institutions receiving waste collection	Limited mainly to Vila Maumeta and Beloi	At least 80% by 2030
17	Controlled waste-treatment or disposal facility	None	At least one operational by 2029
18	Reduction in open burning and dumping	Baseline to be established in 2027	70% reduction by 2030
19	Major water systems functional at annual inspection	Not established	At least 90% annually from 2029
20	Major assets with approved maintenance plans	No consolidated system	100% by 2029
21	Reduction in household water-collection time	Baseline in 2027	At least 50% by 2030
22	Dam safety and emergency-action plan	None	Approved before commissioning
23	Desalination energy efficiency	To be established	Target set through approved design
24	Brine discharge compliant with environmental requirements	No system	100% after commissioning
25	Annual performance reports	No consolidated report	Annual reports from 2028
26	Programme evaluations	None	Mid-term in 2029; final in 2031

4. Options Analysis

4.1 Options Considered

Option 1: Status Quo

Government would continue existing arrangements without a coordinated new programme or major additional investment.

Water systems would receive occasional repairs based on annual funding. Communities outside the main networks would continue relying on seasonal springs, small household tanks, purchased water and local initiatives.

Sanitation and waste-management coverage would remain limited.

Advantages

- Lowest immediate public expenditure.
- No new programme structure required.
- Limited additional implementation demands.

Disadvantages

- Water shortages and infrastructure failures continue.
- No strategic storage or alternative supply.
- Unsafe water and sanitation risks remain.
- Remote communities remain underserved.
- Emergency and household costs increase over time.
- National and PEDTA targets are unlikely to be achieved.

Assessment: Not recommended.

Option 2: Minimum Intervention

Government would undertake targeted repairs to Maquer and Berau, provide selected water tanks, rehabilitate a small number of toilets and expand waste collection modestly.

The option would not include a comprehensive dam, desalination, wastewater or island-wide service-management programme.

Advantages

- Faster and less expensive than a full programme.

- Addresses selected urgent infrastructure failures.
- Provides visible short-term benefits.

Disadvantages

- Coverage remains fragmented.
- Remote communities may remain unserved.
- No major increase in strategic storage.
- No rainfall-independent water source.
- Sanitation, septic and waste problems remain only partially addressed.
- Repaired infrastructure may deteriorate again without maintenance reform.

Assessment: Suitable only for urgent early actions, not as the full policy response.

Option 3: Integrated and Diversified Water Security and Basic Sanitation Programme

This option combines:

- Maquer rehabilitation and expansion;
- Berau rehabilitation and expansion;
- source protection;
- decentralised rainwater harvesting;
- construction of a rainwater-catchment dam or reservoir;
- development of desalination;
- treatment and water-quality monitoring;
- household and public sanitation;
- septic and wastewater management;
- solid-waste management; and
- institutional and maintenance reform.

Implementation of the dam and desalination components will follow a staged decision process. Feasibility studies will be completed in 2027, followed by conditional implementation from 2028.

Advantages

- Addresses the complete policy problem.

- Diversifies water sources.
- Reduces dependence on seasonal springs.
- Improves drought resilience.
- Provides island-wide and equitable coverage.
- Produces health, education, environmental and economic benefits.
- Protects existing public investment.
- Establishes sustainable operation and maintenance.

Disadvantages

- Highest initial capital requirement.
- More complex coordination and procurement.
- Significant technical and environmental studies required.
- Dam and desalination investments may have high lifecycle costs.
- Strong operator and maintenance capacity will be necessary.

Assessment: Preferred option, subject to feasibility and staged approval.

Option 4: Alternative Service-Delivery Model

Government would retain policy and regulatory control but contract private, non-governmental, cooperative or community organisations to deliver selected services.

Possible arrangements include:

- Performance-based maintenance contracts;
- Desalination operation contracts;
- Design-build-operate arrangements;
- Contracted waste collection;
- Community-managed decentralised systems;
- Recycling cooperatives; and
- Partnerships with tourism operators.

Advantages

- Access to specialised expertise.
- Potential operational efficiency.
- Performance-based service standards.
- Opportunities for private and community participation.

Disadvantages

- Ataúro's small and dispersed market may not be commercially viable.
- Remote communities may be unattractive to private operators.
- User charges may be unaffordable.
- Strong government contract-management capacity remains necessary.
- Private failure could interrupt essential services.

Assessment: Appropriate for selected components but not as a stand-alone model.

4.2 Cost–Benefit or Cost-Effectiveness Analysis

The proposed integrated tourism programme is expected to generate greater economic,

Analytical approach

A full monetary cost-benefit analysis will be completed after the 2027 baseline, feasibility studies and detailed designs.

At this stage, a cost-effectiveness approach is used to compare:

- cost per household served;
- reliability;
- geographic coverage;
- health and environmental benefits;
- drought resilience;
- useful life;
- operation and maintenance costs;
- affordability; and
- institutional feasibility.

Quantified benefits

Based on the 2022 baseline of approximately 2,052 households, achieving 90% coverage would provide reliable services to at least **1,847 households**, before allowing for population growth.

The programme targets:

- 90% water coverage;

- 90% improved sanitation;
- all 19 aldeias open-defecation free;
- 100% WASH coverage in schools and health facilities;
- 95% drinking-water quality compliance;
- 80% waste-service coverage;
- 50% reduction in household water-collection time;
- 70% reduction in open dumping and burning; and
- 90% annual functionality of major water assets.

Additional measurable benefits include:

- lower household expenditure on purchased water;
- reduced emergency water transport;
- fewer emergency repairs;
- reduced treatment costs for waterborne illness;
- fewer school and working days lost;
- increased water availability for agriculture and business;
- improved tourism-service capacity; and
- extended useful life of public infrastructure.

Dam cost-effectiveness considerations

A rainwater-catchment dam or reservoir may have comparatively low operating costs after construction, but its effectiveness depends on:

- catchment yield;
- geological conditions;
- evaporation;
- sedimentation;
- location;
- treatment requirements;
- distribution costs; and

- construction scale.

The feasibility study must compare a conventional dam with off-stream storage, lined reservoirs, check dams, managed aquifer recharge and decentralised storage.

Desalination cost-effectiveness considerations

Desalination offers a rainfall-independent supply but may have higher recurring costs for:

- electricity;
- membranes;
- chemicals;
- specialist maintenance;
- corrosion control;
- spare parts; and
- brine management.

Its cost-effectiveness will improve where:

- renewable energy is available;
- the plant is modular;
- production matches actual demand;
- existing reservoirs and networks can be used;
- operators are properly trained; and
- lifecycle maintenance is contractually secured.

Non-monetary benefits

The programme will provide:

- greater equity between connected and remote communities;
- reduced burdens on women and girls;
- improved dignity and safety;
- better conditions in schools and health facilities;
- greater service access for vulnerable households;
- protection of groundwater and marine ecosystems;

- compliance with national strategies and SDG 6;
- reduced drought and climate risk; and
- stronger public confidence in government services.

Principal risks and mitigation

Risk	Mitigation
Incomplete baseline or demand data	Complete island-wide baseline and demand forecast in 2027
Insufficient spring or catchment yield	Seasonal yield monitoring and conservative hydrological modelling
Unsuitable dam geology	Geotechnical drilling and independent engineering review
High evaporation or sedimentation	Assess alternative reservoir types, lining and sediment controls
Dam safety failure	Independent dam-safety review, spillway design and emergency plan
Desalination energy costs	Renewable or hybrid power, modular implementation and energy-efficiency standards
Brine impacts	Marine studies, dispersion modelling, compliant outfall design and monitoring
Imported equipment delays	Long-term spare-parts and membrane supply agreements
Cost escalation	Detailed designs, verified BoQs, phased contracts and contingency
Weak contractor capacity	Qualification requirements, supervision and performance guarantees
Poor operation and maintenance	Trained operators, protected budgets, spare parts and service contracts
Community disputes	Early consultation, transparent site selection and grievance mechanisms
Unaffordable tariffs	Affordability assessment and targeted subsidies
Environmental damage	Environmental licensing, management plans and independent monitoring

4.3 Rationale for the Preferred Option

Option 3 is preferred because it provides the strongest combination of effectiveness, equity, resilience and long-term value for money.

It does not rely on a single source. Instead, it creates a diversified supply system based on:

- protected springs and groundwater;
- rehabilitated Maquer and Berau networks;

- household and community rainwater storage;
- strategic wet-season runoff storage; and
- desalination as a supplementary rainfall-independent source.

The programme protects existing public investment by rehabilitating infrastructure before it deteriorates further. It reduces future emergency expenditure by increasing storage, improving maintenance and diversifying supply.

The dam and desalination components will not proceed automatically at an undefined scale. The preferred option uses clear decision gates so that government commits major capital funding only where feasibility, environmental acceptability, affordability and lifecycle sustainability have been demonstrated.

Option 1 is rejected because it would leave the problem unresolved. Option 2 is rejected as the principal response because it would provide fragmented and temporary improvements. Option 4 is rejected as a stand-alone model because universal access and affordability cannot depend solely on commercial viability. Selected elements of Option 4 will nevertheless be incorporated into the preferred hybrid delivery model.

5. Programme and Implementation Plan

5.1 Scope and Activities

Component 1: Governance, baseline and integrated planning

The programme will:

- establish governance and management arrangements;
- complete household and infrastructure baselines;
- map water, sanitation and waste assets;
- assess current and future demand;
- prepare an integrated Water Security and Basic Sanitation Plan;
- establish KPIs and reporting systems; and
- prepare annual work, procurement and financing plans.

Component 2: Water-source protection and management

Activities will include:

- mapping springs, wells, aquifers and catchments;

- monitoring yield, salinity and water quality;
- establishing source-protection zones;
- controlling contamination risks;
- rehabilitating catchments;
- preparing drought and emergency plans; and
- introducing integrated water-resource management.

Component 3: Maquer water-supply system

The programme will:

- protect the source;
- rehabilitate and replace pipelines;
- improve pumping and solar energy;
- construct or rehabilitate reservoirs;
- expand distribution;
- install treatment and monitoring; and
- establish trained operation and maintenance.

Component 4: Berau water-supply system

The programme will:

- assess existing infrastructure;
- replace damaged and leaking pipelines;
- improve abstraction and pumping;
- expand storage;
- improve distribution pressure;
- extend services;
- install treatment and monitoring; and
- establish preventive maintenance.

Component 5: Decentralised rainwater harvesting and storage

Activities will include:

- household storage systems;
- community reservoirs;
- rainwater systems in schools and health facilities;
- storage for drought-prone communities;
- emergency water reserves;
- construction standards; and
- household water-safety education.

Component 6: Rainwater-Catchment Dam and Storage Reservoir Project

Feasibility and design in 2027

Studies will cover:

- Rainfall and runoff;
- Catchment yield;
- Topography;
- Geological and geotechnical conditions;
- Evaporation and sedimentation;
- Climate risk;
- Environmental and social impacts;
- Land requirements;
- Storage capacity;
- Treatment and distribution;
- Dam safety;
- Capital and lifecycle cost; and
- Alternatives to a conventional dam.

Implementation from 2028 onward

Subject to approval:

- complete land and environmental requirements;
- finalise detailed engineering;
- procure construction and supervision;
- construct storage, spillways and safety systems;

- install treatment and network connections;
- protect the catchment;
- establish sediment controls;
- train operators; and
- commission the facility.

Component 7: Desalination Project

Feasibility and design in 2027

The study will assess:

- Demand and production capacity;
- Preferred location;
- Seawater quality;
- Intake design;
- Desalination technology;
- Pretreatment and post-treatment;
- Solar, grid, battery and hybrid power;
- Storage and network connections;
- Brine disposal;
- Marine impacts;
- Lifecycle cost;
- Tariff implications;
- Operating arrangements; and
- Modular expansion.

Implementation from 2028 onward

Subject to approval:

- Complete licensing;
- Procure design and equipment;
- Construct intake and outfall infrastructure;
- Install the desalination plant;
- Install energy systems;
- Connect storage and distribution;

- Test water quality;
- Train operators;
- Commission the first phase; and
- Expand capacity according to demand.

Component 8: Water treatment and quality assurance

The programme will:

- Establish routine testing;
- Install treatment and disinfection;
- Prepare water-safety plans;
- Provide field equipment and laboratory support;
- Establish contamination-response procedures; and
- Publish water-quality information.

Component 9: Household sanitation and hygiene

Activities will include:

- Household sanitation assessment;
- Construction and upgrading of toilets;
- Support for vulnerable households;
- Open-defecation elimination;
- Accessible and gender-responsive facilities;
- Handwashing stations; and
- Sustained hygiene promotion.

Component 10: WASH in public institutions

The programme will ensure functional WASH services in:

- Schools;
- Health facilities;
- Markets;
- Administrative buildings;
- Transport facilities; and
- Other priority public locations.

Component 11: Septic, wastewater and faecal-sludge management

Activities will include:

- Septic design and location standards;
- Registration and inspection;
- Identification of high-risk systems;
- Desludging equipment and services;
- Faecal-sludge treatment;
- Commercial wastewater controls; and
- Groundwater and marine protection.

Component 12: integrated solid-waste management

The programme will:

- Establish collection routes in all five sucos;
- Procure vehicles and bins;
- Establish sorting and transfer facilities;
- Introduce recycling and composting;
- Establish controlled disposal;
- Manage medical and hazardous waste;
- Reduce open dumping and burning; and
- Prevent waste entering the sea.

Component 13: operation, maintenance and institutional capacity

Activities will include:

- Asset registration;
- Designation of operators;
- Preventive-maintenance plans;
- Annual maintenance budgets;
- Spare-parts systems;
- Operator and technician training;
- Service standards;
- Fault reporting;

- Affordability arrangements; and
- Annual performance reporting.

Component 14: monitoring, safeguards and communication

The programme will:

- Conduct quarterly monitoring;
- Maintain a risk register;
- Monitor environmental and social safeguards;
- Maintain grievance mechanisms;
- Publish annual results;
- Conduct a mid-term evaluation in 2029;
- Undertake corrective action; and
- Complete a final evaluation in 2031.

5.2 Delivery Model

A **hybrid delivery model** will be used.

Government-led functions

Government will retain responsibility for:

- policy;
- planning;
- financing;
- infrastructure ownership;
- technical standards;
- procurement oversight;
- environmental compliance;
- regulation;
- equity and affordability;
- monitoring;
- audit; and

- public reporting.

Outsourced specialist functions

Qualified consultants and contractors will undertake:

- hydrological and geotechnical investigations;
- desalination and marine studies;
- feasibility studies;
- detailed engineering;
- environmental and social assessments;
- construction;
- equipment supply;
- independent supervision;
- laboratory testing;
- commissioning; and
- specialised operation and maintenance.

Partnership arrangements

Partnerships may be established with:

- development partners;
- universities and research organisations;
- civil-society organisations;
- private service providers;
- tourism businesses;
- recycling enterprises;
- cooperatives;
- schools and health institutions; and
- community organisations.

Community participation

Communities will participate in:

- priority setting;
- site consultation;
- source protection;
- sanitation and hygiene promotion;
- waste separation;
- fault reporting;
- local monitoring; and
- representation of women and vulnerable groups.

Community participation will complement, not replace, government responsibility.

5.3 Timeline

Five-Year Implementation Timeline, 2027–2031

Legend

-  Governance, planning and preparation
-  Existing water systems and source protection
-  Rainwater-catchment dam and storage
-  Desalination project
-  Water quality, sanitation and hygiene
-  Solid-waste management
-  Operations and capacity development
-  Monitoring and evaluation
-  Continuing or follow-up activity
-  Key milestone

Phase and activity	2027	2028	2029	2030	2031	Key milestone
 PHASE 1 — GOVERNANCE, BASELINE AND PROGRAMME PREPARATION						
Establish the Programme Steering Committee, PMU and technical groups						 Governance arrangements operational in 2027
Complete the household baseline and infrastructure asset inventory						 Baseline approved in 2027
Prepare the integrated Water Security and Basic Sanitation Investment and Management Plan						 Plan approved by the end of 2027
Prepare annual work plans, budgets and procurement plans						Annual plans approved before implementation
 PHASE 2 — EXISTING WATER SYSTEMS AND SOURCE PROTECTION						

Phase and activity	2027	2028	2029	2030	2031	Key milestone
Rehabilitate and expand the Maquer water-supply system		☐				★ Principal system operational by the end of 2027
Rehabilitate and expand the Berau water-supply system			☐			★ Principal system operational by the end of 2028
Protect priority springs, catchments and groundwater-recharge areas					☐	Priority sources protected by 2030
Install decentralised water-supply and household rainwater systems					☐	Service coverage expanded annually
Increase community and institutional water-storage capacity					☐	Priority drought-affected communities covered by 2030
■ PHASE 3 — RAINWATER-CATCHMENT DAM AND STORAGE RESERVOIR						
Conduct dam feasibility, hydrological and site-assessment studies						★ Feasibility study completed in 2027
Conduct geological, geotechnical and topographical investigations		☐				Preferred site confirmed before detailed design
Complete environmental and social impact assessment			☐			Environmental approval obtained before construction
Prepare detailed engineering design and tender documentation			☐			Detailed design independently verified
Procure dam construction and supervision services			☐			Construction contract awarded from 2028
Construct the dam, reservoir, spillway and safety infrastructure					☐	Phased construction from 2028 onward
Install water treatment, storage and distribution connections		☐			☐	Commissioning subject to approved design
Prepare dam-safety and emergency-action plans				☐	☐	Approved before commissioning
■ PHASE 4 — DESALINATION PROJECT						
Conduct desalination feasibility and technology studies						★ Feasibility study completed in 2027
Assess plant location, demand and production capacity		☐				Preferred location and capacity confirmed
Complete marine, energy, seawater-intake and brine-disposal studies		☐				Environmental approval obtained before procurement
Prepare detailed engineering design and procurement documents			☐			Technical design approved from 2028
Procure desalination equipment, energy systems and specialist services			☐			Contracts awarded from 2028
Install and commission the first desalination phase				☐		★ Initial production capacity commissioned
Expand desalination capacity according to demand					☐	Expansion subject to performance and demand
Monitor energy efficiency, production cost and brine discharge		☐				Continuous compliance and performance monitoring

Phase and activity	2027	2028	2029	2030	2031	Key milestone
● PHASE 5 — WATER QUALITY, SANITATION, HYGIENE AND WASTEWATER						
Introduce drinking-water treatment and quality monitoring	●	●	●	●	●	Routine testing operational from 2028
Construct and upgrade household sanitation facilities	●	●	●	●	□	90% household coverage by 2030
Improve WASH services in schools and health facilities	●	●	●	●	□	100% institutional coverage by 2030
Rehabilitate priority public toilets	●	●	□			Priority facilities operational by 2028
Implement hygiene promotion and open-defecation-elimination activities	●	●	●	●	□	★ All 19 aldeias open-defecation free by 2030
Establish septic inspection and faecal-sludge management services		●	●	●	□	Service operational by 2029
■ PHASE 6 — INTEGRATED SOLID-WASTE MANAGEMENT						
Complete the waste baseline, system design and facility-site assessment	■	■				System design approved by 2028
Procure waste-collection vehicles, bins and operational equipment	■	■	□			Priority equipment operational
Establish sorting, recycling, composting and controlled-disposal facilities		■	■	■	□	★ Controlled facility operational by 2029
Expand regular waste collection across all five sucos	■	■	■	■	□	80% service coverage by 2030
Introduce medical, chemical and hazardous-waste controls		■	■	■	□	Special-waste procedures operational
■ PHASE 7 — OPERATION, MAINTENANCE AND CAPACITY DEVELOPMENT						
Establish the consolidated infrastructure asset register	■	■	□	□	□	All major assets registered by 2029
Prepare operation and preventive-maintenance plans	■	■	■	□	□	100% of major assets covered by 2029
Train water, sanitation, dam, desalination and waste-system operators	■	■	■	■	■	Annual technical training programme
Establish annual maintenance budgets and spare-parts arrangements	■	■	■	■	■	Annual funding allocations protected
Introduce service standards, fault reporting and performance management		■	■	■	■	Performance system operational by 2029
■ PHASE 8 — MONITORING, EVALUATION AND PROGRAMME IMPROVEMENT						
Conduct quarterly physical, financial, procurement and safeguard monitoring	■	■	■	■	■	Quarterly reports submitted
Produce annual water, sanitation and waste-performance reports	■	■	■	■	■	Annual public performance report
Conduct the programme mid-term evaluation			■			★ Mid-term evaluation completed in 2029

Phase and activity	2027	2028	2029	2030	2031	Key milestone
Implement corrective actions and programme adjustments			■	■		Evaluation recommendations implemented
Conduct the final evaluation and prepare the next-phase strategy					■	★ Final evaluation completed in 2031

Key Decision Points

The following approvals will determine whether the dam and desalination components proceed to full implementation:

Decision point	Target date
Approval of dam feasibility-study results and preferred option	End of 2027
Approval of desalination feasibility-study results and preferred option	End of 2027
Completion of environmental and social approvals	2027–2028
Independent verification of detailed engineering and lifecycle costs	2028
Confirmation of financing and procurement arrangements	2028
Commencement of phased construction and installation	From 2028
Mid-term review of technical, financial and environmental performance	2029
Final evaluation and decision on further expansion	2031

5.4 Governance and Oversight

Programme Steering Committee

A Programme Steering Committee will provide strategic oversight and approve:

- annual plans and budgets;
- major scope changes;
- feasibility-study recommendations;
- dam and desalination investment decisions;
- risk responses;
- financing arrangements; and
- evaluation recommendations.

Programme Management Unit

The PMU will:

- prepare plans and budgets;
- manage procurement and contracts;
- coordinate technical studies;
- consolidate progress;
- maintain risks and KPIs;
- coordinate safeguards;
- maintain the asset register; and
- prepare quarterly and annual reports.

Ataúro Implementation and Coordination Team

The local team will:

- coordinate field implementation;
- facilitate consultation and land access;
- inspect works;
- verify beneficiaries;
- support maintenance arrangements;
- receive complaints; and
- report monthly to the PMU.

Technical Working Group

The multidisciplinary working group will review:

- technical studies;
- engineering designs;
- water-quality results;
- sanitation standards;
- waste and sludge systems;
- commissioning; and

- system performance.

Dam and Desalination Technical Subcommittee

A specialist subcommittee will:

- review feasibility-study terms of reference;
- review hydrological and geological assumptions;
- assess dam options and safety;
- assess desalination technology and energy;
- review intake and brine-disposal designs;
- verify lifecycle costs;
- review environmental safeguards;
- recommend approval gates; and
- confirm readiness for commissioning.

Reporting lines

Contractors, consultants and operators will submit monthly reports to the PMU. The Ataúro Implementation and Coordination Team will also submit monthly field reports.

The PMU will verify and consolidate these reports and submit quarterly physical, financial, procurement, risk and safeguard reports to the Steering Committee.

The Steering Committee will review performance and submit annual consolidated reports and recommendations to the responsible ministers, the Ministry of Finance and other competent bodies.

Annual results will also be communicated to the AAA General Council, suco authorities, communities and development partners.

6. Budget Request

This budget presents the estimated **additional funding required for PPG No. 20 – Water Security and Basic Sanitation from 2027 to 2031.**

The proposed five-year funding request is:

Total estimated budget request: USD 24,824,000

This comprises a programme subtotal of **USD 23,200,000** and a physical and price contingency of approximately **7%, equivalent to USD 1,624,000**.

The estimates are preliminary planning figures. The final costs for the rainwater-catchment dam, desalination project and other major infrastructure will be refined through feasibility studies, environmental and social assessments, detailed engineering designs and independently verified Bills of Quantities.

6.1 Multi-Year Cost Summary

Detailed Five-Year Budget Estimate

No.	Budget component	2027	2028	2029	2030	2031	Total
A. Programme preparation and management							
1	Baseline surveys, integrated planning and technical coordination	\$450,000	\$200,000	\$100,000	\$100,000	\$50,000	\$900,000
2	PMU personnel, administration and programme support	\$180,000	\$180,000	\$180,000	\$180,000	\$180,000	\$900,000
B. Existing water systems and source protection							
3	Maquer water-supply rehabilitation and expansion	\$700,000	—	—	—	—	\$700,000
4	Berau water-supply rehabilitation and expansion	\$500,000	\$1,000,000	—	—	—	\$1,500,000
5	Water-source, spring and catchment protection	\$150,000	\$250,000	\$300,000	\$300,000	\$200,000	\$1,200,000
6	Decentralised water supply, rainwater harvesting and storage	\$250,000	\$450,000	\$500,000	\$400,000	\$200,000	\$1,800,000
C. Rainwater-catchment dam and reservoir							
7	Dam feasibility, hydrological, geological, environmental and detailed-design studies	\$700,000	\$300,000	—	—	—	\$1,000,000
8	Dam or reservoir construction, treatment and distribution connections	—	\$800,000	\$1,200,000	\$800,000	\$200,000	\$3,000,000
D. Desalination project							
9	Desalination feasibility, marine, energy and detailed-design studies	\$550,000	\$250,000	—	—	—	\$800,000
10	Desalination plant, renewable or hybrid energy, intake, outfall, storage and network connection	—	\$1,500,000	\$2,400,000	\$1,200,000	\$400,000	\$5,500,000
E. Water quality, sanitation and waste services							

11	Water treatment, laboratory equipment and quality monitoring	\$75,000	\$150,000	\$125,000	\$100,000	\$50,000	\$500,000
12	Household sanitation and WASH in schools, health facilities and public locations	\$250,000	\$450,000	\$500,000	\$400,000	\$200,000	\$1,800,000
13	Septic inspection, desludging equipment and faecal-sludge management	\$50,000	\$200,000	\$400,000	\$300,000	\$150,000	\$1,100,000
14	Integrated solid-waste collection, sorting, composting and controlled disposal	\$200,000	\$550,000	\$650,000	\$400,000	\$200,000	\$2,000,000
F. Sustainability and oversight							
15	Operator training, initial operation and maintenance support and spare parts	\$25,000	\$50,000	\$60,000	\$60,000	\$55,000	\$250,000
16	Monitoring, evaluation, audit and environmental and social safeguards	\$50,000	\$50,000	\$60,000	\$40,000	\$50,000	\$250,000
	Programme subtotal	\$4,130,000	\$6,380,000	\$6,475,000	\$4,280,000	\$1,935,000	\$23,200,000
17	Physical and price contingency—approximately 7%	\$289,000	\$447,000	\$453,000	\$300,000	\$135,000	\$1,624,000
	TOTAL ADDITIONAL BUDGET REQUEST	\$4,419,000	\$6,827,000	\$6,928,000	\$4,580,000	\$2,070,000	\$24,824,000

Summary by Programme Category

Programme category	Estimated cost
A. Programme preparation and management	\$1,800,000
B. Existing water systems and source protection	\$5,200,000
C. Rainwater-catchment dam and reservoir	\$4,000,000
D. Desalination project	\$6,300,000
E. Water quality, sanitation and waste services	\$5,400,000
F. Sustainability and oversight	\$500,000
Programme subtotal	\$23,200,000
Physical and price contingency—approximately 7%	\$1,624,000
Total additional budget request	\$24,824,000

Annual Funding Profile

Year	Main expenditure focus	Estimated budget
2027	Baseline studies, programme planning, Maquer works, initial Berau works, and dam and desalination feasibility studies	\$4,419,000
2028	Berau completion, dam construction mobilisation, desalination procurement, sanitation improvements and waste equipment	\$6,827,000
2029	Peak dam construction, desalination installation, sanitation expansion, faecal-sludge services and waste facilities	\$6,928,000

2030	Completion and commissioning of major systems, distribution connections and island-wide service expansion	\$4,580,000
2031	Defect correction, system consolidation, operator support, performance assessment and final evaluation	\$2,070,000
Total		\$24,824,000

6.2 Costing Assumptions

Price basis

All amounts are expressed in United States dollars and represent preliminary policy-planning estimates for the 2027–2031 implementation period.

The estimates include:

- transport and mobilisation to Ataúro;
- imported materials and specialist equipment;
- technical studies and design;
- environmental and social safeguards;
- construction supervision;
- installation and commissioning;
- initial training and spare parts; and
- a physical and price contingency of approximately 7%.

The estimates should be refined following the 2027 feasibility studies and detailed engineering. Major capital estimates may vary depending on site conditions, technology selection, environmental requirements and final infrastructure capacity.

Maquer water-supply system

A total of **\$700,000** is allocated in 2027 for the rehabilitation and expansion of the Maquer system.

The allocation is expected to cover:

- source protection and improvement;
- rehabilitation or replacement of priority pipelines;
- pumping and solar-power improvements;
- storage and distribution facilities;

- water treatment and disinfection;
- technical supervision;
- testing and commissioning; and
- initial operation and maintenance support.

No additional allocation is proposed from 2028 onward under this budget component. Any subsequent maintenance will be financed through the relevant annual operational budgets.

Berau water-supply system

A total of **\$1,500,000** is allocated for the Berau system:

Year	Allocation
2027	\$500,000
2028	\$1,000,000
Total	\$1,500,000

The 2027 allocation will support condition assessment, priority pipeline repairs, technical design and initial procurement. The 2028 allocation will support the principal rehabilitation and expansion works, including pipeline replacement, source improvement, storage, treatment, distribution and commissioning.

Rainwater-catchment dam and reservoir

The revised dam and reservoir budget is **\$4,000,000 before programme contingency**, comprising:

Dam or reservoir cost item	Estimate
Feasibility, hydrology and site assessment	\$300,000
Geological and geotechnical investigations	\$150,000
Environmental and social assessment	\$150,000
Detailed engineering and tender documentation	\$250,000
Procurement support and independent technical verification	\$150,000
Subtotal	\$1,000,000
Civil works for dam, reservoir or alternative storage structure	\$1,800,000
Spillway, drainage, safety and sediment-control infrastructure	\$350,000
Water treatment, storage and distribution connections	\$550,000

Site access, installation, supervision, testing and commissioning	\$300,000
Subtotal	\$3,000,000
Total dam and reservoir component	\$4,000,000

The feasibility study may recommend:

- A small conventional dam;
- An off-stream reservoir;
- A lined storage basin;
- Several smaller reservoirs;
- A system of check dams;
- Managed aquifer recharge; or
- A combination of storage solutions.

The final investment must remain within the approved budget envelope unless the Government approves an adjusted scope and additional financing.

Desalination project

The desalination component remains estimated at **\$6,300,000 before programme contingency**, comprising \$800,000 for studies and design and \$5,500,000 for capital implementation.

The estimate assumes a modular seawater reverse-osmosis system that can be expanded according to demand and affordability.

Desalination cost item	Estimate
Feasibility, demand and technology study	\$250,000
Marine, seawater-intake and brine-dispersion study	\$180,000
Environmental and social assessment	\$120,000
Detailed design and procurement support	\$250,000
Subtotal	\$800,000
Modular desalination plant	\$2,100,000
Seawater intake, pretreatment and brine outfall	\$700,000
Renewable or hybrid-energy system and battery storage	\$1,400,000

Product-water storage and distribution connection	\$650,000
Initial membranes, chemicals, laboratory equipment and spare parts	\$300,000
Installation, testing, operator training and commissioning	\$350,000
Subtotal	\$5,500,000
Total desalination component	\$6,300,000

The final plant capacity, energy arrangement and implementation scale will be determined through the 2027 feasibility study.

Water treatment and quality monitoring

A total of **\$500,000** is allocated over five years for:

- Field water-testing equipment;
- Basic laboratory equipment;
- Treatment and disinfection systems;
- Water-safety planning;
- Microbiological and physicochemical testing;
- Operator training;
- Monitoring consumables; and
- Reporting and contamination-response procedures.

The annual allocations are:

Year	Allocation
2027	\$75,000
2028	\$150,000
2029	\$125,000
2030	\$100,000
2031	\$50,000
Total	\$500,000

Operator training and initial maintenance support

A total of **\$250,000** is allocated for:

- Operator and technician training;
- Maintenance manuals;
- Initial spare parts;
- Basic tools and safety equipment;
- System commissioning support;
- Fault-reporting arrangements; and
- Transition to regular institutional operation and maintenance.

This allocation does not replace the need for annual recurrent operation and maintenance budgets.

Monitoring, evaluation, audit and safeguards

A total of **\$250,000** is allocated for:

- Quarterly programme monitoring;
- Environmental and social safeguard monitoring;
- Financial and procurement audit;
- Water, sanitation and waste-performance reporting;
- The 2029 mid-term evaluation;
- The 2031 final evaluation; and
- Public reporting and disclosure.

Contingency

A physical and price contingency of approximately **7%**, equivalent to **\$1,624,000**, is included.

The contingency may be used only for approved programme requirements such as:

- Verified changes in construction quantities;
- Unforeseen site or geological conditions;
- Price escalation;

- Additional environmental mitigation;
- Equipment transport or installation requirements;
- Minor design adjustments; and
- Essential works required for safe commissioning.

Use of the contingency must be approved through the programme's established financial and governance procedures.

6.3 Proposed Sources of Financing

The total additional budget request of **\$24,824,000** is proposed to be financed through a combination of new State Budget appropriations, national capital financing and external assistance.

Proposed financing source	Indicative share	Estimated amount
New GPP and annual State Budget appropriations	55%	\$13,653,200
Infrastructure Fund or other national capital financing	30%	\$7,447,200
Development-partner grants, concessional assistance and climate finance	15%	\$3,723,600
Total	100%	\$24,824,000

The financing shares are indicative and may be adjusted during annual budget preparation and discussions with potential financing partners.

External support should be prioritised for:

- Hydrological and geotechnical studies;
- Dam feasibility and safety assessments;
- Desalination feasibility and marine studies;
- Renewable energy for desalination;
- Climate-resilient storage systems;
- Environmental and social safeguards;
- Technical assistance;
- Water-quality monitoring;
- Operator training; and

- Recycling and waste-treatment systems.

Major capital infrastructure should be financed primarily through public or concessional sources. Household tariffs or community contributions should not be used to finance major construction.

Any future service charge should:

- Be based on an affordability assessment;
- Reflect actual operation and maintenance requirements;
- Protect low-income and vulnerable households;
- Be transparent;
- Be approved by the competent authorities; and
- Include appropriate subsidies where necessary.

6.4 Recurrent Cost Requirement after Programme Completion

The five-year capital budget includes limited initial operation, maintenance, training and spare-parts support. Following full commissioning, a dedicated annual recurrent budget will be required to keep the systems operational.

The preliminary annual recurrent requirement from 2032 onward remains estimated at approximately **\$1,200,000**.

Recurrent expenditure	Estimated annual cost
Maquer, Berau, dam, reservoir and decentralised water-system operation and maintenance	\$300,000
Desalination electricity, chemicals, membranes and specialist maintenance	\$550,000
Solid-waste collection, septic services and faecal-sludge management	\$250,000
Water-quality monitoring, administration and performance reporting	\$100,000
Estimated annual recurrent requirement	\$1,200,000

The annual recurrent estimate should be updated after:

- completion of the feasibility studies;
- confirmation of dam and desalination capacity;
- selection of energy and treatment technologies;

- determination of staffing requirements;
- confirmation of waste-collection routes;
- commissioning of the systems; and
- at least one full year of operating data.

No major facility should be commissioned unless the responsible institution has an approved operation and maintenance plan, trained personnel and a confirmed recurrent budget.

7. Risk Assessment

PPG No. 20 involves a complex, multi-year programme combining rehabilitation of existing water systems, construction of new water-storage infrastructure, development of desalination, sanitation improvements, wastewater and faecal-sludge management, and island-wide solid-waste services. The programme therefore carries significant delivery, financial, policy, environmental and reputational risks.

The risk assessment uses the following ratings:

Rating	Meaning
Low	The risk is unlikely to materially affect programme objectives and can be managed through routine controls.
Medium	The risk could affect cost, schedule, service quality or public confidence and requires active management.
High	The risk could seriously affect programme delivery, affordability, safety or Government credibility and requires senior-level oversight.
Very High	The risk could make a major component unviable or cause serious financial, safety, environmental or reputational consequences.

The **inherent risk rating** reflects the level of risk before mitigation. The **residual risk rating** reflects the expected level after the proposed controls are implemented.

7.1 Delivery Risks

Risk 1: Incomplete baseline and technical information

Ataúro does not yet have a complete island-wide baseline covering household service access, water demand, water-source yields, sanitation coverage, septic systems, waste generation and infrastructure condition. Inadequate data could lead to incorrect priorities, unrealistic targets, unsuitable designs or inaccurate cost estimates.

Mitigation strategies

- Complete the household, infrastructure and service baseline in 2027.
- Prepare a consolidated asset register and geographic information system.
- Conduct seasonal monitoring of springs, wells and other water sources.
- Update population, household, tourism and institutional demand projections.
- Require technical verification of all baseline data before detailed design.
- Update programme targets and cost estimates after baseline approval.

Inherent risk: High

Residual risk: Medium

Risk 2: Delays in feasibility studies and detailed design

The rainwater-catchment dam and desalination components depend on specialised feasibility, hydrological, geological, marine, energy, environmental and social studies. Delays in consultant recruitment, surveys, approvals or design review could postpone implementation beyond 2028.

Mitigation strategies

- Prepare detailed Terms of Reference and procurement documents before the start of the 2027 budget year.
- Procure dam and desalination studies as separate specialist packages where appropriate.
- Establish clear deliverables, review periods and payment milestones.
- Assign the PMU and Technical Working Group responsibility for rapid technical review.
- Use independent specialists to verify critical assumptions and designs.
- Maintain a decision calendar for feasibility approval, environmental licensing and procurement.

Inherent risk: High

Residual risk: Medium

Risk 3: Insufficient yield from existing springs or proposed rainwater catchment

The Maquer and Berau systems, smaller springs and the proposed dam depend on adequate source yield. Seasonal variability, prolonged drought and limited runoff may reduce the amount of water available.

Mitigation strategies

- Conduct wet- and dry-season yield testing.
- Use conservative hydrological assumptions.
- Monitor rainfall, runoff, spring flow and groundwater levels.
- Diversify supply through Maquer, Berau, decentralised rainwater systems, strategic storage and desalination.
- Phase infrastructure capacity according to verified demand and yield.
- Prepare drought and emergency water-supply plans.
- Avoid dependence on a single source.

Inherent risk: Very High

Residual risk: Medium

Risk 4: Unsuitable dam site, geology or storage design

The proposed rainwater-catchment dam or reservoir may face unsuitable geology, leakage, unstable slopes, high evaporation, sedimentation, insufficient catchment area or downstream safety risks.

Mitigation strategies

- Complete geological and geotechnical investigations before site approval.
- Compare a conventional dam with off-stream reservoirs, lined storage basins, check dams, managed aquifer recharge and decentralised storage.
- Conduct independent dam-safety review.
- Incorporate spillways, drainage, erosion control and sediment-management measures.
- Prepare dam-safety, inspection and emergency-action plans.
- Do not proceed with construction where the preferred site does not demonstrate technical, environmental and economic viability.

Inherent risk: Very High

Residual risk: Medium

Risk 5: Desalination plant underperformance or technical failure

The desalination project may experience low production, high energy use, membrane failure, corrosion, inadequate pretreatment, equipment breakdown or difficulties obtaining chemicals and spare parts.

Mitigation strategies

- Select proven and appropriate desalination technology.
- Use modular implementation so capacity can be increased gradually.
- Require minimum production, water-quality and energy-efficiency guarantees.
- Procure equipment from suppliers with established maintenance and spare-parts support.
- Include redundancy for critical pumps, membranes and control systems.
- Establish preventive-maintenance and membrane-replacement schedules.
- Train local operators before commissioning.
- Use a performance-based operation and maintenance contract during the initial operating period.

Inherent risk: High

Residual risk: Medium

Risk 6: Procurement and contractor-capacity constraints

Ataúro's remote location, transport conditions and limited local market may reduce contractor interest, increase mobilisation costs and cause delays or poor-quality work.

Mitigation strategies

- Package contracts according to market capacity and technical complexity.
- Conduct early market assessment.
- Apply clear technical and financial qualification requirements.
- Use competitive procurement and transparent evaluation.
- Require realistic work programmes, performance guarantees and defect-liability periods.
- Appoint independent construction supervision.
- Link payments to verified physical progress and quality testing.
- Encourage qualified national contractors to partner with specialist firms where required.

Inherent risk: High

Residual risk: Medium

Risk 7: Transport and logistical delays

Construction materials, desalination equipment, vehicles, laboratory supplies and spare parts must be transported to Ataúro. Weather, maritime transport limitations and port-handling constraints may delay delivery.

Mitigation strategies

- Prepare project-specific logistics and transport plans.
- Schedule major deliveries outside periods of higher maritime risk where possible.
- Include realistic mobilisation and shipping periods in contracts.
- Consolidate equipment and material shipments.
- Maintain secure storage facilities on the island.
- Procure critical spare parts before commissioning.
- Require contractors to maintain contingency transport arrangements.

Inherent risk: High

Residual risk: Medium

Risk 8: Weak coordination between institutions

The programme involves several national ministries, technical agencies, AAA, FEDA, local authorities, communities, development partners and private contractors. Unclear responsibilities could cause duplication, delays or accountability gaps.

Mitigation strategies

- Establish the Programme Steering Committee, PMU, Technical Working Group and Ataúro Implementation and Coordination Team.
- Approve clear Terms of Reference and reporting lines.
- Assign responsibility for each component and asset.
- Hold regular coordination and technical-review meetings.
- Maintain a consolidated annual work plan and procurement plan.
- Use an issue and decision register.
- Escalate unresolved matters to the Steering Committee.

Inherent risk: High

Residual risk: Low–Medium

Risk 9: Land access and community disagreement

Land may be required for reservoirs, pipelines, treatment facilities, desalination infrastructure, waste facilities, access roads and brine outfalls. Disagreement over location, ownership, compensation or impacts could delay implementation.

Mitigation strategies

- Conduct early land and stakeholder mapping.
- Consult affected communities before selecting sites.
- Use transparent site-selection criteria.
- Confirm land ownership and access rights before procurement.
- Apply applicable land, compensation and grievance procedures.
- Avoid or minimise physical and economic displacement.
- Document agreements with landowners and communities.
- Maintain an accessible grievance-redress mechanism.

Inherent risk: High

Residual risk: Medium

Risk 10: Environmental and social impacts

Construction and operation may affect springs, catchments, coastal areas, marine habitats, groundwater, community access, livelihoods and public safety. Desalination intake and brine discharge could affect marine ecosystems, while waste and sludge facilities may create pollution or community concerns.

Mitigation strategies

- Complete environmental and social screening and licensing.
- Conduct impact assessments for major infrastructure.
- Apply environmental and social management plans.
- Undertake brine-dispersion, marine-ecology and intake studies.
- Monitor groundwater, coastal water and marine conditions.
- Require contractor health, safety and pollution-control plans.
- Avoid environmentally sensitive sites where possible.
- Conduct regular independent safeguard monitoring.
- Implement corrective action where non-compliance is identified.

Inherent risk: Very High

Residual risk: Medium

Risk 11: Infrastructure becomes non-functional after construction

Water, sanitation and waste infrastructure may fail if ownership is unclear or maintenance budgets, trained operators, spare parts and operating procedures are not available.

Mitigation strategies

- Identify the responsible owner and operator before construction.
- Prepare operation and maintenance plans during design.
- Establish annual recurrent budgets.
- Train operators, technicians and local maintenance personnel.
- Procure initial tools and spare parts.
- Maintain an asset register and maintenance schedule.
- Include post-construction support and defect correction in contracts.
- Do not commission major facilities without confirmed operating arrangements.

Inherent risk: Very High

Residual risk: Medium

7.2 Financial Risks

Risk 12: Capital-cost escalation and budget overrun

Remote-island transport, imported equipment, uncertain site conditions, inflation and design changes may increase construction costs beyond the approved budget.

Mitigation strategies

- Complete feasibility studies and detailed designs before major works.
- Prepare independently verified cost estimates and Bills of Quantities.
- Use phased procurement and clearly defined contract packages.
- Include a physical and price contingency of approximately 7%.
- Require approval for scope changes and contingency use.
- Monitor commitments, expenditure and cost forecasts monthly.
- Apply value engineering without reducing safety, quality or service coverage.
- Defer or rescope lower-priority activities if costs exceed the approved ceiling.

Inherent risk: High

Residual risk: Medium

Risk 13: Insufficient multi-year financing

The programme requires approximately **USD 24.824 million** in additional financing over five years. Delays or reductions in annual appropriations could result in incomplete infrastructure, contract claims or facilities that cannot be commissioned.

Mitigation strategies

- Secure formal multi-year Government commitment.
- Align annual budgets with approved procurement and construction schedules.
- Separate essential core investments from scalable components.
- Seek Infrastructure Fund and development-partner support.
- Avoid awarding contracts without confirmed financing.
- Prepare annual cash-flow forecasts.
- Phase dam and desalination investments according to available funds.
- Prioritise completion of functioning systems over starting multiple incomplete projects.

Inherent risk: High

Residual risk: Medium

Risk 14: High desalination operating costs

Electricity, membrane replacement, chemicals and specialist maintenance may make desalinated water expensive and financially unsustainable.

Mitigation strategies

- Assess lifecycle cost rather than capital cost alone.
- Integrate solar or hybrid renewable energy.
- Select energy-efficient technology.
- Match plant capacity to verified demand.
- Operate the plant strategically during periods of drought or peak demand where appropriate.
- Negotiate long-term supply and maintenance agreements.
- monitor energy use and cost per cubic metre.

- Provide targeted public subsidy where necessary to protect affordability.
- Review tariffs periodically without excluding vulnerable households.

Inherent risk: Very High

Residual risk: Medium–High

Risk 15: Inadequate recurrent operation and maintenance funding

Capital infrastructure may be constructed without sufficient annual funding for staff, electricity, chemicals, repairs, waste collection, desludging and monitoring.

Mitigation strategies

- Prepare recurrent-cost projections before investment approval.
- Require approved operation and maintenance budgets before commissioning.
- Integrate recurrent requirements into annual State Budget planning.
- Establish transparent tariff or contribution arrangements where appropriate.
- Protect low-income households through targeted subsidies.
- Use performance-based contracts for specialised services.
- Monitor recurrent spending and asset condition annually.
- Review the estimated annual recurrent requirement after one full year of operation.

Inherent risk: Very High

Residual risk: Medium

Risk 16: Financial mismanagement or weak contract control

Weak expenditure verification, procurement controls or contract administration could lead to overpayment, ineligible expenditure, delays or loss of public funds.

Mitigation strategies

- Apply approved public financial-management and procurement procedures.
- Separate procurement, contract management, certification and payment functions.
- Require independent verification of progress.
- Maintain complete contract and payment records.
- Conduct internal and external audits.
- Use financial-management information systems.

- Report financial execution quarterly.
- Investigate and correct irregularities promptly.

Inherent risk: High

Residual risk: Low–Medium

7.3 Policy and Reputational Risks

Risk 17: Major infrastructure fails to deliver promised results

Failure of the dam, desalination plant or rehabilitated water systems to provide reliable water could reduce public trust and damage Government credibility.

Mitigation strategies

- Communicate that dam and desalination investments are conditional on feasibility.
- Avoid announcing final capacity or completion dates before studies are completed.
- Use independent technical review and staged approval.
- Establish realistic targets and implementation schedules.
- Publish verified progress and performance information.
- Address system failures transparently and promptly.
- Commission facilities only after successful testing.

Inherent risk: Very High

Residual risk: Medium

Risk 18: Public expectations exceed available resources

Communities may expect immediate universal coverage, free water, household connections or rapid completion of major works. Delays or prioritisation decisions could create dissatisfaction.

Mitigation strategies

- Implement a clear public communication and consultation plan.
- Explain programme phases, eligibility criteria and budget constraints.
- Publish annual work plans and geographic priorities.
- Use transparent beneficiary-selection criteria.
- Provide regular progress updates in accessible language.

- Establish complaint and feedback channels.
- Demonstrate early results through priority repairs and household interventions.

Inherent risk: High

Residual risk: Medium

Risk 19: Perceived inequality between communities

Communities receiving infrastructure later than others may consider the programme unfair, particularly where priority is given to population centres or technically accessible areas.

Mitigation strategies

- Apply transparent prioritisation criteria based on need, vulnerability, health risk, population, feasibility and service gaps.
- Include all five sucos in the investment plan.
- Provide interim decentralised solutions where major networks are delayed.
- Publish service-coverage data.
- Ensure representation of remote communities, women and vulnerable groups in consultations.
- Review equity outcomes annually.

Inherent risk: High

Residual risk: Low–Medium

Risk 20: Tariff or user-contribution opposition

Introducing service charges to support operation and maintenance may be politically sensitive and could create concern that low-income households will lose access.

Mitigation strategies

- Conduct affordability and willingness-to-pay assessments.
- Consult communities before approving tariffs.
- Introduce transparent and gradual charging arrangements.
- Protect basic household consumption.
- Provide targeted subsidies or exemptions for vulnerable households.
- Publish how revenue is used for maintenance and service improvement.
- Maintain Government responsibility for major capital costs.

Inherent risk: High

Residual risk: Medium

Risk 21: Environmental controversy over dam, desalination or waste facilities

Communities, civil society or development partners may oppose projects because of concerns about land, marine ecosystems, brine, dam safety, waste disposal or inadequate consultation.

Mitigation strategies

- Undertake meaningful consultation from the feasibility stage.
- Disclose environmental and social assessments.
- Consider alternative sites and technologies.
- Demonstrate compliance with environmental licensing requirements.
- Establish independent monitoring.
- Publish environmental performance results.
- Maintain grievance and appeal mechanisms.
- Reject or redesign options that create unacceptable impacts.

Inherent risk: Very High

Residual risk: Medium

Risk 22: Change in Government priorities or institutional responsibilities

Changes in leadership, institutional mandates or budget priorities may affect programme continuity.

Mitigation strategies

- Anchor the programme in approved national and Ataúro development priorities.
- Secure formal Government approval and multi-year financing.
- Document institutional roles through decisions and agreements.
- Maintain strong technical and financial records.
- Report progress regularly to the Ministry of Finance and responsible ministries.
- Design the programme so that components can continue in phases.
- Build local institutional ownership through AAA, FEDA and suco participation.

Inherent risk: Medium–High

Residual risk: Medium

7.4 Consolidated Risk Register

No.	Risk	Category	Inherent rating	Key mitigation	Residual rating
1	Incomplete baseline and technical information	Delivery	High	Baseline, asset mapping and technical verification	Medium
2	Feasibility and design delays	Delivery	High	Early procurement, clear deliverables and rapid review	Medium
3	Insufficient water-source or catchment yield	Delivery	Very High	Seasonal testing and diversified sources	Medium
4	Unsuitable dam site or design	Delivery	Very High	Geotechnical studies and alternatives analysis	Medium
5	Desalination underperformance	Delivery	High	Proven technology and performance guarantees	Medium
6	Procurement and contractor constraints	Delivery	High	Market assessment and qualified contractors	Medium
7	Transport and logistical delays	Delivery	High	Logistics planning and critical spare-parts stock	Medium
8	Weak institutional coordination	Delivery	High	Steering Committee, PMU and clear responsibilities	Low–Medium
9	Land and community disputes	Delivery	High	Early consultation and documented agreements	Medium
10	Environmental and social impacts	Delivery/policy	Very High	Licensing, safeguards and independent monitoring	Medium
11	Infrastructure not sustainably operated	Delivery/financial	Very High	Operators, maintenance plans and recurrent budgets	Medium
12	Capital-cost escalation	Financial	High	Verified BoQs, 7% contingency and cost control	Medium
13	Insufficient multi-year financing	Financial	High	Confirmed financing and phased implementation	Medium
14	High desalination operating cost	Financial	Very High	Renewable energy and lifecycle-cost controls	Medium–High
15	Insufficient recurrent funding	Financial	Very High	Approved recurrent budgets before commissioning	Medium
16	Financial or contract-management weakness	Financial	High	Audit, separation of duties and independent verification	Low–Medium

17	Major projects fail to deliver results	Reputational	Very High	Staged approval, testing and transparent reporting	Medium
18	Public expectations exceed delivery capacity	Reputational	High	Communication and transparent prioritisation	Medium
19	Perceived inequality between communities	Policy/reputational	High	Equity criteria and island-wide coverage planning	Low–Medium
20	Opposition to tariffs or contributions	Policy/reputational	High	Affordability protections and consultation	Medium
21	Environmental controversy	Policy/reputational	Very High	Disclosure, consultation and alternatives assessment	Medium
22	Changes in priorities or responsibilities	Policy	Medium–High	Formal approval and institutional ownership	Medium

7.5 Overall Residual Risk Assessment

The overall inherent risk of PPG No. 20 is assessed as **High**, primarily because the programme includes technically complex dam and desalination investments, substantial capital expenditure, remote-island logistics, environmental sensitivities and long-term operation and maintenance obligations.

Following implementation of the proposed mitigation measures, the overall residual risk is expected to be **Medium**.

The desalination project's recurrent financial risk is expected to remain **Medium–High** until actual energy consumption, water-production costs, operating capacity and affordability have been confirmed through feasibility studies and operational experience.

The Programme Steering Committee should review the consolidated risk register at least quarterly. Risks rated **High or Very High** should be escalated immediately, assigned to a responsible institution and accompanied by a documented corrective-action plan.

8. Monitoring, Evaluation and Reporting

The Monitoring, Evaluation and Reporting framework will track implementation progress, expenditure, service delivery, infrastructure functionality and achievement of programme objectives. It will cover all five sucos and 19 aldeias and will use the 2027 baseline as the principal reference point.

8.1 Monitoring Framework

Monitoring will focus on:

- physical and financial progress;
- procurement and contract performance;
- household access to safe water and sanitation;
- functionality of the Maquer and Berau systems;
- progress and performance of the rainwater-catchment dam;
- desalination production, energy use and operating cost;
- drinking-water quality;
- sanitation and open-defecation-free status;
- septic, faecal-sludge and solid-waste services;
- environmental and social safeguards;
- operation and maintenance; and
- beneficiary satisfaction and complaints.

Data Sources

Main data sources will include:

- the 2027 household and infrastructure baseline;
- contractor and supervision reports;
- PMU financial and procurement records;
- water-source and water-quality monitoring;
- Maquer, Berau, dam and desalination operating records;
- sanitation and open-defecation-free verification;
- school and health-facility inspections;
- waste collection and septic-service records;
- environmental and social monitoring;

- grievance registers; and
- beneficiary satisfaction surveys.

Reporting Frequency

Reporting product	Frequency
Contractor, consultant and field reports	Monthly
Water-system and desalination operating reports	Monthly
Financial, procurement and safeguard monitoring	Monthly, consolidated quarterly
PMU programme progress report	Quarterly
Steering Committee review	Quarterly
Water-quality monitoring	Monthly or according to risk
Asset-functionality assessment	Annually
Annual programme performance report	Annually
Public results summary	Annually
Mid-term evaluation	2029
Final evaluation	2031

Serious incidents involving water contamination, dam safety, environmental damage, major cost overruns or public safety must be reported immediately.

Responsible Units

The **Programme Management Unit (PMU)** will manage the overall results framework, consolidate data and prepare quarterly and annual reports.

Technical monitoring will be undertaken by:

- supervising engineers and contractors for construction;
- responsible water operators for Maquer and Berau;
- the Dam and Desalination Technical Subcommittee for major infrastructure;
- relevant water and health authorities for water quality;
- AAA and responsible service units for sanitation, septic and waste services;
- the PMU safeguards function for environmental and social compliance; and

- the Ataúro Implementation and Coordination Team for community issues and field verification.

The Programme Steering Committee will review progress, risks and corrective actions.

8.2 Evaluation Plan

Two independent evaluations will be conducted.

Mid-Term Evaluation

The mid-term evaluation will take place in **2029** and will assess:

- progress against objectives and KPIs;
- implementation delays and cost performance;
- effectiveness of programme governance;
- progress of the dam and desalination projects;
- environmental and social compliance;
- equity between communities;
- operation and maintenance readiness; and
- required changes to scope, budget, targets or sequencing.

The evaluation will inform corrective actions for the remaining programme period.

Final Evaluation

The final evaluation will be completed in **2031** and will assess:

- achievement of programme objectives;
- changes in water and sanitation access;
- service reliability and water quality;
- functionality of completed infrastructure;
- health, education, economic and environmental benefits;
- affordability and financial sustainability;
- institutional capacity;
- community satisfaction;
- value for money; and

- priorities for the next programme phase.

Evaluation Methodology

The evaluations will use a mixed-method approach, including:

- comparison of 2027 baseline data with results in 2029 and 2031;
- household and beneficiary surveys;
- technical inspections and asset-functionality assessments;
- review of financial, procurement and operational records;
- stakeholder interviews and community consultations;
- cost-effectiveness analysis;
- lifecycle-cost analysis;
- environmental and social assessment;
- equity and gender analysis; and
- impact analysis where sufficient baseline and comparison data are available.

Cost-effectiveness measures may include:

- cost per household receiving reliable water;
- cost per person served;
- cost per cubic metre of water stored or produced;
- cost per household receiving improved sanitation;
- cost per aldeia verified as open-defecation free; and
- cost per household receiving regular waste collection.

The evaluations will be conducted by independent specialists. Findings will be submitted to the Programme Steering Committee and responsible government authorities. A management response will identify accepted recommendations, responsible institutions, deadlines and required corrective actions.

9. Legal and Other Considerations

Implementation of PPG No. 20 must comply with the Constitution, environmental legislation, public procurement requirements, land and property laws, public-finance rules and the legal mandates of the institutions responsible for development in Ataúro.

A detailed legal review should be completed during programme preparation in 2027 and updated before procurement, construction and commissioning of each major component.

9.1 Compliance with Existing Legislation

Constitutional and environmental obligations

Article 61 of the Constitution recognises the right of all citizens to a humane, healthy and ecologically balanced environment. It also requires the State to preserve and use natural resources rationally and to promote environmental protection and sustainable economic development.

The Environmental Basic Law, approved by Decree-Law No. 26/2012, establishes the general framework for environmental protection, conservation and sustainable use of natural resources. The programme must apply principles including prevention, precaution, pollution control, public participation and environmental responsibility.

Environmental licensing

Projects capable of causing environmental impacts are subject to the environmental licensing system established by Decree-Law No. 5/2011, as amended by Decree-Law No. 39/2022. The National Environmental Licensing Authority, ANLA, I.P., is responsible for project classification, environmental assessment, licensing and compliance monitoring.

The following components are likely to require early consultation with ANLA and appropriate environmental assessment:

- the rainwater-catchment dam or reservoir;
- the desalination plant;
- seawater-intake and brine-discharge infrastructure;
- major pipelines and reservoirs;
- faecal-sludge treatment;
- wastewater facilities;
- controlled waste-disposal facilities; and

- works affecting coastal, marine or sensitive catchment areas.

Construction must not begin before the required environmental licence and environmental and social management plans have been approved.

Public procurement and contracts

All consulting services, civil works, equipment and operational contracts must follow the **Code of Procurement and Public Contracts**, approved by Decree-Law No. 1/2025 and amended by Decree-Law No. 25/2025. The implementing regulation approved by Government Decree No. 1/2026 applies to public contracts for goods, services and works and has been in force since 1 January 2026.

Procurement arrangements should ensure:

- Open and competitive procedures where required;
- Clear technical specifications;
- Transparent evaluation;
- Verified budgets and bills of quantities;
- Conflict-of-interest controls;
- Appropriate performance guarantees;
- Independent supervision;
- Documented contract variations;
- Certification before payment; and
- Proper record-keeping and audit.

Land access, property and compensation

Land required for dams, reservoirs, pipelines, desalination facilities, treatment plants, access roads and waste facilities must be identified and legally secured before construction.

The Special Regime for Determining Ownership of Immovable Property under Law No. 13/2017 governs the clarification of land and property ownership. Where voluntary agreement cannot be reached and land is required for a demonstrated public purpose, Law No. 8/2017 establishes the applicable public-utility expropriation procedures.

The programme should prioritise negotiated access and minimise displacement. Where land, structures, crops or livelihoods are affected, the Government must provide consultation, documented agreements and fair compensation in accordance with the applicable law.

Institutional mandates

The AAA was established by Decree-Law No. 82/2023 as a public legal entity with administrative and financial autonomy. Its organisation and functioning are further regulated by Ministerial Diploma No. 42/2024.

FEDA is regulated by Decree-Law No. 83/2023 and has a mandate to support development and infrastructure investment in Ataúro.

Before implementation, written agreements should clearly define the responsibilities of:

- The lead ministry;
- AAA;
- FEDA;
- The responsible water-service institution;
- Environmental and public-health authorities;
- Infrastructure agencies;
- Operators and contractors; and
- Suco and community representatives.

These agreements should cover asset ownership, procurement, contract management, operation, maintenance, tariffs, monitoring and reporting.

9.2 Need for New or Additional Legal Instruments

The existing legal framework provides a basis for feasibility studies, environmental assessment, procurement, land access and public infrastructure development. Therefore, no new primary legislation is necessarily required before the programme can begin.

However, a **legal and regulatory gap assessment should be completed in 2027**. The assessment should determine whether new regulations, ministerial diplomas, technical standards or inter-institutional agreements are required in the following areas:

Area	Possible legal or regulatory requirement
Dam and reservoir safety	Standards for design review, classification, inspection, monitoring, emergency planning and responsible ownership
Desalination	Rules for seawater intake, water-production standards, marine monitoring and brine discharge
Drinking-water services	Water-quality standards, service levels, testing, reporting and contamination response

Tariffs and affordability	Transparent tariff methodology, minimum basic access and protection for vulnerable households
Septic and faecal-sludge management	Standards for septic design, registration, inspection, desludging, transport, treatment and disposal
Solid-waste management	Service responsibilities, collection requirements, disposal controls and hazardous-waste procedures
Operator licensing and performance	Minimum technical competence, maintenance requirements and reporting obligations
Asset ownership	Formal allocation of ownership and operating responsibility between national institutions, AAA, FEDA and service operators
Community participation	Requirements for consultation, grievance handling and disclosure of programme information

Any new instrument should be prepared early enough to be approved before the relevant infrastructure is commissioned.

9.3 Citizens' Expectations

Citizens will reasonably expect the programme to provide visible, fair and sustainable improvements rather than infrastructure that functions only temporarily.

The programme should respond to the following expectations:

- reliable and safe water throughout the year;
- affordable access for low-income and vulnerable households;
- equitable investment across all five sucos and 19 aldeias;
- priority attention to communities facing severe water shortages;
- functioning toilets in schools, health facilities and public places;
- cleaner communities and reduced waste dumping and burning;
- transparent selection of project locations and beneficiaries;
- meaningful consultation before land or community resources are affected;
- fair treatment and compensation where assets or livelihoods are affected;
- timely information about progress, delays and changes;
- accessible complaint and grievance mechanisms; and
- clear responsibility for maintenance after construction.

Government communication must explain that construction of the dam and desalination plant is conditional on the results of the 2027 feasibility studies. The studies may recommend full implementation, phased construction, a smaller pilot, an alternative technology or rejection of an option that is technically, environmentally or financially unsuitable.

The programme should avoid announcing final locations, capacities or completion dates before the necessary studies and approvals are completed.

9.4 Other Relevant Considerations

Environmental and marine protection

Ataúro's water resources, coastal areas and marine ecosystems are environmentally sensitive. Dam construction must avoid unacceptable impacts on catchments, downstream users, biodiversity and community access. Desalination must include appropriate seawater-intake design, brine-dispersion assessment and ongoing marine monitoring.

Climate resilience

All infrastructure should be designed for changing rainfall patterns, drought, intense storms, coastal hazards, erosion and increased future demand. The programme should avoid overestimating freshwater yield and should maintain a diversified combination of springs, rainwater harvesting, strategic storage and desalination.

Affordability and social protection

Charges for water, desludging or waste collection should reflect the need for sustainable operation without excluding poor or vulnerable households. Any tariff arrangement should be based on an affordability study and may require a basic-service subsidy, exemptions or targeted assistance.

Gender, disability and social inclusion

Women, children, older persons and persons with disabilities should be involved in consultation and facility design. Water points, toilets and public WASH facilities should be safe, accessible, appropriately located and responsive to privacy and menstrual-hygiene needs.

Cultural heritage

Site selection and construction should avoid damage to sacred places, burial grounds, archaeological sites and other areas of cultural or customary importance. Relevant authorities and communities should be consulted where potential impacts are identified.

Operation and maintenance

Legal and administrative approval of capital investment must be accompanied by:

- Identified asset ownership;
- An appointed operator;
- An approved maintenance plan;
- Trained personnel;
- Spare-parts arrangements;
- An annual recurrent budget;
- Service-performance standards; and
- Emergency-response procedures.

No major facility should be commissioned without these arrangements.

Transparency and accountability

The PMU should publish annual information on:

- Programme expenditure;
- Procurement and contract status;
- Physical progress;
- Service coverage;
- Water quality;
- Dam and desalination performance;
- Environmental compliance;
- Complaints and resolutions; and
- Corrective actions.

This will support public confidence, institutional accountability and informed participation throughout programme implementation.

- Citizens' expectations
- Other relevant considerations

10. Annexes

Annex 1: Detailed costing table

No.	Budget component	2027	2028	2029	2030	2031	Total
A. Programme preparation and management							
1	Baseline surveys, integrated planning and technical coordination	\$450,000	\$200,000	\$100,000	\$100,000	\$50,000	\$900,000
2	PMU personnel, administration and programme support	\$180,000	\$180,000	\$180,000	\$180,000	\$180,000	\$900,000
B. Existing water systems and source protection							
3	Maquer water-supply rehabilitation and expansion	\$700,000	—	—	—	—	\$700,000
4	Berau water-supply rehabilitation and expansion	\$500,000	\$1,000,000	—	—	—	\$1,500,000
5	Water-source, spring and catchment protection	\$150,000	\$250,000	\$300,000	\$300,000	\$200,000	\$1,200,000
6	Decentralised water supply, rainwater harvesting and storage	\$250,000	\$450,000	\$500,000	\$400,000	\$200,000	\$1,800,000
C. Rainwater-catchment dam and reservoir							
7	Dam feasibility, hydrological, geological, environmental and detailed-design studies	\$700,000	\$300,000	—	—	—	\$1,000,000
8	Dam or reservoir construction, treatment and distribution connections	—	\$800,000	\$1,200,000	\$800,000	\$200,000	\$3,000,000
D. Desalination project							
9	Desalination feasibility, marine, energy and detailed-design studies	\$550,000	\$250,000	—	—	—	\$800,000
10	Desalination plant, renewable or hybrid energy, intake, outfall, storage and network connection	—	\$1,500,000	\$2,400,000	\$1,200,000	\$400,000	\$5,500,000
E. Water quality, sanitation and waste services							
11	Water treatment, laboratory equipment and quality monitoring	\$75,000	\$150,000	\$125,000	\$100,000	\$50,000	\$500,000
12	Household sanitation and WASH in schools, health facilities and public locations	\$250,000	\$450,000	\$500,000	\$400,000	\$200,000	\$1,800,000
13	Septic inspection, desludging equipment and faecal-sludge management	\$50,000	\$200,000	\$400,000	\$300,000	\$150,000	\$1,100,000
14	Integrated solid-waste collection, sorting, composting and controlled disposal	\$200,000	\$550,000	\$650,000	\$400,000	\$200,000	\$2,000,000
F. Sustainability and oversight							
15	Operator training, initial operation and maintenance support and spare parts	\$25,000	\$50,000	\$60,000	\$60,000	\$55,000	\$250,000
16	Monitoring, evaluation, audit and environmental and social safeguards	\$50,000	\$50,000	\$60,000	\$40,000	\$50,000	\$250,000
Programme subtotal		\$4,130,000	\$6,380,000	\$6,475,000	\$4,280,000	\$1,935,000	\$23,200,000
17	Physical and price contingency—approximately 7%	\$289,000	\$447,000	\$453,000	\$300,000	\$135,000	\$1,624,000
Total additional budget request		\$4,419,000	\$6,827,000	\$6,928,000	\$4,580,000	\$2,070,000	\$24,824,000

Annex 2: Logic Model and Theory of Change

1. Purpose

This annex explains how the activities and investments under PPG No. 20 are expected to address Ataúro's water-security, sanitation and waste-management challenges and lead to measurable improvements in public health, social welfare, economic development, environmental protection and climate resilience.

The logic model establishes the relationship between:

- the policy problem;
- programme inputs;
- activities;
- immediate outputs;
- short- and medium-term outcomes;
- long-term impacts;
- key assumptions; and
- external factors that may affect results.

It will also provide the basis for programme monitoring, the 2029 mid-term evaluation and the 2031 final evaluation.

2. Policy Problem

Ataúro does not currently have a sufficiently reliable, diversified and sustainable system for supplying safe water and managing sanitation, wastewater and solid waste.

The main problems include:

- limited and seasonal freshwater sources;
- no permanent rivers;
- saltwater intrusion in some coastal wells;
- damaged or inadequate Maquer and Berau water infrastructure;
- insufficient household and community rainwater storage;
- limited treatment and water-quality monitoring;
- lack of strategic wet-season water storage;
- absence of a reliable rainfall-independent water source;
- inadequate household and public sanitation;
- unsafe septic and faecal-sludge management;
- limited solid-waste collection and disposal;
- insufficient operation and maintenance capacity; and
- increasing demand from population growth, public services, agriculture, businesses and tourism.

These problems contribute to water shortages, health risks, high household water costs, reduced economic activity, lost school and working time, environmental pollution and a disproportionate burden on women, children and remote communities.

3. Theory of Change Statement

If the Government:

- rehabilitates and expands the Maquer and Berau water-supply systems;

- protects existing springs, wells and catchment areas;
- increases household, community and institutional rainwater harvesting and storage;
- undertakes feasibility studies and develops a technically viable rainwater-catchment dam or reservoir;
- undertakes feasibility studies and develops an environmentally and financially sustainable desalination system;
- improves water treatment and quality monitoring;
- expands household and public sanitation;
- establishes safe septic, wastewater and faecal-sludge services;
- introduces integrated solid-waste collection, treatment and disposal;
- strengthens institutional coordination, operator capacity and maintenance financing; and
- actively involves communities in planning, monitoring and service management,

then households, schools, health facilities, businesses and communities across Ataúro will obtain more reliable, safe, affordable and climate-resilient water, sanitation and waste-management services.

This will occur because the programme will:

- diversify Ataúro's water sources;
- increase water storage and dry-season availability;
- reduce leakage and infrastructure failure;
- improve drinking-water safety;
- reduce open defecation and environmental contamination;
- improve collection and treatment of solid waste and faecal sludge;
- strengthen accountability for infrastructure operation; and
- ensure that major assets have trained operators, maintenance plans and recurrent budgets.

The long-term result will be improved health and dignity, reduced water-collection burdens, stronger education and economic productivity, improved tourism and business conditions, reduced drought vulnerability and better protection of Ataúro's freshwater, coastal and marine ecosystems.

4. Results Chain

The programme's causal pathway can be summarised as follows:

Policy problem	Programme response	Immediate result	Medium-term change	Long-term impact
Seasonal and inadequate freshwater supply	Protect sources, rehabilitate Maquer and Berau, expand rainwater harvesting	Increased functioning water infrastructure	More reliable year-round water access	Reduced water insecurity and drought vulnerability
Insufficient water storage	Develop household tanks, community reservoirs and rainwater-catchment dam	Increased storage capacity	Improved dry-season availability	Greater climate resilience
Dependence on rainfall	Develop desalination as a supplementary source	Additional rainfall-independent production capacity	Improved supply during drought and peak demand	Diversified and resilient water security
Poor water quality	Introduce treatment, testing and water-safety planning	Routine water-quality monitoring and treatment	Reduced exposure to unsafe water	Improved public health

Inadequate sanitation	Construct and upgrade household and public toilets	More functional sanitation facilities	Increased use of improved sanitation and reduced open defecation	Reduced sanitation-related disease and improved dignity
Unsafe septic and sludge disposal	Establish inspection, desludging, transport and treatment	Functional faecal-sludge service	Reduced groundwater and soil contamination	Improved environmental and public-health protection
Limited solid-waste services	Expand collection, recycling, composting and controlled disposal	Waste services operating across the island	Reduced dumping and open burning	Cleaner communities and protected marine ecosystems
Weak operation and maintenance	Assign operators, train staff and fund maintenance	Maintenance systems and budgets established	Higher infrastructure functionality	Sustainable public services
Unequal access	Prioritise remote and vulnerable communities	More equitable distribution of investments	Reduced service disparities	Inclusive development across all five sucos

5. Detailed Logic Model

Results level	Description	Main indicators	Means of verification
Inputs	Government financing of USD 24.824 million; technical personnel; PMU; land and infrastructure access; consultants; contractors; equipment; environmental approvals; community participation; development-partner support	Funding approved; PMU established; personnel recruited; procurement plans approved	State Budget documents, PMU records, contracts, institutional decisions
Activities	Conduct baseline surveys; rehabilitate Maquer and Berau; protect sources; install rainwater systems; undertake dam and desalination studies; construct approved infrastructure; improve treatment; expand sanitation; establish sludge and waste services; train operators; monitor performance	Percentage of planned activities initiated and completed	Annual work plans, procurement records, contractor reports, supervision reports
Outputs	Water systems rehabilitated; storage installed; dam and desalination studies completed; approved infrastructure constructed; treatment systems operating; toilets improved; waste and sludge services established; operators trained	Number of systems completed; storage capacity; treatment facilities; households and institutions served; operators trained	Completion certificates, asset register, technical inspections, training records
Short-term outcomes	Increased water production, storage and network functionality; improved water quality; increased sanitation and waste-service coverage; stronger institutional coordination	Water produced; storage capacity; system functionality; water-quality compliance; service coverage	Operator records, water tests, PMU reports, household surveys
Medium-term outcomes	Reliable water access for at least 90% of households; improved sanitation for at least 90%; all 19 aldeias open-defecation free; 80% waste-service coverage; reduced water-collection time	Coverage percentages; ODF verification; collection time; waste-service coverage; user satisfaction	Household surveys, ODF assessments, service records, evaluation reports
Long-term impacts	Improved public health, gender equality, school attendance, productivity, tourism readiness, environmental quality and climate resilience	Reduced waterborne illness; reduced household time and expenditure; improved environmental indicators; infrastructure sustainability	Health records, household surveys, environmental monitoring, final evaluation

6. Inputs

The programme requires the following key inputs:

Financial inputs

- five-year programme budget of USD 24.824 million;
- annual State Budget appropriations;
- national capital financing;
- possible development-partner and climate-finance support;
- dedicated recurrent funding for operation and maintenance; and
- approved contingency for verified cost and physical risks.

Institutional inputs

- Programme Steering Committee;
- Programme Management Unit;
- Ataúro Implementation and Coordination Team;
- Technical Working Group;
- Dam and Desalination Technical Subcommittee;
- responsible national ministries and agencies;
- AAA and FEDA;
- suco and aldeia authorities; and
- public water, health, education, environmental and infrastructure institutions.

Technical inputs

- water-resource, hydrological and geological expertise;
- dam and reservoir engineering;
- desalination and marine expertise;
- water-supply, sanitation and waste-management engineers;
- environmental and social specialists;
- procurement and contract-management expertise;
- laboratories and water-testing equipment;
- construction materials and equipment; and
- monitoring and information-management systems.

Social and community inputs

- household and community participation;
- participation by women, vulnerable households and persons with disabilities;
- landowner consultation;
- community knowledge of water sources and seasonal conditions;
- local labour and operators; and
- grievance and feedback mechanisms.

7. Key Activities

The programme will implement the following main groups of activities:

a. Governance and planning

- establish programme-management structures;
- complete baseline surveys;
- map assets and service gaps;
- prepare annual work, procurement and financing plans.

b. Existing water systems

- rehabilitate Maquer;
 - rehabilitate and expand Berau;
 - replace damaged pipelines;
 - improve pumping, reservoirs, treatment and distribution.
- c. **Water-resource protection**
- map and monitor springs and wells;
 - protect catchments and recharge areas;
 - control contamination;
 - prepare drought and emergency plans.
- d. **Rainwater harvesting and storage**
- install household and institutional tanks;
 - construct community storage;
 - increase emergency dry-season reserves.
- e. **Rainwater-catchment dam or reservoir**
- complete feasibility, hydrological, geological and environmental studies in 2027;
 - select the preferred site and storage option;
 - complete detailed design and procurement;
 - commence phased construction from 2028;
 - connect treatment and distribution infrastructure;
 - establish safety and emergency plans.
- f. **Desalination**
- complete feasibility, marine, energy and lifecycle-cost studies in 2027;
 - select technology, location and capacity;
 - complete environmental licensing;
 - commence phased implementation from 2028;
 - install intake, treatment, energy, brine-discharge, storage and network systems;
 - train operators and monitor production performance.
- g. **Water treatment and quality**
- install disinfection and treatment;
 - establish routine testing;
 - prepare water-safety plans;
 - respond to contamination incidents.
- h. **Sanitation and hygiene**
- construct and improve household toilets;
 - rehabilitate public toilets;
 - improve WASH in schools and health facilities;
 - implement hygiene and open-defecation-free campaigns.
- i. **Septic and faecal-sludge management**
- introduce septic standards;
 - register and inspect systems;
 - provide desludging and sludge-treatment services.

j. **Solid-waste management**

- expand collection;
- provide vehicles and bins;
- establish sorting, composting and recycling;
- construct controlled treatment and disposal facilities;
- reduce open burning and dumping.

k. **Institutional sustainability**

- assign asset ownership;
- train operators;
- prepare maintenance plans;
- establish recurrent budgets and spare-parts systems;
- introduce performance reporting.

8. Expected Outputs

By the end of the programme, the main outputs will include:

- an approved island-wide water-security and sanitation plan;
- a complete infrastructure asset register;
- the Maquer system rehabilitated and operational;
- the Berau system rehabilitated and expanded;
- priority water sources and catchments protected;
- household, community and institutional rainwater systems installed;
- a rainwater-catchment dam or alternative reservoir system developed, subject to feasibility;
- a desalination plant or first modular phase commissioned, subject to feasibility;
- water-treatment and quality-monitoring systems operating;
- improved sanitation facilities for households and public institutions;
- all schools and health facilities equipped with functional WASH services;
- open-defecation-free verification completed in all 19 aldeias;
- septic inspection and faecal-sludge services established;
- regular solid-waste services extended across all five sucos;
- a controlled waste-treatment or disposal facility operational;
- trained operators and maintenance teams;
- approved maintenance plans and recurrent budgets; and
- functioning monitoring, grievance and public-reporting systems.

9. Expected Outcomes

Short-term outcomes, 2027–2028

- improved programme coordination and technical planning;
- more accurate information on water resources and service gaps;
- reduced leakage and failure in Maquer and Berau;
- increased household and institutional storage;
- approved technical options for the dam and desalination projects;
- improved access to water treatment and testing;
- improved sanitation in priority communities and public institutions; and
- increased public awareness of hygiene and waste management.

Medium-term outcomes, 2029–2031

- at least 90% of households have reliable access to safe water;
- at least 90% of households use improved sanitation;
- all 19 aldeias are open-defecation free;
- all schools and health facilities have functional WASH;
- at least 95% of regulated water samples meet quality standards;
- at least 80% of households, institutions and businesses receive regular waste services;
- household water-collection time is reduced by at least 50% in targeted communities;
- open waste burning and uncontrolled dumping are reduced by at least 70%;
- major water assets achieve at least 90% annual functionality;
- additional dam or reservoir storage improves dry-season supply; and
- desalination provides a supplementary source during drought and peak demand.

10. Long-Term Impacts

The programme is expected to contribute to:

Public health

- reduced waterborne and sanitation-related diseases;
- improved hygiene;
- reduced exposure to contaminated water and waste;
- healthier school and community environments.

Social wellbeing and equality

- reduced water-collection burdens on women and girls;
- improved dignity and privacy;
- increased access for vulnerable and remote households;
- reduced inequality between communities.

Education

- fewer school absences caused by water collection or illness;
- safer and more functional school WASH facilities;
- improved learning conditions.

Economic development

- increased productivity;
- lower household spending on purchased water;
- improved conditions for tourism and small businesses;
- greater water security for agriculture and livestock;
- reduced emergency water-supply expenditure.

Environmental protection

- reduced contamination of groundwater;
- reduced open dumping and waste burning;
- improved protection of springs and catchments;
- reduced waste entering beaches and marine ecosystems;
- monitored and controlled desalination brine discharge.

Climate resilience

- increased water-storage capacity;
- diversified water sources;

- reduced dependence on seasonal rainfall;
- improved drought preparedness;
- more resilient public services.

11. Key Assumptions

The results chain depends on the following assumptions:

Assumption	Importance to the programme
Government provides adequate multi-year financing	Necessary to complete multi-year infrastructure and avoid unfinished works
Feasibility studies confirm viable dam and desalination options	Required before major capital investment proceeds
Adequate water yield and suitable sites are identified	Necessary for sustainable supply and storage
Environmental and social approvals are obtained	Required before procurement and construction
Land access is resolved through consultation and legal procedures	Necessary to avoid delays and disputes
Qualified consultants and contractors are available	Required for specialist studies, construction and commissioning
Communities participate and use the services	Necessary to achieve sanitation, hygiene and waste outcomes
Operators are appointed and trained	Essential for infrastructure functionality
Recurrent budgets are protected	Required for energy, chemicals, repairs, staffing and waste services
Spare parts and technical assistance remain available	Particularly important for desalination and pumping systems
Institutions coordinate effectively	Necessary to prevent duplication and accountability gaps
Service charges remain affordable	Required to ensure equitable access
Climate conditions remain within the design parameters	Important for dam yield, storage and infrastructure safety

12. External Factors

Some factors affecting programme results are outside the direct control of the implementing institutions. These include:

- prolonged drought or lower-than-expected rainfall;
- extreme storms, flooding or coastal hazards;
- changes in population or tourism demand;
- inflation and construction-price increases;
- maritime transport disruptions;
- global supply-chain delays;
- energy-price changes;
- institutional restructuring;
- changes in annual Government financing;
- major public-health emergencies; and
- community or land disputes.

These factors will be monitored through the programme risk register. Where necessary, activities, schedules, capacities or budget allocations will be adjusted.

13. Critical Causal Links

The programme's success depends on several important causal links:

Infrastructure must lead to functioning services

Construction alone will not produce results. Infrastructure must be connected, tested, operated, maintained and supplied with recurrent funding.

Increased water supply must be combined with safe treatment

Additional water production will not improve health unless water remains safe from the source to the point of consumption.

Sanitation must be supported by water and behaviour change

Constructing toilets will not eliminate open defecation unless households have adequate water, understand hygiene practices and consistently use and maintain facilities.

Desalination must be financially sustainable

Desalination will improve resilience only where energy, maintenance, membranes, chemicals, operators and affordability arrangements are secured.

Dam construction must be supported by catchment protection and safety

A dam or reservoir will not provide sustainable storage unless sedimentation, catchment degradation, structural safety, water treatment and emergency procedures are managed.

Waste infrastructure must be supported by regular collection

A disposal or treatment facility will have limited impact without reliable collection, community participation, enforcement and operating funds.

14. Theory of Change Indicators

Change expected	Suggested indicator
Improved water availability	Percentage of households with reliable year-round supply
Increased storage	Total cubic metres of functional storage installed
Diversified water sources	Percentage of total supply derived from multiple operational sources
Improved water safety	Percentage of regulated samples meeting standards
Reduced household burden	Average time spent collecting water per household
Improved sanitation	Percentage of households using improved sanitation
Elimination of open defecation	Number of aldeias verified as open-defecation free
Improved institutional WASH	Percentage of schools and health facilities with functional WASH
Improved waste services	Percentage of households and institutions receiving regular collection
Reduced environmental pollution	Reduction in uncontrolled dumping and open burning
Sustainable assets	Percentage of major assets functional at annual inspection
Stronger maintenance	Percentage of assets with funded maintenance plans
Improved user confidence	Percentage of users satisfied with service reliability and quality
Improved resilience	Number of days essential demand can be met during dry-season interruption