

Isle of Coral: an Art-Science dialogue on Marine Human-Nature relationship

L'Île au Corail : un dialogue Art-Science sur la relation Homme – Nature Marine

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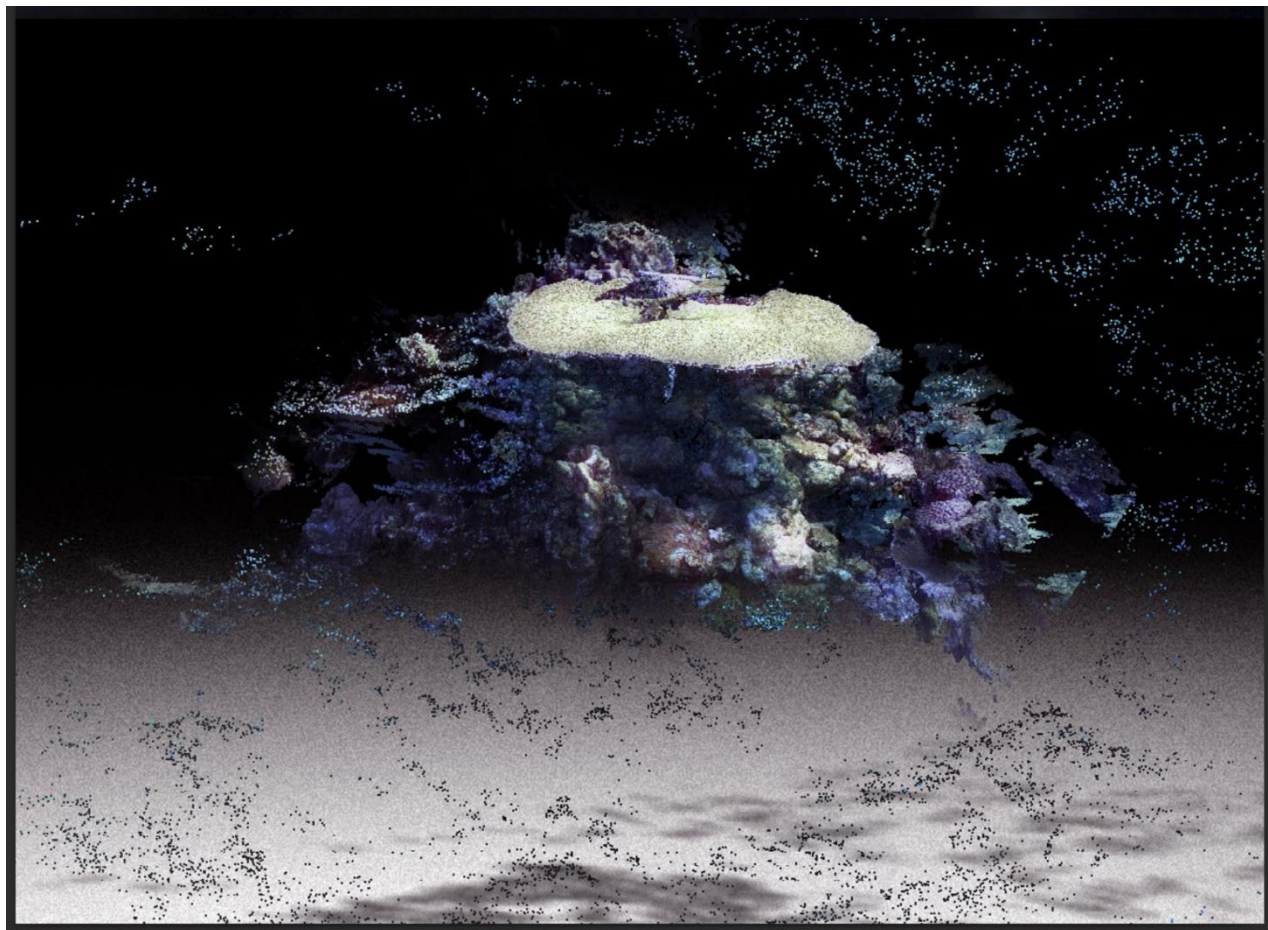
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ABSTRACT. Coral reefs of the Western Indian Ocean (WIO) are among the most biodiverse and most threatened marine socio-ecosystems on the planet, yet conventional science mediation often lacks the indigenous (i.e. local) knowledge and innovative, locally adapted approaches needed to produce genuine, long-term engagement. This article presents Isle of Coral, an Art-Science co-creation programme built through an ongoing dialogue between a marine biologist and a visual artist, where scientific data, indigenous knowledge and artistic practice come together. The collaboration takes form through immersive video installations, monumental façade projections, and collages built from underwater SfM photogrammetry, alongside original music, oral storytelling, and ceramic works exploring a coral bleaching event and the wider stakes of reef conservation. Rather than purely bio-physiological, bleaching is woven together with Mahorais, Comorian, and Malagasy beliefs and customary codes - Djinns, Marids, Fady (taboos) - that long governed human relationships with reefs before the Western concept of marine protected areas. We describe the project's narrative architecture and participatory methodology, co-created with local communities, schools, and knowledge holders, and its measurable reach through festivals, museums, and school programmes. Finally, we discuss how treating indigenous knowledge as a genuine epistemic contributor extends the durability of conservation messaging. We outline the scalable co-creation model in the WIO and other reef socio-ecosystems worldwide.

RÉSUMÉ. Les récifs coralliens du sud-ouest de l'océan indien (sooi) comptent parmi les socio-ecosystemes marins les plus riches en biodiversité et les plus menacés de la planète, pourtant la médiation scientifique conventionnelle manque souvent des savoirs indigènes (i.e. Locaux) et d'approches innovantes et localement adaptées pour produire un engagement véritable et durable. Cet article présente l'île au corail, un programme de co-creation art-science construit à travers un dialogue continu entre une biologiste marin et un artiste visuel, où données scientifiques, savoirs indigènes et pratique artistique se rejoignent. Cette collaboration prend forme à travers des installations vidéo immersives, des projections monumentales sur façades et des collages construits à partir de photogrammétrie sous-marine par sfm, ainsi que des créations musicales, des contes oraux et des œuvres en céramique explorant un événement de blanchissement corallien et les enjeux de la conservation des récifs. Plutôt que purement bio-physiologique, le blanchissement est tissé avec les croyances et codes coutumiers mahorais, comoriens et mal-gaches -djinn, marids, fady (tabous)- qui ont longtemps régi les relations avec les récifs avant le concept occidental d'aire marine protégée. Nous décrivons l'architecture narrative du projet et sa méthodologie participative, co-construite avec les communautés locales, écoles et détenteurs de savoirs, ainsi que sa portée mesurable à travers festivals, musées et programmes scolaires. Enfin, nous discutons comment positionner les savoirs indigènes comme de véritables contributeurs épistémiques qui renforcent la pérennité des messages de conservation. Nous présentons le modèle de co-creation, évolutif aux autres pays du sooi et à d'autres socio-ecosystemes récifaux dans le monde.

KEYWORDS. Coral reefs, Art-Science co-creation, coral bleaching, photogrammetry, indigenous knowledge, marine conservation, ocean literacy, Mayotte, Madagascar, Western Indian Ocean.

MOTS-CLÉS. Récifs coralliens, co-création Art-Science, blanchissement corallien, photogrammétrie, savoirs indigènes, conservation marine, culture des océans, Mayotte, Madagascar, Sud-Ouest océan Indien.



Isle of Coral. Spotlighting indigenous knowledge, customary codes and belief systems for marine conservation and ocean literacy. ©Isabel Urbina-Barreto & Simon Rouby

1. Introduction

Coral reefs¹ are simultaneously extraordinarily rich and extraordinarily fragile. Although they cover only around 0.1 per cent of the ocean's surface, they harbour more than a quarter of the world's marine biodiversity. Around one-fifteenth of the world's population depends directly or indirectly on these goods and services (e.g., fishing, tourism, marine aquaculture) while forming natural breakwaters against wave and swell erosion and constituting privileged navigation corridors for coastal communities across the tropics (1–3). In the Western Indian Ocean (WIO), this dependence is especially acute: lagoons and barrier reefs are woven into subsistence fishing, coastal protection and cultural identity. Yet reefs across the WIO region face a convergence of anthropogenic pressures – demographic growth, industrial development, mass tourism – compounded by increasingly frequent and intense climate disturbances (4). Some projections suggest that mass mortalities of corals following bleaching events² will become ever more frequent, more than 60% of coral reefs worldwide are under immediate and direct threat from local stressors, today worldwide scientists now warn about the global 'coral reef ecosystem crisis' (5–7). The worldwide urgency of transformative change is underscored by the projected collapse of key ecosystem functions associated with current global trends driving biodiversity loss, which has implications for all ecosystems and for human well-being (8).

¹ A coral reef is a marine biogenic structure resulting from the accumulation of calcareous skeletons produced by reef-building organisms, mainly stony corals - Scleractinia-, which are engineer organisms and key components of these ecosystems. The majority of coral reefs are located in tropical regions and on islands.

² A large-scale environmentally triggered expulsion of symbiotic dinoflagellates (Symbiodiniaceae) from coral tissues, resulting in visible paling and increased mortality risk.

Communicating about ocean literacy within this ecosystem crisis trajectory is not simply a matter of transferring data. Learning that coral reefs may disappear can be paralysing rather than mobilising, and descriptive or consultative communication tends to reach only those already engaged with environmental issues (6,9,10). Aside from photography and documentary film, artists worldwide have grown a body of work in immersive media as a research relevant tool for marine conservation communication. Virtual reality experiences that place participants inside a coral reef, or let them embody marine species, have been shown to increase motivation, ocean literacy, and self-reported connectedness to the ocean among learners (11,12). Randomised trials comparing screen-based, headset, and fully immersive underwater VR conditions find that deeper immersion correlates with stronger feelings of awe, ocean connectedness, and even donation behaviour toward marine causes (13). Participatory, citizen-science-framed immersive experiences also appear to shift how audiences perceive degraded coastal ecosystems, suggesting that immersion can re-calibrate perception as much as inform it (14). In parallel, an international consortium of marine scientists, artists, and designers has argued that reef conservation communication needs sculpture, textile, sound, and other visual and creative-arts practices alongside data-driven messaging, treating aesthetic and emotional engagement as necessary complements to ecological evidence (15) ; CoralScienceConsortium³.

A parallel shift concerns whose knowledge counts. Sustainability research increasingly recognises indigenous and local knowledge (ILK) not as contextual information to be collected, but as a body of observation, practice and belief shaped by generations of direct engagement with ecosystems, and as a lever for transformative change (8,9). Long before the formal designation of marine protected areas, many coastal societies regulated access to reefs, lagoons and fishing grounds through customary tenure, seasonal closures, sacred sites and religious prescriptions, and in the Western Indian Ocean such systems have in places been mobilised in contemporary marine protected area management (16,17). Yet the intangible cultural values these ILK systems carry remain largely absent from area-based management and marine spatial planning across the region, and conservation measures designed without them can meet local opposition to the point of never being implemented (17). International frameworks now treat engagement with Indigenous peoples and local communities as a condition of success for ocean governance (10), and transdisciplinary guidance calls for knowledge co-production rather than consultation (18). Customary codes and beliefs -ILK- systems are potential sources of conservation strategies in their own right, often best placed to reconcile ecological safeguards with the livelihood needs of coastal communities.

Across the Western Indian Ocean, a handful of recent initiatives have begun to bring these two movements together, through documentary and performance on the intangible heritage of coastal communities' ocean narratives (e.g., 19). *Isle of Coral - L'île au Corail* - situates itself within this emerging, still-small empirical field. It is a collaboration between a marine biologist/ecologist (Isabel Urbina-Barreto) and a visual artist (Simon Rouby) that treats co-creation – with communities, with artists, with ILK systems and scientists as a legitimate route to producing and transmitting knowledge about the importance and conservation of coral reef socio-ecosystems.

2. Programme genesis

2.1. From two domains to a shared tool, the SfM photogrammetry scans

The project's origin lies in a science-technical convergence, the 3D reconstruction through photogrammetry by structure from motion (SfM)⁴. Since the late 2010's, S. Rouby has built a growing

³ Coral Science consortium - Art as a Voice for Reefs : <https://coralartscience.org/>

⁴ Photogrammetry: derived from Greek, the word photogrammetry is composed of photos - meaning "light", gramma - meaning "drawing", and metrein - meaning "measurement". It is the science of obtaining reliable information about the properties of objects

archive of photogrammetric 3D scans gathered during residencies in the Kerguelen Islands, Nepal and Nigeria for his ongoing body of work *Pangea*, an exploration of ecosystem fragility in the Anthropocene. Independently, I. Urbina-Barreto had been using the same scan technique - aerial and underwater photogrammetry- to quantify the structural complexity of coral reefs and application for coral reef functional ecology studies in her doctoral and postdoctoral researches (20–25), Fig 1. When the two met in 2019, at a presentation of *Pangea*⁵ at the Cité des Arts in La Réunion, the overlap was immediately apparent: the same tool that I. Urbina-Barreto used to coral reef ecology, S. Rouby used to give it visual and sculptural form. In 2023, thanks to the «L'Art et la Mer» residency grant⁶, artist and scientist travelled together to Mayotte to translate this shared method into a joint mediation Art-Science work.

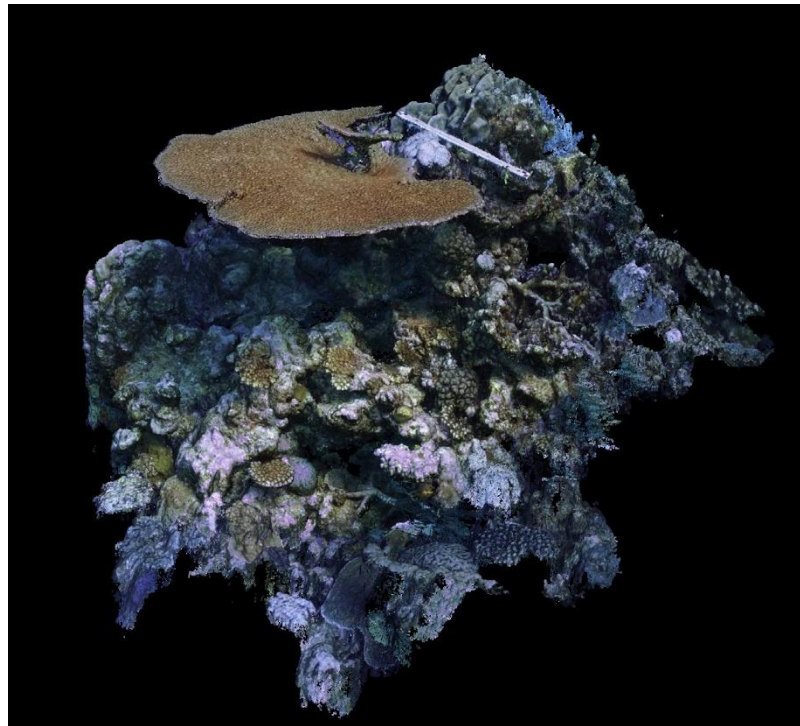


Figure 1. 3D point-cloud scan of a coral colony obtained by underwater SfM photogrammetry. The RAW material of *Isle of Coral*. Scan ©Isabel Urbina-Barreto; edition ©Simon Rouby.

2.2. Mayotte Island, a relevant starting point for the Western Indian Ocean

Mayotte Island is located in Comoros Archipelago, between northwestern Madagascar and northeastern Mozambique (Fig 2). It represents a relevant reef biodiversity and structurally complex coral reef lagoon, the third-largest closed reef lagoon worldwide, and is a reef ecosystem reference in the Western Indian Ocean (26). For I. Urbina-Barreto, three factors make the site particularly relevant: the significance of these reef socio-ecosystems in the WIO, the increasing frequency and intensity of coral bleaching events and the social context and local conservation challenges. For S. Rouby, coral bleaching offers an entry into the island's layered and contested political status within the Comoros archipelago: a territory shaped by colonisation, restructured by its integration into the French state, and now under environmental threat. This is a territory where Cyclone *Chido* (date:12-2024), migration tensions, dwindling freshwater reserves and precarity overlap into a chronic crisis that mainland France addresses only in fits and starts. Roinsard N. (2022), in « *Une situation post-coloniale* » (a post-colonial

and the environment by recording, measuring, and interpreting photographic images. Structure from Motion (SfM): technique which allows the reconstruction of three-dimensional point clouds from overlapping digital photographs.

⁵ *Pangea* (2019). <https://taaf.fr/agenda/exposition-et-installation-video-pangea-de-simon-rouby/>.

⁶ «L'Art et la Mer» residency grant (2023–2024). Funding: Mayotte Direction of Cultural Affairs (DAC 976), French Biodiversity Agency (OFB), and Mayotte Marine Nature Park (PNMM).

situation), describes a society reshaped from the outside, where change is experienced as a source of identity destabilisation⁷. In this sense, diverse manifestations of environmentalism were studied by Gentiluchi and Stoica (2024) (27), remarking the difficulties and failures of occidental conservationist models imposed in post-colonial territory as Mayotte.

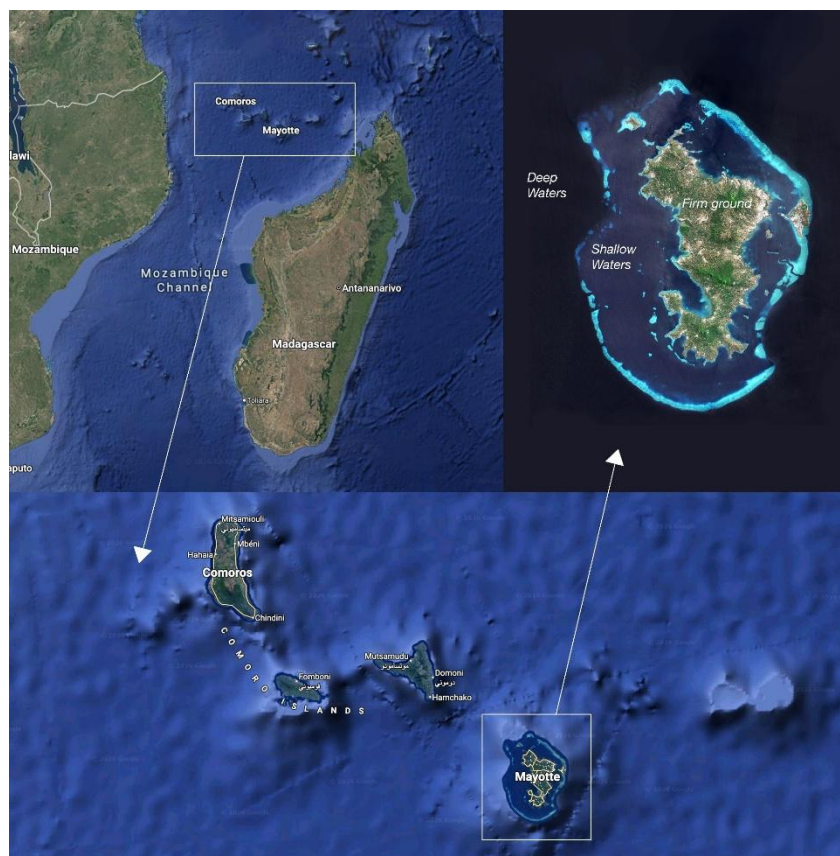


Figure 2. Mayotte island - atoll concentric structure, composed by deep waters (dark blue); reef barrier (cyan) within the reef lagoon sheltering the inner reefs, double barrier reef and fringing reefs (light blue) corresponding to shallow waters, and the mainland composed by Grande Terre (left) and Petite Terre (right). Satellite image modified from Copernicus Sentinel data (2023).

3. Indigenous and local knowledge, beliefs, customary codes and coral reefs

Long before French-administered natural reserves regulated access to Mayotte's reefs, other frameworks already governed how people related to the lagoon. In Mahorais and Comorian tradition, this role belongs in part to the *Djinns*. The *Djinn* is an Islamic figure that Islam inherited from pre-Islamic Arabia and incorporated within a monotheistic cosmology; carried along the Swahili coast and into the archipelago, it became the category through which older African and Malagasy spirit entities could be named and kept as the region became Muslim. That incorporation remained partial: alongside the *Djinns*, Malagasy-derived possession spirits held on to their own names and identities, among them the *Trumba*, spirits of Sakalava belief (28–30). Among these figures the *Marids*, *Djinns* of the sea, bear directly on the reef and the mangrove, shaping which places, resources and behaviours are permissible. Thus, *Djinns* are/were vectors of the negotiation between Humans and Non-Humans, shaping and modulating relationships between human and nature in Mayotte⁸. The Shimaoré term *Fadh*, from the Malagasy *Fady*,

⁷ Roinsard, Nicolas. Une situation postcoloniale. Mayotte ou le gouvernement des marges. **2022**. CNRS editions, 352 p.

⁸ Testimonial, Ali Siandou Dimassi - Director of the Environment and Sustainable Development (DEDDE), Mayotte (date of interview: October 2023): "I've seen the island change a great deal. The relationship between the population and the environment was different, because it was a social relationship — a truly homogeneous relationship — with a balance: everyone had their place. There were perhaps five to ten thousand inhabitants, so that balance existed, the ecosystem balance existed; the transition between land and sea happened naturally. We also had a relationship with spirits — here, we call them *Djinns*, or *Goulus*. You couldn't do anything without

names a taboo -customary rule/code, sacred in origin and close in function to what a marine protected area would later formalise.

The reef-building corals are symbiotic organisms whose colour comes from the micro-algae (i.e. zooxanthellae) living within their tissue; under stress, corals expel these algae and turn white, a process that is reversible if conditions recover in time. This process of reversibility resonates with the capacity of resilience of a social-ecological system⁹. Anthropological work on Mayotte, notably that of Michael Lambek since the 1970s, has documented how the intensification of modern infrastructure and machinery has coincided with a retreat of these spirits from everyday life – not because belief in them ceased, but because the conditions for encountering them eroded (31).

***Isle of Coral* builds its central metaphor on a deliberate structural echo between two processes: the expulsion of symbiotic algae by thermic stressed coral polyps, and the withdrawal of spirits from an increasingly ‘modernised’ land / seascape.**

Both processes run in parallel, both are in principle reversible, and neither reduces neatly to a simple before/after narrative of loss. The project treats this parallel as a genuine interpretive frame: a reef that loses its colour and a lands/seascape that loses its spirit become two readings of the same underlying fragility (Fig 3).



Figure 3. *Isle of Coral* visually draws a parallel between the symbiosis of coral polyps and microalgae (zooxanthellae), and that of humans and spirits, here a 3D model of Djahere Ahmada Saïd, one of the interviewees. ©Isabel Urbina-Barreto & Simon Rouby.

consulting these Djinns; even to send your child to school — to the 'white people's school,' as we used to say — the question would come up: ah, we consult the Djinns first. When we talk about corals, it was also an economic matter, because corals used to be used for building, for making cement. At the time, houses were built entirely out of coral — beyond the mosques, it's the equivalent of today's breeze-block houses. But we managed to maintain that balance." Used for the [Isle of Coral – teaser](#).

⁹ Social-ecological resilience: is the capacity of a social-ecological system to absorb or withstand perturbations and other stressors such that the system remains within the same regime, essentially maintaining its structure and functions. It describes the degree to which the system is capable of self-organization, learning and adaptation (Resilience Alliance : <https://www.resalliance.org/key-concepts>)

4. Isle of Coral programme

Structured as a multi-channel video installation and a scalable programme, Isle of Coral is organised around three concentric circles: i. The outer reef slope (deep waters); ii. The barrier reef and the lagoon reef (shallow waters), and iii. The mainland, the first two corresponding to the bands of Mahorais waters, and the third to the land (Fig 2, top right) following the typical geomorphology of atolls¹⁰ (reef islands). Each of these circles is a stage in the narrative, allowing us to discover coral reefs and explore the Human - No Human relationship. Approaching the island through a submarine, draws the viewer in and opens, from there, onto the island's social, political and postcolonial complexity.

4.1. The outer reef slope, deep waters

Built around the delimitation of maritime space, this introductory chapter opens onto what the lagoon represents at a larger scale. Mayotte, French oversea territory, grants France an Exclusive Economic Zone in the middle of the Mozambique Channel, and with it a presence along one of the region's major maritime routes. The island takes its place among a constellation of small territories held across five oceans, through which France ranks 2nd globally for its Exclusive Economic Zone and overall maritime zones. Here the reef is first encountered as jurisdiction, the most recent of the frameworks that govern it.

4.2. The barrier reef and the lagoon reef, shallow waters

The second circle is the barrier reef itself, historically both a protective threshold and a hazard to navigation – Mayotte was known to Arab navigators as “*Jazirat al-Mawt*” (جزيرة الموت), the Island of Death, probably on account of the barrier reef surrounding it, which has long constituted a danger for ships. Here, the chapter turns on coral bleaching itself. The installation renders this reversibility as a tactile gesture: drifting point-cloud particles gather into coral colour as the viewer approaches, and drain away as they withdraw (Fig 4). From the escaping zooxanthellae, abstract particle-based transitions carry the viewer to the *Djinns* and the *Marids*, and onward to the mangrove and the corrugated-iron architecture of the bangas (Fig 5).

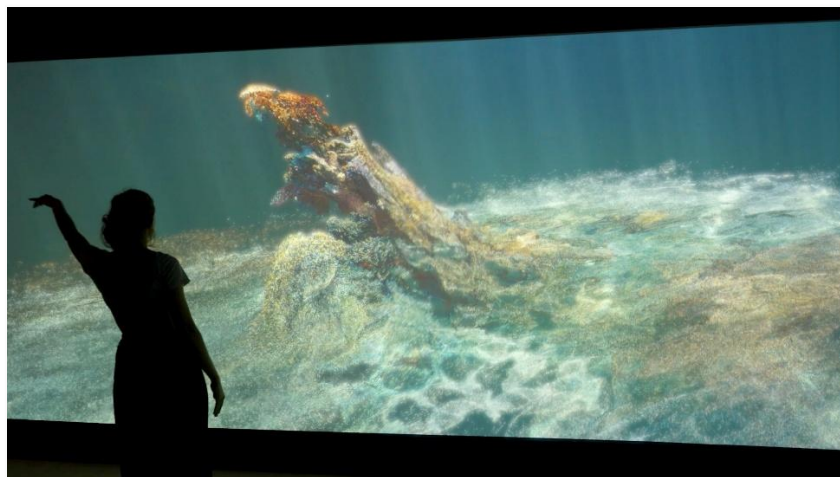


Figure 4. Virtual interactive prototype. The lifeless, sandy seabed will then stir into motion, forming a cloud of floating particles that will gradually organise themselves into living corals. These forms will dissolve as one draws near, becoming once more clouds of luminous, floating points - before re-forming. The touch of our hands upon these coral shapes will cause them to bleach¹¹. ©Simon Rouby & Isabel Urbina-Barreto.

¹⁰ A ring-shaped coral reef, island, or series of islets surrounding a central lagoon, formed from the subsidence of a volcanic island and subsequent coral growth.

¹¹ Virtual interactive prototype, video: <https://vimeo.com/1095434845/563d34b4c0>.



Figure 5. *From the escape of the zooxanthellae to the Djinns, through to the mangrove and the corrugated-iron architecture of the bangas, the experience takes us from one universe to another through abstract, particle-based transitions. ©Isabel Urbina-Barreto & Simon Rouby.*

4.3. The mainland

The innermost circle follows a slow ascent from the reef barrier toward the fringing reefs, the mangrove forest, and the shore. Coral is, quite literally, at the origin of Mayotte's beaches and of a locally distinctive building material: blocks of bleached coral limestone, historically used in vernacular architecture. The Tsingoni mosque, built from coral stone dates from AD 1441¹² and the oldest mosque still in use in France (Fig 6), anchors this final chapter, alongside footage of informal settlements (bangas) and everyday scenes that give space to residents to speak about their own environmental and social priorities.

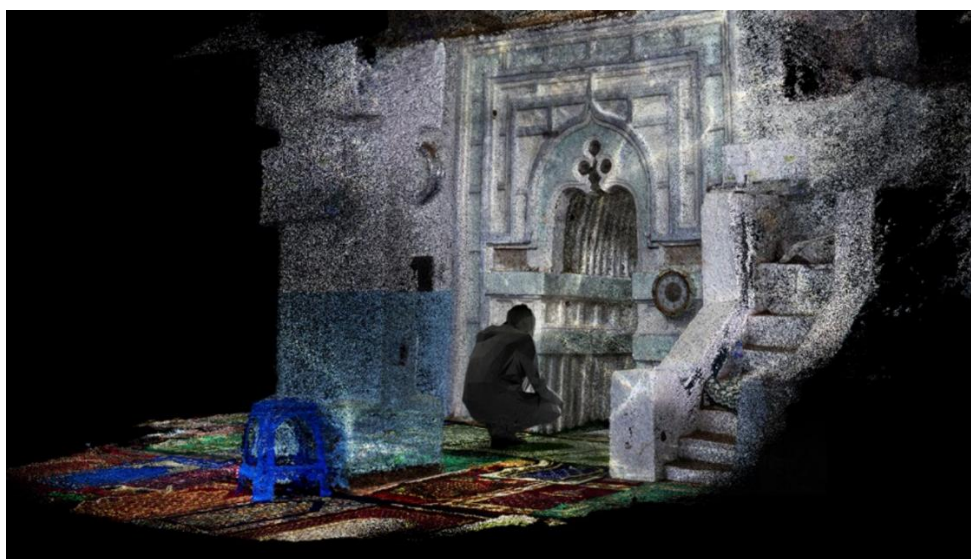


Figure 6. *Photogrammetric reconstruction of an interior of the Tsingoni mosque, built from coral limestone in the fifteenth century. ©Simon Rouby.*

¹² Lambek, Michael (1993). [Knowledge and Practice in Mayotte: Local Discourses of Islam, Sorcery and Spirit Possession](#). University of Toronto Press. p. 41.

5. Co-Creation as method

The Co-Creation in the project's subtitle is methodological, it operates on three levels:

First, at the level of RAW material: the point-cloud imagery that forms the visual substance of the work is built jointly from Urbina-Barreto's scientific coral reef scans and Rouby's own photogrammetric campaigns, extended by dedicated dives targeting the reef's most aesthetical and sculptural coral colonies (Fig 7).

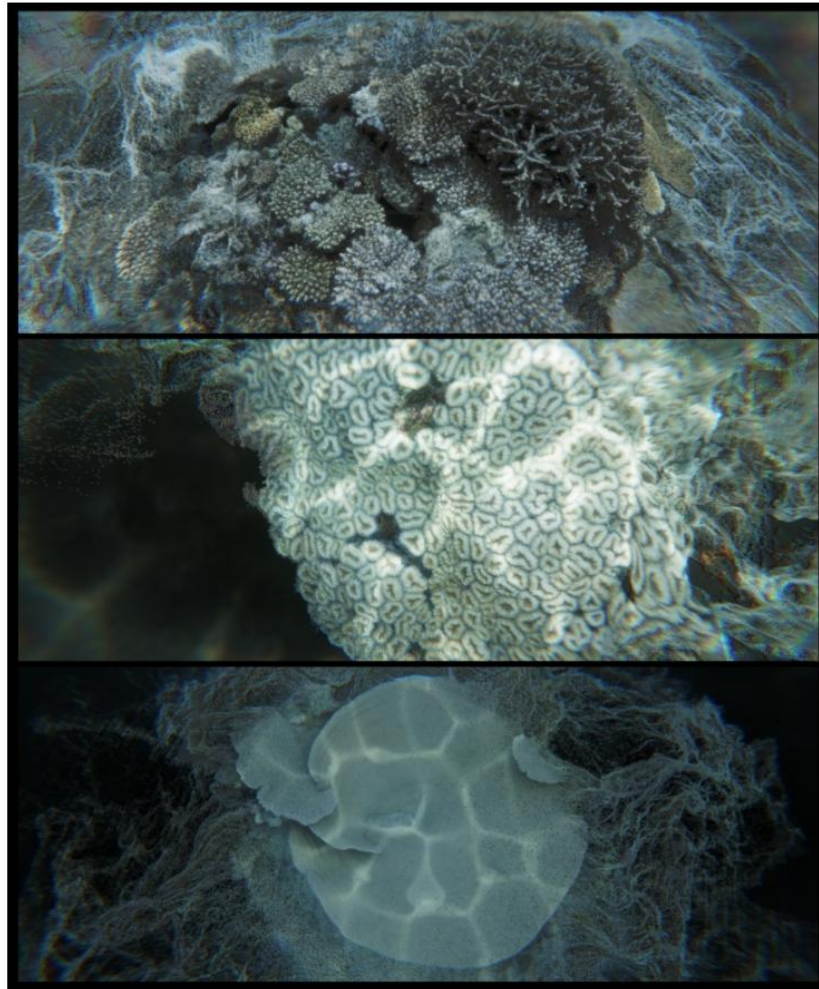


Figure 7. 3D coral scans - animations, a coral reef patch inner reef (top); Coral colonies: *Lobophyllia* sp. cone coral fringing reef (middle), and *Acropora hyacinthus* tabular coral - 'S pass' reef pass-barrier (bottom). ©Isabel Urbina-Barreto & Simon Rouby.

Second, at the level of testimony: the oral accounts, vernacular knowledge and beliefs gathered in the field enter the narrative architecture described above as narration in their own right. To develop this material responsibly, the project records interviews with knowledge-holders directly – *Foundi* (religious and wise man) working with *Djinns*, a practitioner able to speak to the relationship between *Djinns* and Islam, and residents recalling childhood encounters with spirits said to inhabit the mangrove (Fig 4) – alongside interviews with a historian, a geographer, the director of MUMA (Mayotte museum) and marine scientists from Marin Mayotte Natural Park. The intention is to let both cosmological and scientific accounts speak within the same narrative. *Djahere Ahamada Saïd* speaks to the relationship between *Djinns* and Islam and appears in the work itself as a point-cloud figure (Fig 3). The storyteller *Bacar Abdou N'tro*, a guardian of Mahorais oral tradition, sets the register in which the lagoon is heard for the rest of the piece. These accounts hold the same status in the edit as the scientific voice by *Isabel* describing the expulsion of the zooxanthellae, and the montage lets the two stand side by side.

Third, at the level of production, community members are trained in photogrammetry and 3D-scanning techniques and take part directly in the capture process, while schoolchildren's drawings have been physically assembled into large-format wallpaper collages (frescoes) in Dzaoudzi - Petite Terre, becoming part of the exhibited work itself (Fig 8). *Bacar Abdou N'tro* crosses from the second level into this one. He led the music and storytelling workshops of the « La Classe, L'Oeuvre » project, worked the *Djinn* narratives through with the pupils, and staged the performance they gave with him at the - Maison du Gouverneur - on the night the projection ran. The training also travelled beyond the sessions themselves: *Djahere Ahamada Saïd*, having learned the photogrammetry technique in a workshop, photographed coral-ornamented tombs during a family visit to Grande Comore Island, and the images were processed into the project's archive. The method left with the people who learned it and returned carrying material the authors could not have reached.



Figure 8. As part of « La Classe L'Oeuvre » and in preparation for Museum Night 2024 at MUMA, we held a series of school workshops to create a wallpaper collage to which the children added their representations of Djinni spirits.

Medium choice followed the same logic of accessibility and immersion. In venues with museum infrastructure, the work takes the form of a multi-channel video installation: four to six synchronised projectors fill a darkened room with real-time, optically tracked point clouds, exploiting a particle density well beyond what conventional high-definition video allows, and drawing on an intuitive, essayistic documentary sensibility (Fig 5). In the field sites where the project is rooted, particularly Mayotte and, eventually, Madagascar, where museum infrastructure is largely absent, the work instead circulates through monumental nocturnal projections onto building facades and through large-format wallpaper collages (frescoes) printed from the same coral scans and pasted directly onto walls, lighter and more itinerant formats, visible in daylight as well as at night, Fig 8 top-right and Fig 9.



Figure 9. *Corals scans projection on the facade of the -Maison du Gouverneur- Nuit des Musées 2024. Dzaoudzi - Petite Terre, Mayotte. Image © Simon Rouby.*

On Reunion Island, a third itinerant format took shape through a collateral project, « Corail en Devenir » (2024–2025), initiated by *Leslie Ranzoni* with the association Réunion Métis. Housed in a travelling shipping container, the installation hosted ceramic workshops led by ceramist *Alice Aucuit*, in which schoolchildren and residents of the island's western highlands (*les Hauts*), communities living at a distance from the lagoon, modelled coral forms that accumulated, from one stop to the next, into a collective ceramic reef. The ceramic pieces were brought to life by projections of *Isle of Coral's* coral footage, while reef-ecology awareness workshops were run by Agence de Recherche pour la Biodiversité à La Réunion (A.R.B.R.E), Fig 10.

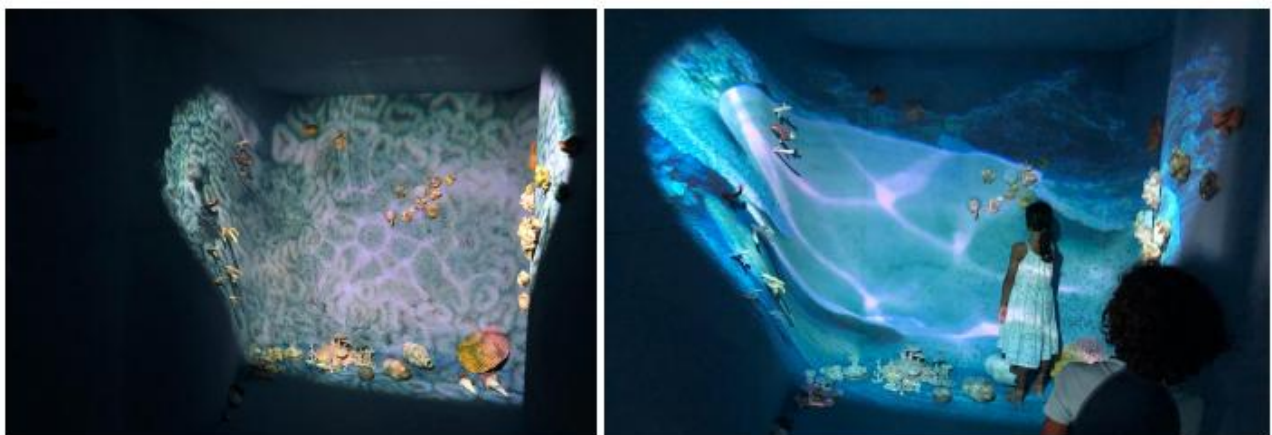


Figure 10. « Corail en Devenir » installation: The public visits an immersive experience inside a traveling shipping container, blending ceramics, soundscapes, and coral footage from *Isle of Coral*. Location: La Saline-les-Bains, Réunion, 2024.

6. Discussion

Set against international marine conservation priorities, *Isle of Coral* examines the processes through which marine biodiversity is protected, and argues that these processes stand to benefit from the integration of ILKs, traditional authority (i.e. customary codes) and belief systems - bodies of knowledge shaped by generations of direct, local engagement with the reef and often best placed to reconcile ecological safeguards with the livelihood needs of coastal communities. Rather than treating ILKs as a

supplement to scientific monitoring, the programme positions it as a source of preservation strategies in its own right, one capable of enriching contemporary conservation models. Across the WIO, more and more creative initiatives help democratise ocean literacy, moving it beyond science-heavy didacticism. *Isle of Coral* advances this movement through a reciprocity: photogrammetric 3D scanning serves both disciplines -Art & Science- by building its narrative and its raw imagery jointly with local knowledge-holders, elders, schoolchildren and residents, and by drawing a structural parallel between coral bleaching and the retreat of autochthonous spiritual frameworks under modernisation, the project offers one working model for how science and art can jointly hold complexity – ecological, cultural and political – without resolving it prematurely into either data or metaphor alone.

Using inter and transdisciplinary approaches, the project speaks to a broader question of how Art-Science collaboration can serve marine conservation and ocean literacy treating ILK as an epistemic contributor rather than a background context changes what the work can claim to represent: the programme does not illustrate coral bleaching with local folklore, it argues – through structural parallel – that both share comparable fragility, inviting audiences to hold a scientific and a cosmological account of the same landscape simultaneously, without collapsing one into the other. Concerned about this, the work of A. Claus (2020) (32) offers a close counterpart from Okinawa, Japan. Studying coral reef conservation in the Yaeyama Islands, she contrasts "conservation-far" approaches, in which protected areas restrict residents who rely on the sea spiritually, economically and socially while privileging other forms of extraction by scientists and visitors, with a "conservation-near" approach that draws on indigenous as well as natural and social scientific knowledge. That nearness is also cosmological: in Okinawan belief, gods reach the world of the living across the sea rather than descending from the sky, and ghosts inhabit the sea and help shape human engagements with it. The conservation-near approach is organised around *Satoumi*, from *sato* (village, home) and *umi* (sea), a term that designates a symbiotic relationship between coastal communities and the sea as well, designates also a particular ocean aesthetic (32). Although, *Satoumi* itself is recent, coined in the late 1990s [Yanagi], it draws on older coastal practices and has become an organising concept for marine conservation research and policy in Japan, inherently place-based and small-scale. Similarly, Gentilucci and Stoica (2024) (27), argue that a phenomenon they call 'hyperenvironmentalism' marginalizes Indigenous and ILK alongside traditional Mahorais beliefs. They examine how *Wazungu* ("white people") construct a tropical 'otherness' through 'eco-infantilisation'-paternalistically portraying the Mahorais people as 'children' who must be taught to 'see', 'read', and protect their environment. Ultimately, they demonstrate that efforts to 'change mindsets' fail because they neglect local expertise and fail to integrate new scientific knowledge with established local practices.

In *Isle of Coral*, coral bleaching works as a threshold. Coral bleaching events already circulates in public awareness as a threat to reefs. It is visually decisive, a living colony turning white, and therefore gives audiences immediate connection to the work. From there, the installation opens onto a denser reading, where the colony expelling its algae creates a parallel to a land/seascape losing its spirits, and where whiteness holds several meanings at once: the exposed skeleton, the building stone of Tsingoni, as well as the trace left where something living has withdrawn. Reversibility keeps that passage open in both directions. Corals can recover their symbiotic micro-algae once a stress event passes, and visitors perform the cycle themselves: colour draining from the point cloud as they approach and gathering back as they step away.

Finally, the multi-actors co-creation with distinct audiences – the general public reached through festivals and museum residencies, schoolchildren engaged through sustained classroom programmes, and decision-makers whose conservation policies must reconcile formal protection regimes with ILK systems – requires the underlying dispositive to remain genuinely modular. The project positions communities as authors. This addresses critiques of positivistic, science-heavy ocean literacy and art for ocean stewardship initiatives¹³, by validating plural knowledge systems through embodied creative

¹³ [The Art and Stewardship of the Ocean e-course - One Ocean Hub](#); UN CC.

practice. Also, interdisciplinary sciences give a relevant framework to better understand the complexity of the local issues and challenges (18,32) associated with marine habitat conservation. The project's parallel development of a multi-channel gallery installation and lighter, itinerant formats for Mayotte and Madagascar, facade projections and wallpaper collages, is a direct response to the limited museum and cultural infrastructure in these places.

7. Reach & impact

Since its debut at the 2023 Festival Réunion Métisse, in Reunion Island, « CORAUX- Korail » (*Isle of Coral*) has expanded across multiple formats and territories. Key milestones include a dance performance and installation at Mayotte’s Nuit des Musées 2024 (Maison du Gouverneur) led by storyteller *Bacar Abdou N'tro* a participatory street-art fresco in Petite Terre merging photogrammetric coral imagery with student artwork (Fig 8); and co-creation workshops under the « La Classe, l’œuvre ! » initiative at Padmandzi Secondary School in Mayotte. The project also encompassed regional teacher-training sessions through PREAC across Reunion and Mayotte, alongside « Corail en Devenir » (Fig 10)—an itinerant ceramic and video installation created with artist *Alice Aucuit* and driven by Réunion Métisse. In mainland France, a 2025 national residency at the Aquarium Tropical du Palais de la Porte Dorée - supported by the CNC to develop a tactile, interactive prototype for broader international circulation - marked a key institutional step. Back in Reunion Island, 2026 classroom interventions reached over seventy pupils across three classes through the « Femmes inspirantes de La Réunion » program.

Collectively, these initiatives have directly reached several hundred participants across schools, workshops, and exhibitions (Table 1). Educators report high engagement, noting that students internalize reef conservation through creative practice rather than passive learning, while growing institutional backing continues to open pathways to audiences well beyond the initial festivals and residencies.

Year	Event	Target audience	Format, activities	Collaborators and partners	Location
2026	«Femmes inspirantes de La Réunion» project	School children - CM1 and CM2 classes (70 students, 9-12 years old)	Classroom interventions with students and teachers.	Primary school Lenepveu PEP’S, Reunion Region.	Saint Joseph - Reunion Island.
2025	Residency at the Tropical Aquarium	General public.	Interactive prototype.	Tropical Aquarium of the Palais de la Porte Dorée.	Tropical Aquarium of the Palais de la Porte Dorée. Paris. France mainland.
2024	Kromali Festival	General public.	Artistic installation, ceramic and photogrammetry workshops, immersive video on tour.	Corail en Devenir.	Saint Paul, Reunion Island.
2024	Mayotte museum night	School children. General public.	Artistic installation, dance performance, projection in the building – mapping.	Mayotte museum (MUMA), Department of Cultural Affairs	Maison du Gouverneur. Dzaoudzi- Petite terre, Mayotte Island.

				(DAC), Bacar Abdou N'tro, Pamandzi primary school.	
2024	Ephemeral Art / Street Art	School children - CM1 classes (40 students, 9-10 years old) and general public.	Wallpaper mural: 3D coral images + children's drawings.	Padmadzi primary school.	Padmadzi - Petit terre, Mayotte Island.
2024	«La Classe L'œuvre ! » project	School children - CM1 classes (40 students, 9-10 years old).	Artistic co-creation with students and teachers.	Padmadzi primary school.	Padmadzi - Petit terre, Mayotte Island.
2024	Resource Centers for Art Education (PREAC)	Teachers and adults working across school, cultural, and youth sectors.	National training (February in Réunion, May in Mayotte).	Educational institutions.	Saint Denis, Reunion Island and Mamoudzou-Grande terre, Mayotte Island.
2023	Kromali festival	General public.	Korail installation and collaborative co-creation.	Local and French mainland artists.	Saint Paul, Reunion Island.

Table 1. Productions from the outset of the programme.

8. Future perspectives: from Mayotte Island to the wider Western Indian and Pacific Ocean.

Isle of Coral was conceived from the outset as an evolving, open-ended programme rather than a fixed piece. Its next stage extends the same conceptual framework – ILK as an essential lever for durable conservation of reef socio-ecosystems. In Mayotte though, we were studying *Fady* in displacement within a French department with environmental protection practices that often marginalize traditional knowledge (27). To broaden this perspective, we are planning to extend our field research to the Malagasy origins of *Fady*. On Nosy Boraha (Sainte-Marie Island, Madagascar), where *Dina*¹⁴ (customary code) operates autonomously alongside state regulations, serving as the primary framework for local governance. In this context, ILK holders operate as the core regulatory authority, shaping environmental relations beyond the conventional designation of secondary "stakeholders". There, the project's conceptual apparatus is being co-constructed with local communities around cultural principles (*Fihavanana*) distinct from, but structurally comparable to Mayotte's *Djinns*, *Fady* and legends (Fig 11). The *Fihavanana* is a Malagasy principle of kinship, solidarity and reciprocity that similarly mediates how communities relate and organise to shared marine resources and the relevance of local governance norms to framework sustainable blue coastal activities developed in the reef socio-ecosystems of the island (21), Fig 12.

¹⁴ *Dina*, It can be defined as a "convention" or a collective and deliberate decision. Klein BI. *Dina, domination, and resistance: indigenous institutions, local politics, and resource governance in Madagascar*. J Peasant Stud. 2024; 51(1):81–110.



Figure 11. *Îlot de sable blanc - bio-luminescent phytoplankton, a protected reef zone in the lagoon reef - Mayotte. Sacred site concerned by Mahorais legend ¹⁵. Image ©DeepBlueExploration.*



Figure 12. *Nosy Boraha (Sainte-Marie Island): where the customary codes meet seaweed aquaculture. A new Terrestrial and Marine Protected Area ‘Sorokay’ (2026)¹⁶ recognizes local Dina rules and governance. Images from a recent interdisciplinary study in Sustainable Science (21); left-bottom: seaweed farms mapping by drone ; center: cut-cutting seaweed women team; top-right: M. Mora Grégoire, Tangalamena (wise-man) of Ilampy village, the main seaweed farmer village of Nosy Boraha; bottom-right: seaweed farms, aerial view. Images © Isabel Urbina Barreto.*

¹⁵ According to the legend shared by *Bacar Abdou N'tro*, a village chief ordered every resident to cover the streets in rice for his daughter's wedding. Outraged by this waste, God sent a destructive storm, leaving behind nothing of the village except a small, white island of rice.

¹⁶ [In Sainte-Marie, a new protected area officially placed under temporary protection](#) GRET 03/09/26.

As the project extends from Mayotte and Reunion to Madagascar and, prospectively, across the wider Western Indian and Pacific Ocean, its central hypothesis and concern remains that durable ocean awareness depends less on the volume of scientific information transmitted than on the degree to which affected communities recognise their own knowledge, beliefs and voices within the resulting work - a wager the programme continues to test as it grows. Beyond the Western Indian Ocean, the next stage of the program is field research in Okinawa, Japan. The choice rests on more than cultural analogy. Like Mayotte, the Yaeyama Islands form an island periphery whose incorporation into a larger state is widely read in colonial terms, and whose reefs are today managed largely through national and international institutions. Yet Okinawa is also where the cosmological and *satoumi*-based nearness (discussed in Section 6) has been taken up by conservation actors. The field research will examine how these beliefs and practices coexist with institutional conservation, and how far they reshape it.

We believe that bringing these experiences into dialogue can benefit reef conservation in Mayotte, and in the many territories that share the same configuration: a postcolonial place whose environment is governed by an institutional force experienced as coming from outside. Neither case offers a model to transplant; it is the circulation of ideas between them - from Mayotte to Nosy Boraha, from the Mozambique Channel to Japan - that may help communities and conservation institutions find common ground. Art-based research can foster this dialogue through co-production and co-design, linking science, policy and people, building empathy, enabling capacity building in both vertical and horizontal directions, and supporting scalable approaches to conservation¹⁷.

Taken together, these trajectories point to the fact that marine conservation communication has more to gain from co-creation with the communities, customary codes and beliefs embedded in reef seascapes than from technically accurate but culturally disembedded depictions of socio-ecological decline (33,34). If undocumented, critical insights of how sacred protection systems can function contemporaneously and adapt to socio-economic pressure, while integrating with formal conservation, might be overlooked. We believe that this knowledge is essential to preserve and systematize, as it could establish a transferable methodology across the Western Indian Ocean and worldwide.

9. Ethical statement

Prior to participation, all individuals received a clear explanation of the study and experience objectives, procedures, expected benefits, and their rights, including the right to withdraw at any time without consequences. This information was provided during an initial phase of the programme and in briefing, kick-off meetings and field campaigns, a verbal informed consent was obtained from all participants before their inclusion in the different activities of the study.

The study was conducted in accordance with the American Anthropological Association (AAA) Statement on Ethics, adhering to core principles of ethical and methodological best practice, including: doing no harm, transparency and honesty in research activities, obtaining informed consent and necessary permissions, balancing ethical obligations to collaborators and affected parties, ensuring accessibility of research results, Maintain Respectful and Ethical Professional Relationships protecting and preserving research records, and maintaining respectful and ethical professional relationships. (please see full definition in: American Anthropology Association Statement on Ethics (<https://americananthro.org/about/policies/statement-on-ethics/>)).

In addition, explicit permission was obtained from all individuals prior to photographing, audio recording or conducting interviews. All participants approved the publication of images and recordings included in this study.

¹⁷Philile, Mbatha. Senior Lecturer, Univ. of Cape Town, South Africa. *Dialogue and participation among diverse stakeholders: Lessons from marine and coastal governance in the Western Indian Ocean region*. [BRIDGES Ocean Talks, Session 4](#). Online, 8 September 2026.

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Simon Rouby is a French artist working across sculpture, video, animation cinema and performance. His feature-length animated film *Adama* (2015) was nominated for a César Award. A laureate of the Atelier des Ailleurs residency programme (2018), he has built a photogrammetric 3D archive during residencies in the Kerguelen Islands, Nepal and Nigeria for his ongoing body of work *Pangea*, exploring ecosystem fragility in the Anthropocene. His work has been shown in prestigious institutions such as Centre Pompidou Villa Medici.

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Isabel Urbina-Barreto is a marine biologist specialising in coral reef functional ecology and sustainable science for coastal social-ecological systems, with her work centred on the reef socio-ecosystems of the Western Indian Ocean (WIO). Originally from Venezuela, she began her career in the Los Roques Archipelago National Park, monitoring coral communities and the lionfish invasion. After moving to the WIO, she earned her PhD in marine biology at the University of Réunion Island (2020), applying underwater

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