RESTORESEAS
Nature-based tools to protect and restore biodiversity

KEEP IT NATURAL: GENETIC DIVERSITY UNDERPINS RESILIENT MARINE FORESTS

Water JPI
biodiversa
2021 2030 United Nations Decade of Ocean Science for Sustainable Development

Restoration should use **local genetic sources** to reduce risks from maladaptation, genetic pollution and non-native species and pathogens.

There are many gaps in our knowledge about genetic diversity in restoration across species, so when genetic information is lacking, restoration should follow a "**do no harm**" principle to avoid reducing adaptation and resilience.

MARINE FORESTS

ARE MADE UP OF GENETICALLY DISTINCT, LOCALLY ADAPTED POPULATIONS.

Practical guidance for restoration

Avoid non-native Introductions

Prevent the introduction of non-native species, pathogens, or microbial strains through restoration or aquaculture.

Reinforce ecosystem resilience by using local genetic sources in restoration.

Prevent Genetic Pollution

Use local, genetically appropriate seeds or coral stock to maintain population adaptation.

Introducing allochthonous (non-local) material risks genetic swamping and loss of local resilience traits.

RESILIENCE DEPENDS NOT ONLY ON SPECIES DIVERSITY, BUT ALSO ON GENETIC DIVERSITY WITHIN SPECIES.

GENETIC DIVERSITY IS THE FOUNDATION OF LONG-TERM MARINE ECOSYSTEM RESILIENCE.

Our research shows

Peripheral ancient marine forests, under threat, are essential conservation hotspots and appropriate sources of restoration.

Azorean marine forests host genetically distinct, isolated populations.

Some local genetic types are uniquely adapted to local conditions, essential for recovery and resilience.

Coelho, Márcio AG, et al. "Not out of the Mediterranean: Atlantic populations of the gorgonian Paramuricea clavata are a separate sister species under further lineage diversification." Ecology and evolution 13.1 (2023): e9740.