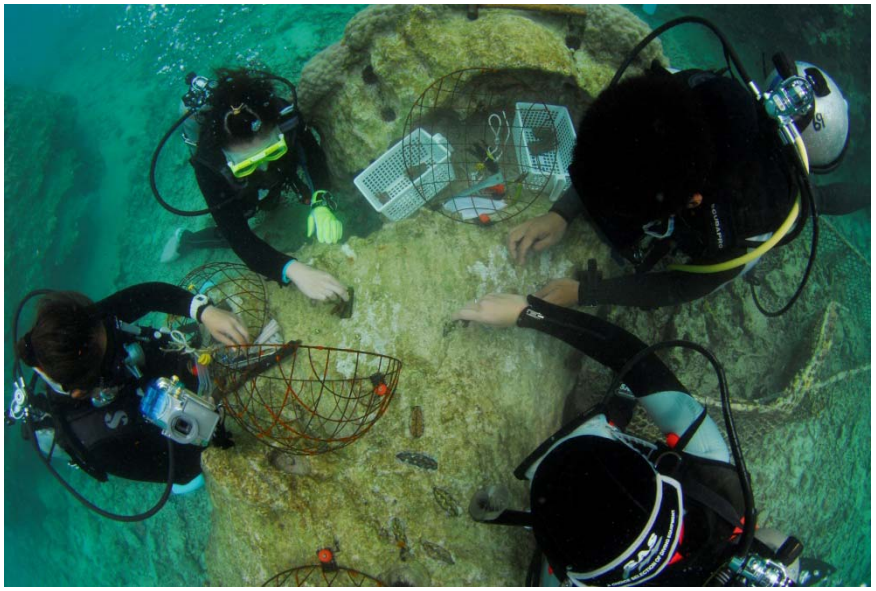
Team Tyura Sango
Coral Regeneration Project



History of Coral Grafting and Planting in Onnason

※Experimental coral grafting started in 1972 at Onnason

1992年　Research/grafting were done at Int'l ANA Manza Beach Resort

1998年　Bleaching of corals occurred worldwide and Onnason was no exception. Onnason Fishery Cooperative (OFC) began coral aquaculture.

2002年　A study group on tourism worked on coral conservation.

Local parties concerned (villages, chambers of commerce and industry, fishery cooperatives, hotels) had a meeting and planned coral planting.

2003年　A facility was built for coral aquaculture at Onna Port to start planting.

2004年　The Team Tyura Sango was launched.

To Save Corals‥

Coral conservation by local governments, residents and firms

Firms inside and outside Okinawa

Economic help and promotion

Cooperation by local parties

Fishery cooperative and resort hotels in Onnason

Help by Local governments

Okinawa Prefecture Onnason Environment Ministry

Participation of volunteer divers

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Company Members in the Team Chura Sango

ANA　YAMAHA　Isamu　PADI

mic21　月刊ダイバー

沖縄電力　Orion　沖縄タイムス社　琉球放送

KAIHO 海邦銀行

11 firms as of April 2012

- Interest in environmental problems in terms of CSR
- Promotion of Okinawa Tourism
- Promotion of Marine Sports（diving）

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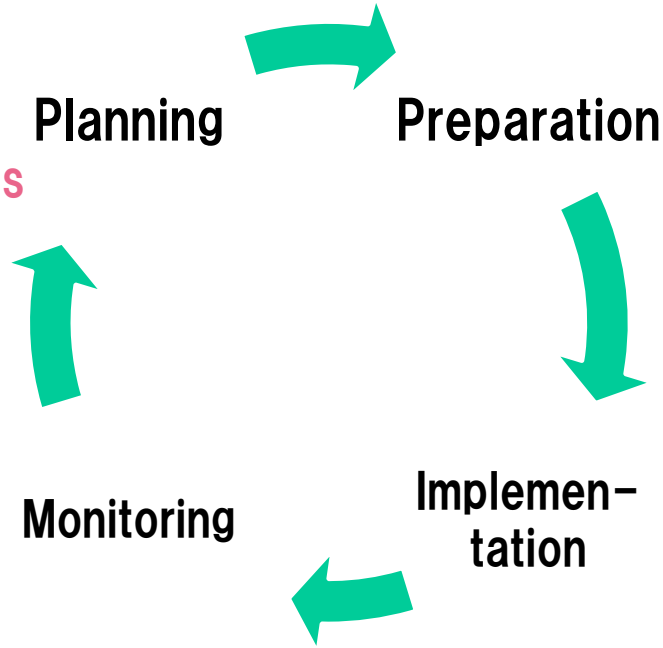
Members' Roles and Cooperation

Planning and Budget control

(decisions to be made after consultation among local firms and other parties concerned)



Coral aquaculture (OFC)

PR activities (pamphlets, each firm's website, related magazines) ; Calls for volunteers (firms)

About four planting events are done each year

- Coral planting by volunteer divers
- Making of seedbeds by citizen non-divers

※Selection and preparation of planting places and provision of boats (OFC)

※Event management and guidance to volunteers

Aftercare of planting (removal of algae on cages, removal of acanthaster)

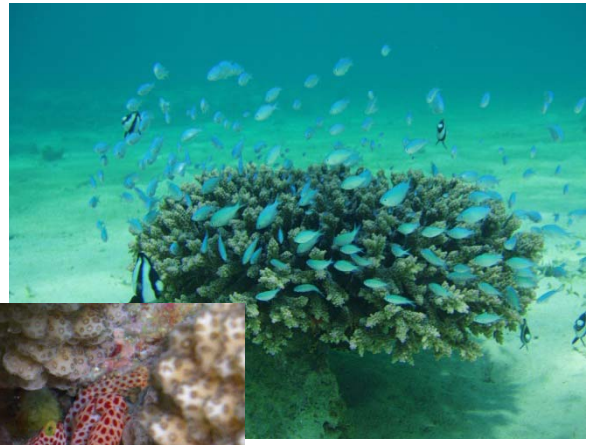
Growth record of planted corals

(OFC, Hotel Diving Center)

Present Condition of the Sea of Okinawa

Corals provide hide-outs and foods !

25% of ocean life depends on coral reef



Life inside Coral

Fish eating coral

Okinawa has about 400 kinds of corals.

Coral reefs are rainforests in the sea !

Human beings also get benefits from Coral

But for corals, man cannot survive ！

Treasury of fishery resources

As building material

What caused coral deaths?

（1） Inflow of reddish soil into the sea (disorderly land development)

→ Administrative measures improved the situation

（2） Damage by crown-of-thorns starfish

→ Major loss of coral caused quantitative balance. Onnason gets rid of them on a regular basis.

（3）Rise in sea temperatures-Biggest threat

→ In 1998 sea temperatures rose rapidly. Rising temperatures forced brown zooxanthella out of coral cells, preventing them from getting energy, turning them white and killing them (bleaching). Since then, Onnason's sea temperatures have been more than 30 degrees Celsius and the hot periods are getting longer, causing planted corals' death.

20 years ago

Affected by
bleaching today

For restoring the sea with beautiful corals

Making of Coral Seedlings

A vinyl house to raise corals

Coral seedlings are put on coral plates made of coral-like components, fixed by wire and controlled by number.

They are raised at an aquafarm for several months and fastened on the coral plates.

Planting Corals

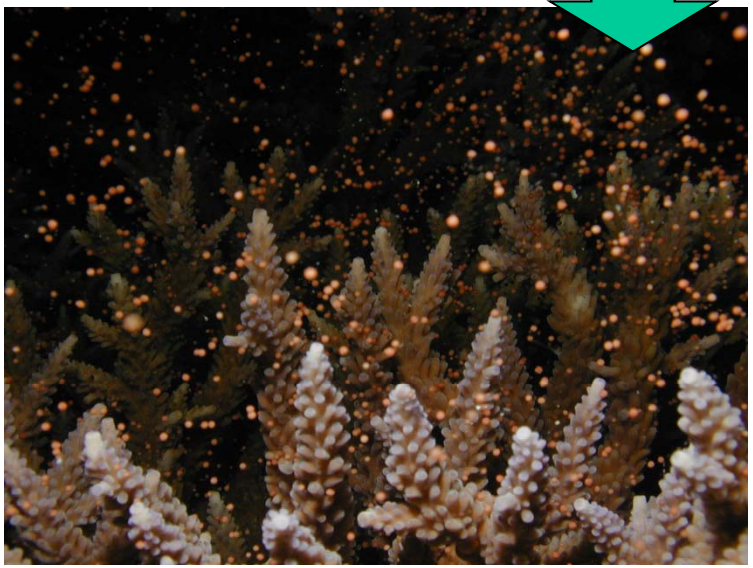
Volunteers do the work

1. Sand on the rock is cleaned and coral plates are screwed on the rock.
2. A protective net is used to prevent damage from fish or crown-of-thorns starlfish.
3. Corals are tagged so that volunteers can recognize them when they come to Onnason again.

Growth Record of Corals

Planted in 2004

4 years later



They spawn naturally when they are around 20 cm.

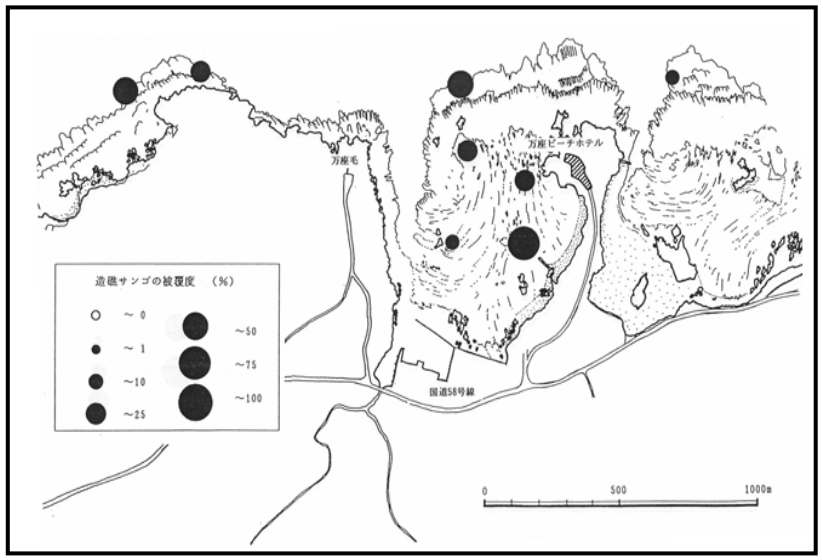
Planting Record

	No. of times	No. of divers	Non-divers	Total	No. of planting
2004年	7回	252人	-	252人	391本
2005年	8回	154人	-	154人	154本
2006年	10回	188人	36人	224人	224本
2007年	11回	285人	94人	379人	285本
2008年	4回	190人	42人	232人	217本
2009年	8回	95人	64人	159人	229本
2010年	5回	107人	178人	285人	243本
2011年	4回	124人	35人	159人	374本
合計	57回	1,395人	449人	1,844人	2,117本

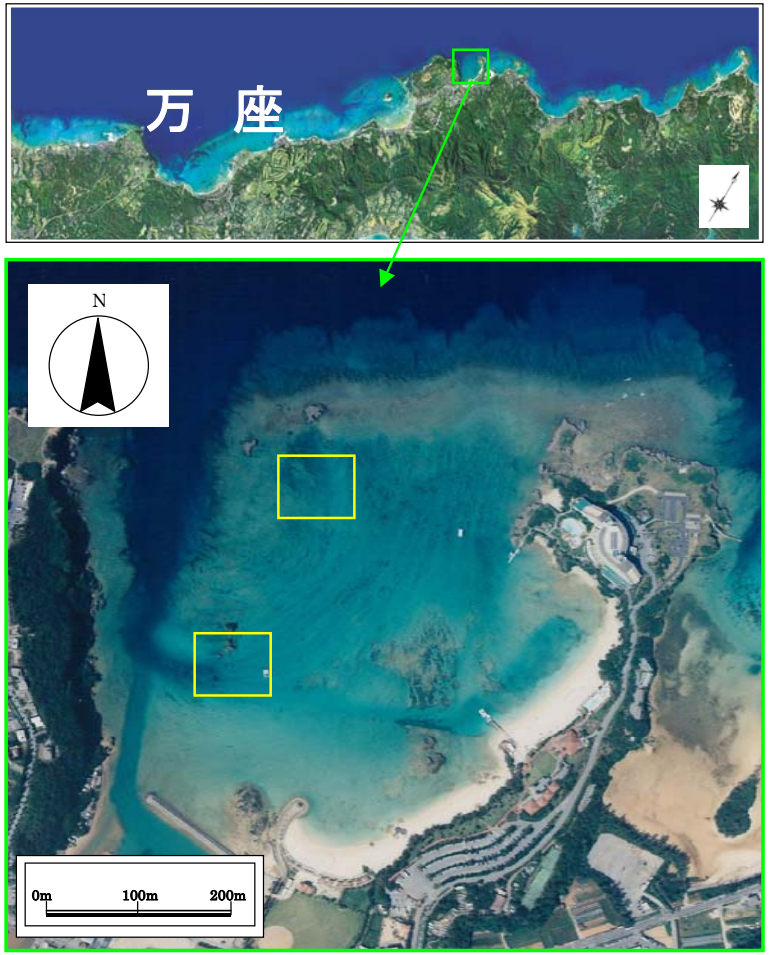
- Recent survival rates are about 50% because of technological improvement.
- Importance is placed on planting by volunteers and not by professionals.
- Not coral breeding but enlightenment through activities is stressed.

Technological Innovation

Selection of Planting Locations



平成4年　サンゴ調査の結果



●Easy to manage

●Locations good for coral survival

Those with high and long-time coverage rate and those resistant to damage from crown-of thorns starfish.

●Locations easy to operate in in terms of waves, current and depth.

Raise more Corals (aquaculture)

① aquaculture facility

② coral fragment

③ Break grown-up corals to increase

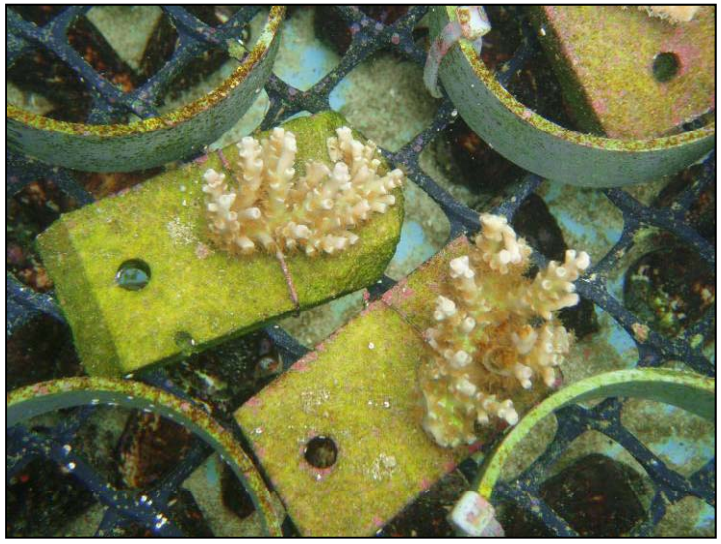
Technical Improvements for Coral Aquaculture

① 2004 pin-type

The planting method was changed in 2005 from pin-type to plate-type.

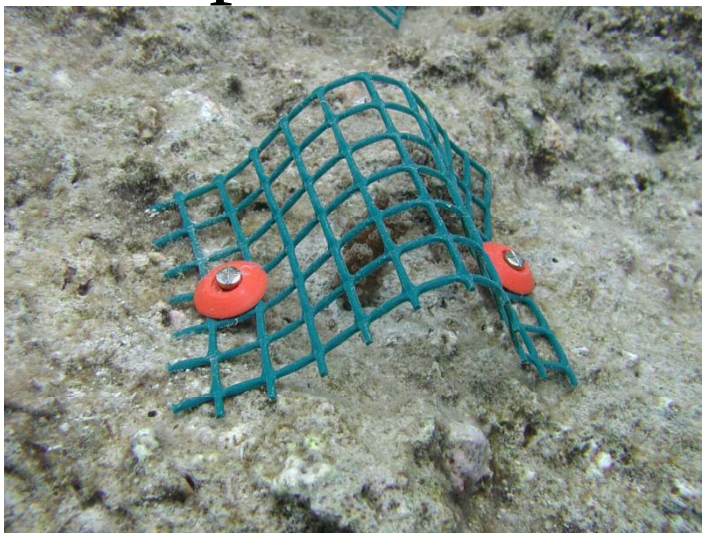
The fixing method was also studied.

② Corals are fixed on a vinyl chloride pipe



③ Since 2005, plate-type

Improvement of Protective Cages



2004

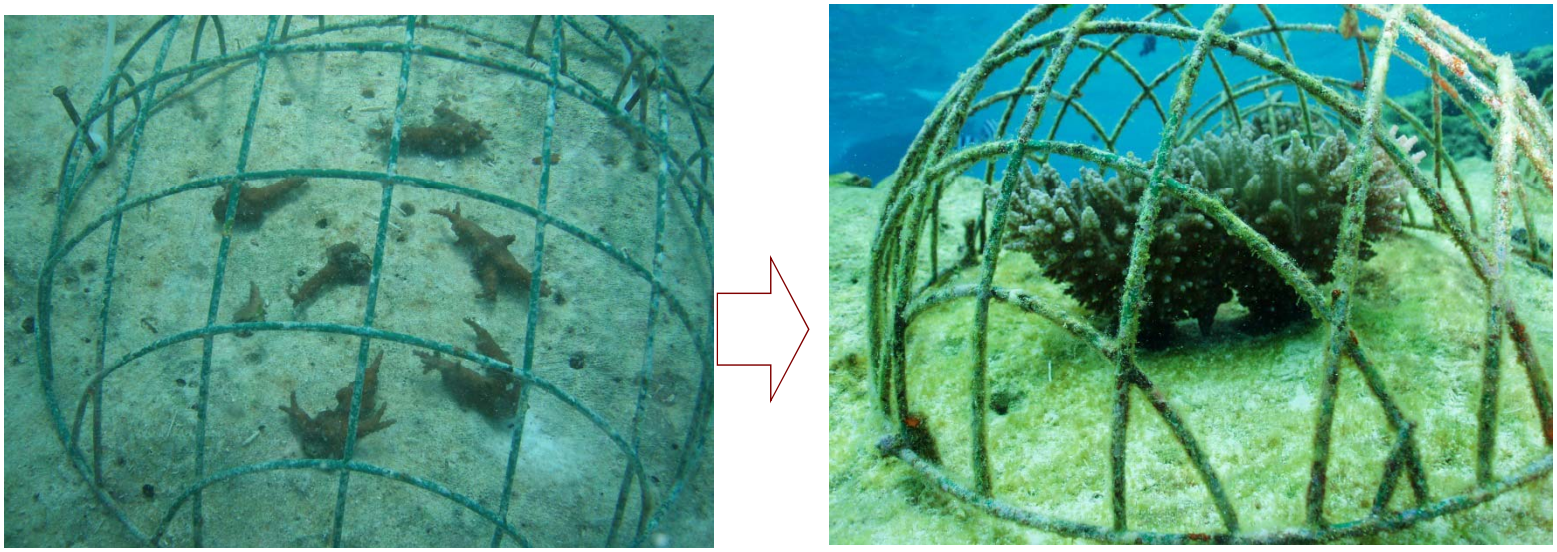
Protective cages were set up as corals were damaged by fish

Autumn 2004

2005

Improved Planting：Group Planting

group planting in a cage --- Fusion helps grwoth.



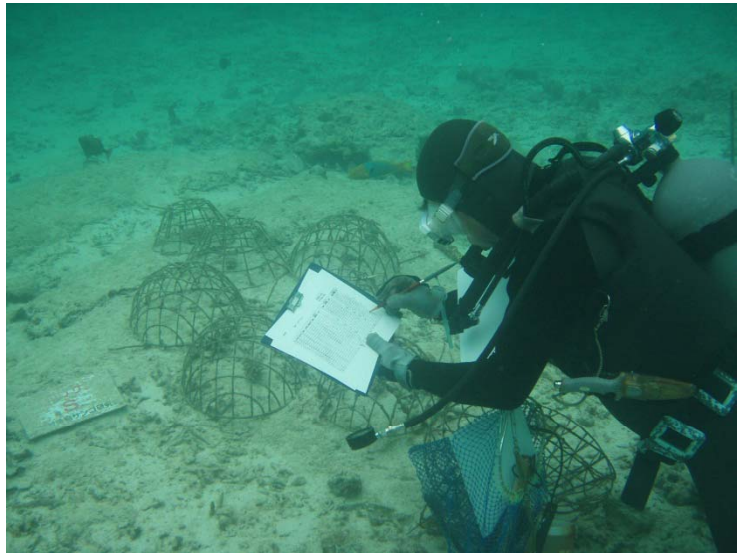
３株が融合

※The same parent strain should be used to get together.

※At the same time, planting was done at different times on the same rock to lessen the risk of bleaching.

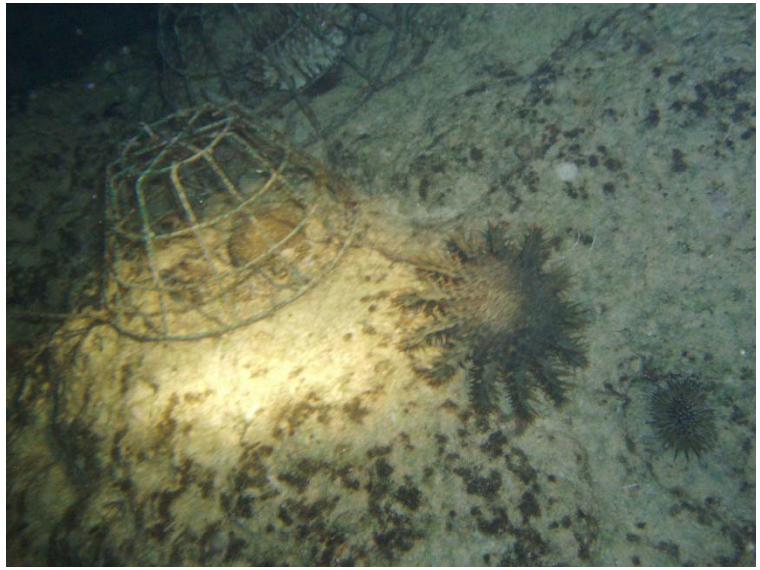
Control and Observation after Planting

① A sign is put on each rock.

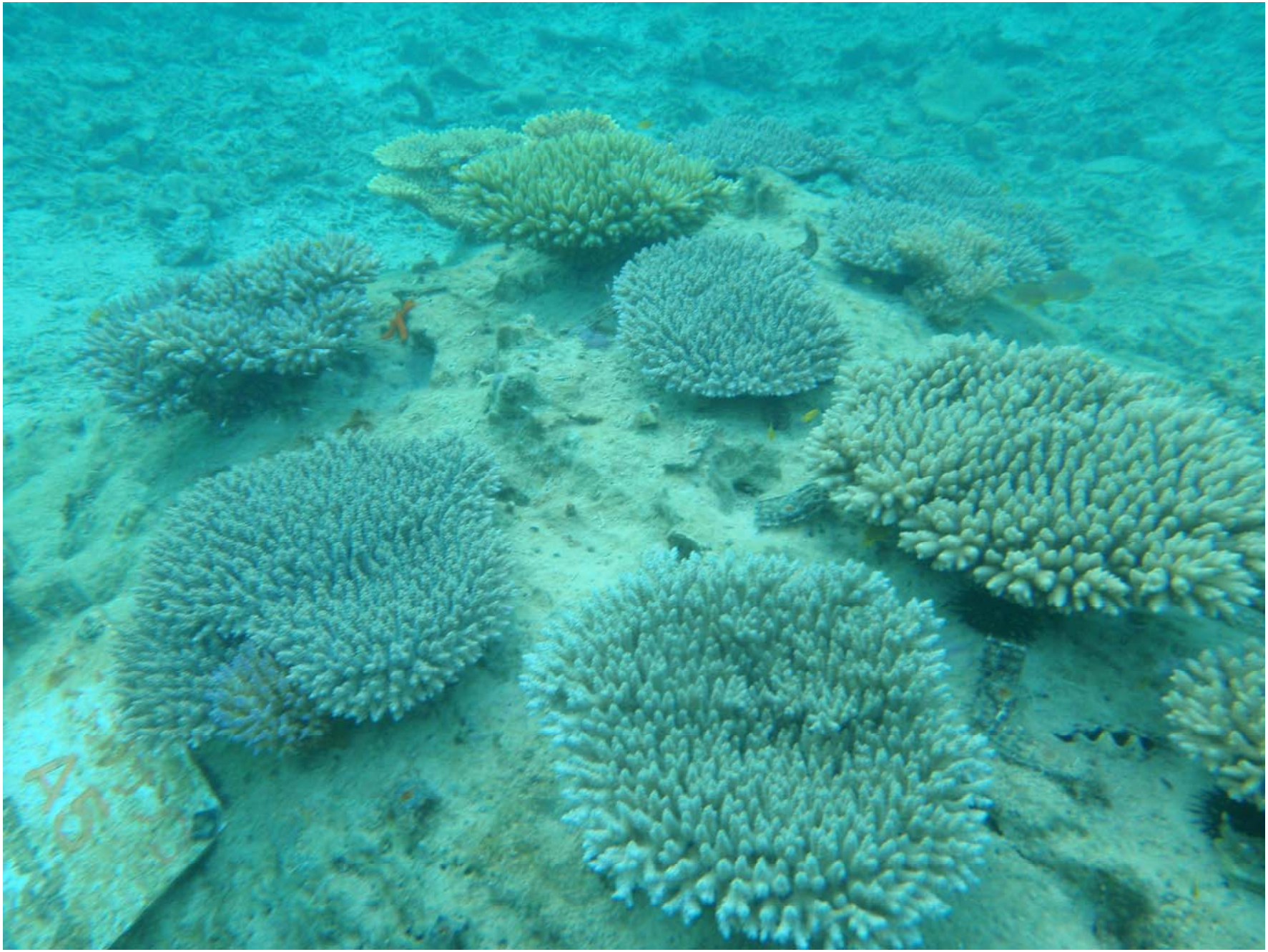


② observation

③ cleaning of the cage



④ removal of crown-of-thorns starfish



Teaching the next Generation

Teaching the next Generation (Tokyo)

- Environment lessons on Okinawa corals in three elementary schools and other places in Tokyo.
- After the lessons, pupils wrote messages on plates for planting seed coral.

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Teaching the future generation (Onnason)

- Neighborhood children were invited to “Coral Festival” (coral quiz, hands-ontraining).
- Children experience seedling-making using plates with messages from Tokyo children.

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Future Plans

① Removal of protective cages
Corals big enough to take fish in are resistant to being eaten.
Protective cages are therefore removed.

② Removal of Crown-of-thorns starfish
Removal is carried out regularly as they increase rapidly.

③ Location and timing of planting
Reefs have high internal temperatures, and if the location is nearer to the outside of the reefs, which are in deeper water, survival rates are high.
Planting is specifically done after summer when temperatures are high.

④ Amount of planting
The more coral seedlings are planted, the higher their survival rates get.

⑤ Kinds of Corals to be planted
A study is being made to make it possible to plant as many high-temperature-resistant kinds as possible.

⑥ Plans are being studied to let more people know about and participate in coral planting.

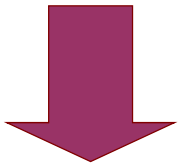
COP10 Biodiversity Convention

From Final Report of the UN Environmental Programme, October 20, 2011

＜Economic Values produced by animals and plants＞

example: coral reefs

：growth of fish; reduction of tsunami damage; tourism resources



Economic Values of $30 – 172 billion

We want to pass on Tyura Sango to our children ！