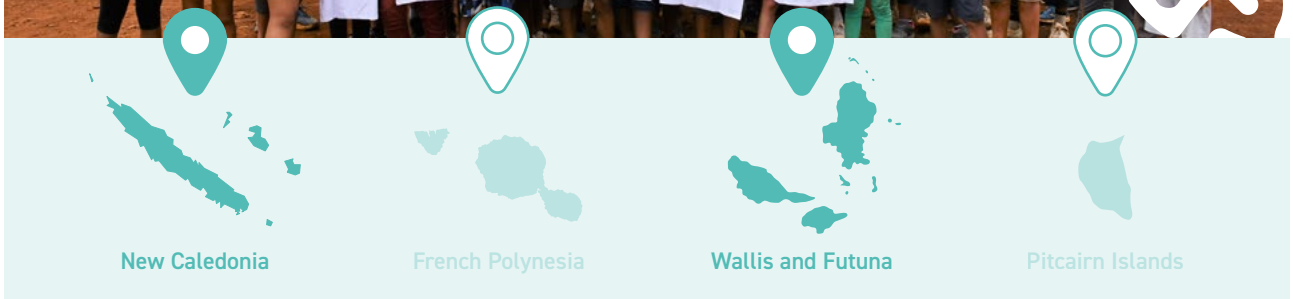
FINAL LESSONS-LEARNED FACTSHEET

CATCHMENT AREA RESTORATION AND AWARENESS RAISING

PROTEGE
PACIFIC TERRITORIES REGIONAL PROJECT FOR SUSTAINABLE ECOSYSTEM MANAGEMENT

Funded by European Union



BUDGET: €563,000 (XPF 67.2 million)

ACTION TIME PERIOD: January 2021 – September 2023

PARTNERS:

• Kokingone Clan Council Association • Weari Neva Association • Nexo Kavijaviru – Maleva

BRIEF SUMMARY

The implementation of catchment area restoration actions, coupled with awareness-raising initiatives, has enabled Wallis and Futuna and New Caledonia to make progress in securing water resources used for drinking water.

In the high islands of the Pacific, catchment areas are impacted by human activities and invasive alien species. These ecosystems, fragile by nature, require the adoption of management or restoration strategies, particularly when they meet the basic needs of local communities.

In **New Caledonia**, in collaboration with and with the financial support of the French Biodiversity Agency (OFB), three restoration projects have been carried out with strong engagement from local populations, especially women. These operations are fully in line with strategic objective no. 1 of New Caledonia's shared water policy adopted in 2019, which aims to "protect and preserve strategic resources". Although the benefits of this type of project in terms of the quality and quantity of water resources are seen in the long term, the immediate effects on raising public awareness are significant, particularly regarding the impact of fires and the role played by forests in the water cycle. These projects have been used as illustrations in the production of videos designed to raise awareness among the general public.

> **"Numerous restoration and awareness-raising initiatives"**

On **Futuna**, the state of the catchment areas is also a major issue, significantly affecting water quality, particularly during rainy periods. The territory plans to set up an educational trail to promote the slopes of Mount Puke, the highest point on the island. This trail will highlight the different ecosystems encountered along the way, the edible and non-edible plants in these environments as well as their uses, while raising public awareness of the threats to these environments. The preliminary studies carried out as part of the PROTEGE project will enable the trail to be developed as part of the tourism strategy to be rolled out over the coming years, thanks to financial support from the European Union.

In addition to these operational actions, educational tools have been developed to raise awareness among younger children: kits containing educational sheets and experiments, designed for 3rd cycle pupils (CM1, CM2 and Year 6) as well as an animated film on the functioning of the great water cycle and the threats to this resource in the Pacific Island context.

BACKGROUND

Under the combined effects of human activities and invasive alien species, the catchment areas of the Pacific Islands are particularly degraded. Yet the ecosystem services provided by forests, which are essential for securing and protecting water resources, represent a major issue for New Caledonia's Grande Terre and for Futuna, where 90% and 100% of drinking water extraction respectively comes from river catchments.

In **New Caledonia,** the degradation of many catchment areas can be attributed to mining activity, particularly old mining operations. In the past, regulations did not require sites degraded by mining to establish water management plans or revegetation plans. Although New Caledonia's institutions have introduced measures to limit the impact of current mining operations, the "mining liabilities" continue to have a significant impact on ecosystems and water resources. Vegetative recovery, particularly on New Caledonian ultramafic soils, remains particularly complex in the absence of remedial action.

In addition, the use of fire, whether for burning, hunting or wilful damage, is a common practice that results in the destruction of vast areas of natural habitat. The Observatory of the Environment in New Caledonia (OEIL) reported nearly 50,000 hectares burnt in 2019, attributing 99% of these fires to human causes, with 87% of fires starting within 500m of human infrastructure. The same study revealed that one in five areas had already burnt over the previous two years, preventing any vegetation cover recovery.

Finally, invasive fauna, most notably wild pigs and Rusa deer, introduced in the 18th and 19th centuries respectively, have proliferated in the absence of natural predators and major pathologies. The deer population was estimated at 400,000 in the 2020s. These two species have an impact on the undergrowth by consuming herbaceous plants, limiting natural regeneration by devouring young plants or hindering seed germination by trampling.

"Water resources, weakened by human activities and invasive species"

On **Futuna,** the state of the catchment areas upstream of the six resources used for drinking water was assessed in 2018 by a WWF France study according to three criteria: soil stabilisation, water buffering and fire resilience. This assessment, which took into account the erosive hazard, the landscape trend and forest fragmentation, revealed that 50% of the areas studied (representing 9% of the island's surface area and 34% of the catchment areas concerned) were in a slightly degraded state. However, the situation is more worrying for two major water catchments, Leava and Malae, which are at high risk of erosion and suffer from marked forest fragmentation. These catchments supply drinking water to two thirds of Futuna's population.

In addition, the state of the undergrowth is a locally recognised problem, due to roaming wild pigs and the low diversity of tree species under the cover of *Pinus caribea,* an invasive species that has colonised many slopes.

ISSUES & OBJECTIVES

The state of catchment areas in the Pacific Islands is a major issue, particularly on New Caledonia's Grande Terre and on Futuna, where surface water is mainly used to meet the population's drinking water needs.

However, the deterioration of water catchment areas is causing both quantitative and qualitative problems. Slope erosion affects the quality of the water supplied and the operation of distribution networks, while sediment transport also causes dams to gradually fill in. A particularly worrying example is the Montagne des Sources, upstream of the Dumbéa dam, the main water resource for Greater Nouméa (40% of New Caledonia's population). In the absence of corrective action, the reservoir could be completely filled by the end of this century, or even as early as 2050 in the most pessimistic scenarios. In addition, the fragmentation, or even absence, of forest cover reduces the buffering of the slopes, affecting the recharge of high-altitude groundwater. This situation exacerbates tensions during low-water periods, when water requirements are at their highest.

The pressures exerted by fires and invasive species further exacerbate the degradation upstream of the resources used for drinking water. Dealing with these problems requires not only rigorous management of economic activities upstream of catchment areas, but also collective awareness and major investment to regulate or even eradicate certain invasive species.

The need to restore the degraded sites is immense, but financial resources are limited. It is therefore crucial to optimise the use of available funds by prioritising the areas of action and the techniques deployed.

IN THIS CONTEXT, THE WORK CARRIED OUT AS PART OF PROTEGE PURSUED 2 MAIN OBJECTIVES:

- ☑ Carrying out restoration work and deploying locally adapted innovative techniques, while critically assessing the results obtained to define restoration models on a larger scale
- ☑ Raising public awareness by producing educational and information tools tailored to target audiences

OUTCOMES

Water catchment areas protection and restoration

Three operations to protect and restore water catchment areas have been carried out in New Caledonia, for a total budget of more than 70 million CFP francs, of which 35 million was provided by PROTEGE, 13.5 million by the French Biodiversity Agency, and the remainder by project sponsors and local authorities.

The first operation, piloted by the WWF, was carried out on the Montagne des Sources, which supplies the Dumbéa dam, the main drinking water reservoir for 110,000 inhabitants, i.e. 40% of New Caledonia's population. This project was distinguished by the innovative use of drones for sowing seeds, enabling 5 million seeds to be dropped over an area of two hectares in two campaigns. The WWF has set up monitoring of plots with a radius of one metre to assess the effectiveness of this method. Initial assessments showed a variable germination rate, ranging from 1.2 to 12.5 seedlings per square metre, which will require follow-up to confirm the method's effectiveness. Seed coating therefore seems to offer an advantage, not by improving the seedlings' germination rate, but by increasing their survival. Further seed monitoring is required to confirm or refine this hypothesis, based on initial observations. In any case, this planting technique is particularly well suited to areas that are difficult to access and seems promising, although the maintenance of the systems depends on the vagaries of the weather. Complementary techniques were deployed, including the installation of 200 living plant fascines, planting of 400 cuttings and installation of 5 coco fibre rolls to reduce sediment transport. Training courses have also been organised for local associations, covering firefighting and selection methods and maintenance of existing shrubs based on Assisted Natural Regeneration (ANR).

"Drone seed-dropping, a promising innovation"

The second operation was carried out in Touho by the ONFi, in partnership with the town council and the North Province. The Kokingone and Haccinem water catchments, which supply drinking water to around 1,400 people, have benefited from enhanced protection thanks to the installation of 960 linear metres of fencing and the creation of 25 anti-erosion dams. In these areas, 2,600 plants of endemic species have been planted over nearly 2 hectares. The planting was carried out by volunteers from the CAAM association, 90% of whom are women. However, a fire affected a plot of land, highlighting the need to continue efforts to raise awareness among local communities. At the same time, the Tipwoto association organised beats to control wild pigs, eliminating 50 of them in sensitive areas near water catchments.

The third project led by the Houaïlou town council focused on the Bâ catchments, which supply water for around 2,400 inhabitants, including the communities of the Waraï customary district and the village of Houaïlou. A 2.5-kilometre fence has been installed to protect 20 hectares, including plots reserved for young people to grow agroforestry crops (see "Reintroducing trees into farming systems" factsheet). This approach aims to extend the lifespan of systems while generating agricultural products. More than 4,000 economic plants, such as vanilla and cocoa, have been planted by local associations, Weari Neva and Maleva. The *Pinus caribea*, an invasive species that acidifies and dries out the soil, was felled over nine hectares, giving five young people from the Weari Neva association the opportunity to be trained in cutting planks, skills they showcased in a demonstration during the town festival in December 2022. A total of 11,382 seedlings were planted over an area of 10 hectares, under the coordination of PPN, which managed to bring together all the stakeholders involved. These achievements were made possible thanks to the support of the Green Farm nurseries in Touho, Nexo Kavijaviru and Male'va. In addition, beats were organised in partnership with the Fauna and Hunting Federation to control deer and wild pig populations over an area of 2,000 hectares. However, with only two deer and one pig removed, the results turned out to be rather ineffective, given the resources deployed and the particularly complex nature of access to upstream catchment areas.

In collaboration with the New Caledonian government, an evaluation of these actions was carried out as part of a final year engineering internship. The study also provides a methodology for prioritising the catchment areas to be restored, and thus guiding future action.

"Women and young people were especially involved in these activities"

These three projects have fully achieved their objectives in terms of involving institutional stakeholders and local communities. Provinces, communes, consultancies, incubators and local associations have worked together effectively thanks to the coordination of the project leaders. Together, they have made it possible to reforest 27 hectares and install 3,460 linear metres of fencing to protect the immediate vicinity of the water catchments from the ravages of deer, wild pigs and fire. More than 190 people were involved in these projects, including around 130 women. Young people and women made a particularly significant contribution to the projects in Touho and Houaïlou, highlighting their key role in these initiatives.

Collaboration with the French Biodiversity Agency has strengthened the operational scope of these projects. As well as providing additional financial support, it has allowed us to draw on the experience gained to draw up restoration plans for the municipalities concerned: Houaïlou, Touho, as well as the Montagne des Sources, encompassing the communes of Dumbéa and Le Mont-Dore. These plans include the definition of priority areas and the types of action to be taken there, providing a solid basis for future conservation and restoration efforts.

Awareness-raising campaigns

As part of PROTEGE, several awareness-raising campaigns have been deployed to inform and engage the public in the issues affecting catchment areas and water resources.

In New Caledonia, the projects carried out led to the creation of videos aimed at the general public. Three of them focus on each of the projects implemented, presenting the problems encountered, the operations carried out and their objectives. A final video, adopting an evaluative approach, sets the overall context, details the actions implemented and sets out the results obtained as well as the limitations encountered. The aim of these videos is to raise local awareness of the importance of preserving water resources.

On Futuna, PROTEGE has helped design an education trail around the emblematic site of Mont Puke, the highest point on the island, overlooking the Leava catchment, the main source of drinking water. The existing path, which is not very accessible and not very well used, was the subject of a mission by experts to determine the infrastructure and facilities needed to make it practicable, while also identifying the ecosystems it crosses that need to be highlighted. Although the project could not be completed due to delays caused by the COVID-19 pandemic and other unforeseen events, all the operations to be implemented have been precisely defined. This work, which includes improvements and awareness-raising panels, is fully in line with the local strategy for the development of sustainable tourism, and could be carried out thanks to financial support from the European Union under another action framework.

To raise awareness among the younger generation, as this target audience is key to changing practices, an animated film entitled *"Hingo's Journey"* was produced, detailing how the major water cycle works and the threats to catchment areas. The film features Hingo, a drop of water, recounting its journey from evaporation to its return to the lagoon in New Caledonia. Through this adventure, the film explains the threats posed by fires, invasive alien species and human activities to the quality and availability of water.

This educational support was supplemented by **the creation of educational kits adapted to the contexts of Wallis and Futuna and New Caledonia.**

In **Wallis and Futuna**, 14 kits were developed and distributed to schools and the Territorial Environment Service (STE). They present the water cycle on a high island (Futuna) and a low island (Wallis), while offering five practical experiments to illustrate threats such as invasive species, diffuse pollution and saline intrusion. These tools enabled teachers and environmental technicians to raise awareness among 2,000 young people in 17 schools and at events such as Science Day.

In the light of this success, the regional dynamics of PROTEGE led to the reproduction of a specific tool for **New Caledonia**, adapting it to the context of Grande Terre and the Isle of Pines (high islands) as well as the Loyalty Islands (low islands). This new tool, financed by the OFB and the New Caledonian Government, addresses the territory's specific problems, including invasive species, fires, mining activities and saline intrusion. 20 units were produced and a distribution plan was drawn up, with the support of New Caledonian institutions (DGRAC, DASS, DAVAR, Customary Senate), the education system (vice-rectorate, DDEC) and associations involved in raising environmental awareness (including CIE). The first awareness-raising campaigns aimed at young people in New Caledonia, initially scheduled for 2024, will begin in 2025 because of the events that took place in May 2024.

These initiatives demonstrate the importance of targeted, innovative awareness-raising to meet the environmental challenges facing Pacific Island territories.

FIRST-HAND ACCOUNTS

PIERRE HENRY HELLEPUTTE

Head of the European Union Office for the Pacific Overseas Countries and Territories, New Caledonia Delegation

As part of the European Green Pact, the European Union is committed to tackling climate change. And we can't do it alone. It requires cooperation with our partners, such as New Caledonia.

HORTENSE LECERCLE

Project Manager at the French Biodiversity Agency (OFB) Territorial Delegation for New Caledonia and Wallis and Futuna

The OFB took part in the PROTEGE initiative by co-financing videos to monitor the project, raise awareness, and report on the work carried out to the local communities and stakeholders. In Dumbéa, the OFB also supplemented the action undertaken with an orientation plan for the area, which will provide knowledge on where to focus efforts to restore water resources in the future.

SOLÈNE VERDA

Project Manager, New Caledonia Office, National Forests Office – International (ONFi)

The PROTEGE project has financed reforestation work on former reforested plots, with the aim of replanting them to maximise their chances of development. Measures to control invasive ungulates and protective fencing have also helped to consolidate the actions undertaken by preventing people and animals from entering these areas.

KEY FIGURES

3
protection and restoration operations
in New Caledonia

5 million
seeds dropped on the Montagne des Sources

15,000
endemic plants
on the East coast

12
lessons-learned videos
for the general public

90%
of women
involved in planting operations

1
educational trail
on Futuna

1
collaboration
with the OFB

34
educational kits
on the water cycle

1
animated film
"The great cycle of Hingo, the little drop of water"

PROSPECTS AND SUSTAINABILITY

Water catchment areas protection and restoration

WWF plans to continue its environmental restoration work, building on the lessons learned from the PROTEGE project. Two new projects are already planned. The first, funded by ADEME, aims to develop a "youth" strategy, focusing on the creation of tools and actions to raise environmental awareness among school children. The second, supported by the Green Fund, aims to restore the Coulée valley using operations tested and developed during the PROTEGE project.

In Touho, the restored and reforested plots will continue to be maintained by the local associations involved in the project. In Houaïlou, the commune is in discussions with the North Province to develop the economic areas created as part of the restoration work.

In addition, the three management plans drawn up in collaboration with the OFB now offer a clear and operational vision of the restoration needs to preserve drinking water resources in Touho, Houaïlou and on the Montagne des Sources. These documents form an essential basis for the future implementation of concrete actions on the ground, provided that funding is available.

"Crucial need for funding to perpetuate the operational and awareness-raising actions initiated by PROTEGE"

However, the situation remains particularly worrying on the Montagne des Sources, where sedimentation continues to threaten the Dumbéa dam. Urgent action is needed to prevent a critical situation that could deprive the conurbation of its main source of drinking water in the near future.

The need for restoration goes far beyond the scope of the PROTEGE project. Although the stakes are high, financial resources are limited. New Caledonia will need to demonstrate innovation and creativity in managing its environmental issues, while stepping up efforts to raise collective awareness.

With regard to the control of invasive animal species, the hunting operations carried out to date have had limited results. Although they are essential for protecting the immediate vicinity of water catchments, professional, large-scale control is needed. It is crucial that these actions are stepped up in the near future to ensure better protection of water resources (see "Control of invasive ungulates" factsheet).

Awareness-raising campaigns

Actions aimed at young people, including the use of educational kits and the animated film produced as part of PROTEGE, will be rolled out in New Caledonia from 2025. Videos highlighting the projects carried out will also be broadcast to raise public awareness. In Wallis and Futuna, the educational kits will continue to be used at a pace that is now well established, helping to maintain an educational dynamic on environmental issues.

Finally, the Mont Puke educational trail project on Futuna will be developed and finalised thanks to financial support from the European Union. This trail is fully in line with the Territory's strategy to develop sustainable tourism, and provides an opportunity to raise environmental awareness while promoting Futuna's natural heritage.

DOCUMENTARY RESOURCES

PROTEGE

Scan or click to access resources

REPORTS

- LE LAN Fanny (2022). Protecting water resources: a challenge for New Caledonia. Priorisation of catchment areas to be restored and assessment of actions carried out as part of the PROTEGE project. Master Thesis. New Caledonia. 104 p.
- VERDA Solène (ONF International) (2022). Phase 3 lessons-learned report on the restoration and protection of the Haccinen and Kokingone water catchments in the Touho commune. New Caledonia. 21 p.
- VERDA Solène and DELVIENNE Quentin (2022). Phase 2 lessons-learned report on the restoration and protection of the Haccinen and Kokingone water catchments in the Touho commune. Progress report. New Caledonia. 98 p.
- VERDA Solène and DELVIENNE Quentin (2021). Phase 1 lessons-learned report on the restoration and protection of the Haccinen and Kokingone water catchments in the Touho commune. Progress report. New Caledonia. 46 p.
- WWF France (2023). Restoring without planting. End of phase 3 report. New Caledonia. 29 p. (without appendices).
- WWF France (2022). Restoring without planting. End of phase 2 report. Nouméa, New Caledonia. 27 p.
- AUBERT Marine (2021). Restoration and reinforcement of the protection and reinforcement of the Mindaï creek water catchment area (Bâ tribe, Houaïlou commune). 1st deliverable: Detailed Operational Plan. Houaïlou, New Caledonia. 34 p.
- POURAWA E. (2022), Operational plan detailing actions to restore and reinforce protection of Mindai creek water catchment area (Bâ tribe, Houaïlou commune). 2nd deliverable: Phase 2, interim report – Houaïlou commune. New Caledonia. 34 p.
- POURAWA E. (2023). Restoring and reinforcing the protection of the Ba tribe's water supply catchments. 3rd (A) deliverable: progress report, implementation phase. New Caledonia. 37 p.
- POURAWA E. (2023). Restoring and reinforcing the protection of the Ba tribe's water supply catchments. Deliverable 3B: Completion of phase 2, implementation. New Caledonia. 48 p.
- SARL FENUA ENVIRONNEMENT (2023). Study of the effectiveness of the French Polynesia Environment Directorate (DIREN)'s campaign to raise awareness of good practices to adopt as the rainy season approaches - Deliverable No. 3. Papeete, French Polynesia. 42 p.

NEWSLETTER

- Monitoring water quality in the Fautaua river. PROTEGE Newsletter #9. December 2021, p. 2.
- Flood scales and panels for flood-prone areas in New Caledonia. PROTEGE Newsletter #9. December 2021, p. 2.
- An animated video on the water cycle. PROTEGE Newsletter #16. September 2023, p. 3.
- Raising young people's awareness of water management in Wallis, the adventure continues... PROTEGE Newsletter #17. December 2023, p. 4.
- Educational kits: two tools to raise awareness amoung young people. PROTEGE Newsletter #19. July-December 2024. p. 17

AWARENESS-RAISING TOOLS

- Documentary ressources on Water: https://www.spc.int/DigitalLibrary/CCES/Collection/PROTEGE_AQUA
- Educational kit on water management and preservation in Wallis and Futuna
- Educational kit on water management and preservation in New Caledonia
- Awareness-raising panels on forest and water catchment areas protection in Touho, Houaïlou, Dumbéa and the Coulée valley
- Photo exhibition organised with the New Caledonian WWF office

MEDIA

- "Outre-mer Grandeur Nature", environmental overseas e-journal, #24, September-October 2024, "PROTEGE PROJECT: a promising outcome for the Pacific Overseas Countries and Territories" – p. 58-59 > https://www.environnement.nc/magazine/
- Environment Magazine, 2024 Edition– #34 – New Caledonia, "PROTEGE: concrete progress for the benefit of the people of Oceania", p. 98-103 > https://issuu.com/oceindia/docs/omgn24

DOCUMENTS

DOCUMENTARY RESOURCES

PROTEGE

Scan or click to access resources

Short version

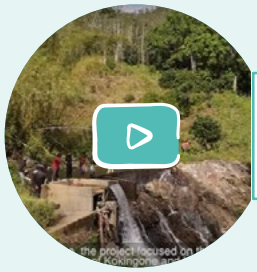
Long version

Resilience Series, #8 - Water, source of life

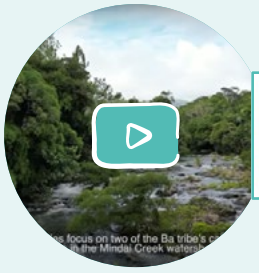
The great cycle of Hingo, the little drop of water

Preserving New Caledonia's drinking water catchment areas. Episode 1/3

Preserving New Caledonia's drinking water catchment areas project monitoring. Episode 2/3

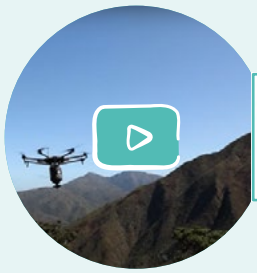


Preserving New Caledonia's drinking water catchment areas project monitoring. Episode 3/3



Preserving the Houailou drinking water catchment areas (New Caledonia)

Preserving the Touho drinking water catchment areas (New Caledonia)



Preserving the Dumbea drinking water catchment areas (New Caledonia)

Preserving New Caledonia's drinking water catchment areas (Review three years on). Final lessons-learned video.

In French

In Tahitian

Rainy season

VIDEOS

FLIPBOOK
Final lessons-learned factsheet

Find all the lessons-learned factsheets on water **freely available on our website.**

PROTEGE

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PITCAIRN ISLANDS

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