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Graduates of the Indonesian tools training workshop.
Photo: L. Izquierdo
LEADERSHIP MESSAGE

The Capturing Coral Reef and Related Ecosystem Services (CCRES) project closed on 31 December 2018.

We are proud to say it has been a fantastic journey with an impressive outcome of 16 innovative tools developed, piloted and packaged to support more effective management of coastal resources in the East Asia-Pacific region.

It has been a coordinated, collaborative, and multi-disciplinary effort that included experts in sustainable fishing, systems thinking, marine spatial planning, ecological economics, social science, engineering, business innovation, governance, behaviour change and marketing communications.

More importantly, the engagement of communities and their champions, as well as government and NGOs at a local, regional and national level, has given CCRES a unique insight into how to approach the challenges to sustainability of coastal ecosystems — in particular food security — not only in the East Asia-Pacific region, but globally.

Several government agencies and NGOs are using the tools to address challenges in support of the global agenda to end poverty, eradicate hunger, take action on climate change or restore life below water. The use of the tools has been mapped against 11 United Nations Sustainable Development Goals (SDGs).

In 2018 CCRES focused on:

- Rollout and uptake of the tools, including making the tools available through the website with user-friendly manuals and supporting material to facilitate applications
- Delivering 10 training workshops on how to use the tools to about 735 participants in Indonesia and Philippines
- Promoting the use of the tools in five high-profile events in Indonesia, Philippines, Thailand and Morocco
- Surveying participants who received training or applied the tools

We visited our pilot sites in Indonesia and the Philippines for one last time to formally close the project in July and November respectively, and thank the people and organisations which have supported and collaborated with CCRES. We presented a final report of the site activities at Selayar in Indonesia and El Nido in the Philippines, which included a summary of the data collected and an outline of which tools used the site data in their development.

Currently, CCRES is seeking opportunities for a new project focused on implementation of the tools at the global scale. We will keep you informed through our website which will remain active until 2021.

On behalf of the leadership team, I take this opportunity to once again thank all partners, researchers, friends and supporters of CCRES who have contributed to the project’s success.

Dr Liz Izquierdo
Project Manager
## CCRES and the Sustainable Development Goals

<table>
<thead>
<tr>
<th>Goal</th>
<th>Title</th>
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<tbody>
<tr>
<td>1</td>
<td>NO POVERTY</td>
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<tr>
<td>2</td>
<td>ZERO HUNGER</td>
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<tr>
<td>5</td>
<td>GENDER EQUALITY</td>
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<td>6</td>
<td>CLEAN WATER AND SANITATION</td>
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<td>8</td>
<td>DECENT WORK AND ECONOMIC GROWTH</td>
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<tr>
<td>12</td>
<td>RESPONSIBLE CONSUMPTION AND PRODUCTION</td>
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<td>13</td>
<td>CLIMATE ACTION</td>
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<td>14</td>
<td>LIFE BELOW WATER</td>
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<td>15</td>
<td>LIFE ON LAND</td>
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<td>16</td>
<td>PEACE, JUSTICE AND STRONG INSTITUTIONS</td>
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<td>17</td>
<td>PARTNERSHIPS FOR THE GOALS</td>
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### Marine planning
- Rebuilding reef fisheries with marine protected areas toolbox (MPA toolbox)*
- MPA placement optimization tool
- MPA size optimization tool
- MPA and fisheries simulator
- Fish SPACE
- Policy brief: Healthy fisheries through marine reserves
- Policy brief: Priority reefs for conservation and fisheries replenishment
- Policy brief: Reduced pathogenic bacteria through seagrass protection

### Systems analysis
- SESAMME
- System Simulation Model
- SYSTORY

### Business development
- Ecosystem-based Business Development (EbBD)
- Eco-Biz Challenge

### Behaviour change
- My Future, My Oceans
- FishCollab
- CCRES project

* Contains six individual tools that can be used separately or together
## AT A GLANCE

<table>
<thead>
<tr>
<th>Key results</th>
<th>Our networks</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>3001</strong> Number of direct project beneficiaries (participants at focus groups, workshops, training)</td>
<td><strong>17</strong> Partners</td>
</tr>
<tr>
<td><strong>47</strong> % of the beneficiaries are women</td>
<td><strong>100+</strong> Researchers and experts</td>
</tr>
<tr>
<td><strong>16</strong> Number of tools completed</td>
<td><strong>1200+</strong> Subscribers</td>
</tr>
<tr>
<td><strong>17</strong> Number of journal publications (includes 5 in review)</td>
<td><strong>548</strong> Followers</td>
</tr>
<tr>
<td><strong>45</strong> Number of coastal resource management projects/plans/sites utilising CCRES models or tools in their design</td>
<td><strong>607</strong> Followers</td>
</tr>
<tr>
<td><strong>50</strong> Number of information-sharing and dissemination campaigns</td>
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</tbody>
</table>

A healthy coral reef. Tourism, food and coastal protection are examples of services provided by this coastal ecosystem.

Photo: P Mumby
Our tools

Marine planning
- Rebuilding reef fisheries with marine protected areas toolbox (MPA toolbox)
  - MPA placement optimization tool
  - MPA size optimization tool
  - MPA and fisheries simulator
  - Fish SPACE
  - Policy brief: Healthy fisheries through marine reserves
  - Policy brief: Priority reefs for conservation and fisheries replenishment
- Policy brief: Reduced pathogenic bacteria through seagrass protection
- Reef React
- Coastal Protection

Systems analysis
- SESAMME
- System Simulation Model
- SYSTORY

Business development
- Ecosystem-based Business Development (EbBD) Approach for Coastal Communities
- Eco-Biz Challenge

Behaviour change
- My Future, My Oceans
- FishCollab

Our partners

Implementing agency
- The World Bank

Project funders
- Global Environment Facility (GEF)
- The University of Queensland (UQ)

Project partners

Australia
- Currie Communications
- The University of Queensland (UQ)

Indonesia
- Bogor Agricultural University, Center for Coastal and Marine Resources Studies (IPB-Bogor)
- DINAS Marine and Fisheries, Selayar (DINAS)
- Indonesian Institute of Sciences (LIPI)
- Ministry for Marine Affairs and Fisheries (MMAF)
- Hasanuddin University (UNHAS)

Philippines
- Department of Environment and Natural Resources, through the Biodiversity Management Bureau (DENR)
- El Nido Foundation (ENF)
- El Nido Local Government (El Nido LGU)
- Palawan Council for Sustainable Development (PCSD)
- Palawan State University (PSU)
- The University of the Philippines’ Marine Science Institute (UPMSI)

United States of America
- Cornell University (CU)
- University of California, Davis (UCD)

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Workshop participant and trainer at the marine planning workshop, Tagaytay, Philippines.
Photo: S. Clayton

1. Contains six individual tools that can be used separately or in combination
CCRES has developed a suite of 16 innovative tools to help coastal managers, policy-makers and planners to strengthen and sustain their coastal ecosystems and communities. The tools can be used individually to address a specific coastal challenge, such identifying the size and location of MPAs, or collectively to deliver a system-wide solution.
GETHER COASTAL MANAGEMENT: TOOLS FOR...

DEVELOPING BUSINESSES THAT WORK IN HARMONY WITH COASTAL ECOSYSTEMS
- Ecosystem-based Business Development
- Eco-Biz Challenge

ENCOURAGING GOVERNMENT & COMMUNITY TO WORK TOGETHER TO MANAGE COASTAL ECOSYSTEMS
- FishCollab

FOSTERING SUSTAINABLE BEHAVIOURS THROUGH UNDERSTANDING BENEFITS & REMOVING BARRIERS
- My Future, My Oceans
February

Indonesian training
The project’s first official training of 2018 was completed in Makassar, Indonesia. A team of experts from Australia, Costa Rica, Indonesia and the United States delivered 10 training workshops to more than 80 participants from government agencies, NGOs and research institutes. Participants from the Systems Analysis tools workshops created a What’s App discussion group to keep in contact and provide support to each other in using the tools to tackle coastal management issues.

April

Philippines training
A team of experts from Australia, Indonesia and Philippines delivered 10 training workshops to more than 90 participants from government agencies, NGOs and research institutions in Tagaytay, Philippines. Participants provided excellent feedback on the quality of the training.

April/May

Sharing tools at regional meetings
CCRES attended the Third Targeted Regional Workshop for the Global Environment Facility International Waters Projects from East Europe and Asia-Pacific and the First Annual Asia-Pacific Regional Network meeting in Bangkok. The meetings provided an excellent opportunity to present the CCRES tools and outline their application in coastal management.

June

Strong presence at APCRS
CCRES had a strong presence at the 4th Asia-Pacific Coral Reef Symposium in Cebu, Philippines with several team members presenting on our work and tools. We also hosted a trade booth to allow hands-on experience with our tools. Over 500 participants from more than 30 countries attended the event with the theme of ‘Coral Reefs of the Asia Pacific: Working together amidst contemporary challenges’.

My Future, My Oceans in El Nido
In collaboration with TKDC, My Future, My Oceans was piloted in El Nido, Philippines, with more than 90 women from two villages participating. The tool was applied to improve problem-solving and plastic collection behaviours in the target communities. My Future, My Oceans also supported philanthropic research and focused on the community facilitation skills of local personnel, including barangay leaders, government officials and staff members from TKDC, as well as a group of students from Georgetown University, Washington DC.

Tools showcased in Vietnam
CCRES business leader Assoc Prof Damian Hine (UQ) delivered a presentation on CCRES tools as part of the Blue Economy Roundtable in the 6th GEF Assembly in Da Nang, Vietnam.
July

Farewell to Selayar
We visited Selayar to formally close the project at our Indonesian pilot site. The event was hosted by the Secretary of the Selayar Islands Regency, Dr Marjani Sultan, at the local government offices in Benteng. Indonesian partners, including LIPI, IPB-Bogor and the DINAS Marine Affairs & Fisheries, Selayar, as well as 50 government officials and community leaders attended the event. A report of our work from 2014–2018 at the pilot site was launched at the event and is available on our website in English and Bahasa Indonesia.

CCRES helps reduce plastic waste
Researchers from the CCRES behaviour change and business development teams delivered a new intervention designed to inspire coastal communities to create value from plastic waste. Using the behaviour change tool My Future, My Oceans, and a business development workshop, Waste2Enterprise (W2E), researchers trialled the program in Selayar, Indonesia.

EbDB approach supports local industry
The National Park Service in Taka Bonerate (Indonesia) in partnership with the DINAS independently ran a three-day community event based on the EbBD approach. The event focused on sustainable tourism and small-scale home industries and guest speakers from the CCRES-EbBD workshop were invited.

Building capacity in MPA design
To build capacity and maximise uptake of the MPA toolbox in Indonesia, CCRES recruited a dedicated local trainer to work with partners. He ran a series of training sessions during the year to support effective design of MPAs using CCRES tools.

In the Philippines, UPMSI led a series of training sessions that supported effective design of marine protected areas (MPAs) using Fish SPACE and other CCRES marine planning tools. A baseline workshop held in July with local partners guided the rollout and focused on the provinces of Oriental Mindoro, Palawan and Batangas. The training built capacity in MPA design in a number of organisations. Attendees work in critical sites in the Philippines. Dedicated local trainers worked with UPMSI and the Philippines Country Coordinating Unit to implement the rollout.

August

Advisory Board meets
The CCRES Advisory Board met for the final time at UQ in Brisbane, Australia. Board members kindly shared their expertise and knowledge to guide our activities aimed at maximising the uptake of CCRES tools during the final months of the project and beyond.
2018 HIGHLIGHTS
CONTINUED ...

September

Marine spatial planning in Palau
CCRES provided assistance to Koror State, Palau, to evaluate the role its MPAs play in fisheries management.

MPA size optimization tool used in Caribbean
An MPACconnect training workshop for MPA managers of 10 Caribbean countries used the CCRES MPA size optimization tool.

October

Systems tools trial in Jakarta
In collaboration with the MMAF, a one-month trial of the systems analysis tools was organised. Nineteen people from MMAF participated in two workshops — at the beginning of the trial to learn how to use the tools, and at the end to provide feedback on the experience.

‘Ocean Talk’, Bali
CCRES chief scientist Prof Peter Mumby and Dr Anna Phelan (UQ) gave an ‘ocean talk’ at the Our Ocean Conference 2018, Bali, Indonesia, with the topic ‘Unlocking the value of coastal ecosystems for future generations’. The two-day event brought together 1900 participants from 37 countries, including six state leaders, private companies and at least 200 NGOs, to discuss the themes of MPAs, climate change, maritime security, sustainable fisheries, marine pollution and sustainable blue economy.

November

International Waters Conference, Morocco
At the Global Environment Facility’s 9th International Waters Conference in Marrakesh, Morocco, almost 10% of the event’s 320 delegates attended the CCRES ‘carousel clinic’ as ‘patients’ with water ecosystem ‘problems’. Around 76% of participants agreed the clinic increased their understanding of their pre-identified challenge and their subsequent capacity to implement appropriate tools and solutions.

Speed dating at PEMSEA congress
At the Partnerships in Environmental Management for the Seas of East Asia (PEMSEA) Congress 2018 at Iloilo City, Philippines, 24 delegates joined our partnership hub, ‘Speed-dating with technical tools for strengthening coastal management’. The session used this dynamic short-meeting format to promote use of the tools for marine planning, mapping and modelling systems, developing sustainable enterprises, and promoting positive behaviours.

CCRES tools in PEMSEA Knowledge Bank
Under a new partnership in knowledge management between PEMSEA and CCRES, the CCRES tools are hosted on the SEA Knowledge Bank which is a knowledge platform for policymakers, planners, managers, investors and other stakeholders to scale up Integrated Coastal Management and investment in the sustainable development of coasts and oceans across East Asia.
Goodbye El Nido

CCRES farewelled the El Nido pilot site at a closing event where we reported on the project’s achievements to local stakeholders who were so integral to delivery. Project partners were joined by representatives from local institutions and the community, as well as the TKDC, which played an important role in project rollout. A final report detailed activities and summarised data collected at the site.

December

CCRES evaluation commences

All projects implemented through The World Bank are required to provide an Implementation Completion Report to document the results achieved and lessons learned. The evaluation of CCRES officially commenced in December when the evaluator visited the Philippines and held interviews with a selection of partners and stakeholders in the Philippines, and the CCRES team in Australia.

Project closes

The CCRES project officially closed on 31 December 2018. A final newsletter was sent to more than 1200 subscribers. Minor wrap-up activities and the project evaluation will continue in early 2019.

A suite of tools

CCRES has developed a suite of 16 innovative tools to help coastal managers, policy-makers and planners to strengthen and sustain their coastal ecosystems and communities. These tools include policy briefs; software programs, models and applications (apps); and toolkits.

The tools are used for planning MPAs, modelling socio-ecological systems, developing sustainable enterprises and fostering behaviour change. They have been developed following research by multi-disciplinary teams that include scientists, policy-makers, businesses and other experts from a range of fields — collaboration between centres of discovery, learning and engagement in Australia, Indonesia, the Philippines and the United States.

The tools can be used individually to address a specific coastal challenge, such as identifying the size and location of MPAs, or collectively to deliver a system-wide solution.

The tools are free to use and are downloadable from the CCRES website. Under a partnership in knowledge management between the Partnerships in Environmental Management for the Seas of East Asia (PEMSEA) and CCRES the tools are hosted in the e-library of PEMSEA’s Seas of East Asia (SEA) Knowledge Bank. Some of our partners are also hosting the tools on their websites including UPMSI (all tools) and IPB Bogor (systems analysis tools).
Our footprint

Tool uptake and application

- Marine Planning
- Business Development
- Systems Analysis
- Behaviour Change
- Coastal Governance
Marine Planning (Component 1)

Key results

45+ Number of institutions (research, government and NGOs) which have attended training for MPA design tools

15 Journal publications (includes 3 in review)

42 Number of coastal resource management projects/plans/sites utilising MPA tools in their design
Impact and uptake up to December 2018

**INDONESIA**
- The marine planning tools have been used by WWF Indonesia and MMAF in 27 locations across 34 Indonesian provinces
- The MPA toolbox has been used by COREMAP to develop the National Coral Reef Health Index, which has been applied to all COREMAP sites monitoring data on coral reefs in Indonesia, and for MPA planning at Aceh

**MESOAMERICA**
- The marine planning tools were used to support a RARE project (Belize, Honduras, Mexico); and an MPACOnnect training workshop for MPA managers of 10 Caribbean countries using MPA Size Optimization tool was held

**PACIFIC**
- The government of Palau requested support to assist Koror State to apply the MPA toolbox to support decision-making

**PHILIPPINES**
- Haribon Foundation, which is a Responsible Partner of the DENR/UNDP SMARTSeas PH Project, used Fish SPACE to evaluate marine reserve design and fisheries management initiatives in Lanuza Bay, Surigao del Sur
- SMARTSeas PH is using Lanuza Bay as a model site to roll out the MPA design tools in other Marine Key Biodiversity Areas such as the Davao Gulf and the Verde Island Passage
- CCRES partner organisation PCSD and WWF Palawan are using Fish SPACE and the MPA size and placement optimization tools to support MPA design in Cluster 5 in northeastern Palawan (El Nido, Linapacan, Taytay, Dumaran, Roxas, Araceli)
- Fish SPACE and the MPA size and placement optimization tools were applied in Oriental Mindoro, Lanuza Bay, Palawan and Batangas. Local stakeholders used Fish SPACE to better understand the trade-offs between biodiversity and fisheries priorities, and the MPA size and placement optimization tools to explore different scenarios for individual MPA size and placement to enhance MPA designs
- The Zoological Society of London working in the Panay and Negros islands, and the Macajalar Bay Development Alliance in Misamis Oriental, have included CCRES MPA design tools in their MPA management workplans
- The Protected Area Management Board of the El Nido-Taytay Managed Resource Protected Area will consider Fish SPACE results and associated research in implementing and planning for protection and interventions in the protected area
2018 Activity updates

MPA toolbox rollout builds capacity

A focused rollout of the MPA toolbox took place in the Philippines and Indonesia. Dedicated trainers in each country worked with local partners to run training sessions to support effective design of MPAs using CCRES tools. This built significant capacity amongst participating organisations in both countries.

The rollout assisted interested local partners to optimize their MPA design. It helped participants to answer three important specific questions in marine spatial planning:

- Where should MPAs be placed? (MPA placement optimization tool)
- How much to protect? (policy brief: Healthy fisheries through marine reserves)
- How big should MPAs be? (MPA size optimization tool)

It also involved the use of Fish SPACE (Philippines) and the MPA and fisheries simulator (Indonesia).

The rollout consisted of workshops to demonstrate how to use the tools, as well as communication, consultation and direct technical assistance for local partners interested in using the toolbox in their own areas. Participants included individuals and organisations who had been involved in previous CCRES training and other events, as well as people new to CCRES.

In Indonesia, the rollout focused on planning MPAs in Simeulue (Aceh Province), Sutra (Sulawesi Tenggara Province) and in the Seram Utara and Seram Utara Barat District (Seram Island, Maluku Province).

In the Philippines, the Country Coordinating Unit led the rollout which was kickstarted at a workshop with partners in Quezon City in July. The primary aim of the workshop was to gain resolution on how to operationalize the rollout with local partners and end-users, particularly to develop a shared workplan, and to evaluate the effort needed to address the data requirements to use the tools.

Several organisations that had previously expressed interest in using the MPA design tools were represented at the workshop. This included the PCSD and SMARTSeas PH (United Nations Development Programme and the DENR) with its Responsible Partners — Haribon Foundation, Conservation International Philippines, and WWF. These organisations, whose technical staff were trained in the June 2017 and April 2018 workshops, work in critical sites in the Philippines.

The rollout focused on the Lanuza Bay (Surigao del Sur), Palawan (Cluster 5) and Batangas. ‘Cliniquing’ workshops and direct technical support were provided to Batangas and Palawan, while a collaborative, mentoring approach was used for Lanuza Bay. As a result of this guidance, champions in the participating organisations were trained to be able to independently replicate tools use in their other sites.

El Nido stakeholders run simulations with Fish SPACE at a local feedback workshop on 26–27 September 2018. 
Photo: K. Follosco
As part of the rollout, the tools were evaluated in terms of the usability, scalability and transferability (MPA optimization tool only). General lessons learned from the rollout were also captured to inform future marine spatial planning related training and projects. Feedback from participants was very positive (see Figure 1).

**Fish SPACE launched**

*Fish SPACE*, a software application that shows the effects on fish stocks and fisheries of different marine reserve designs and fisheries management options, was released. Developed by UMPSI, under the leadership of Dr Vera Horigue and Dr Cesar Villanoy, *Fish SPACE* was developed in the Philippine context where best-practice fisheries management is critical because many Filipinos depend on fishing for their livelihoods.

*Fish SPACE* is a spatially explicit model for coral reef fisheries. It can be used to explore the effects of different scenarios, such as the establishment of a marine reserve or a reduction in fish intensity, to see how they would affect fish stocks and, in turn, the fishers. As part of the MPA toolbox, *Fish SPACE* complements other CCRES tools that focus on optimising the size and placement of MPAs.

**Fish SPACE in action at El Nido**

The coral reefs in El Nido are under mixed management, with a large marine park managed by the national government under the National Integrated Protected Area System (NIPAS) on the western side of the municipality, and small marine reserves (CBMPAs) that are co-managed by the local government and communities located inside the large marine park and on the eastern side of the municipality.

These existing management schemes were evaluated using *Fish SPACE* to test their performance over 35 years, and to demonstrate how the results may be useful in informing management decisions in fisheries and conservation.

**Nature paper**

CCRES Chief Scientist Prof Peter Mumby (UQ) co-authored a paper in the prestigious journal, *Nature*, showing how tropical coral reefs in the Indian and western Atlantic oceans are at risk.

According to the paper, more than three-quarters of 200 tropical coral reefs surveyed in these oceans are likely to be more than 50 centimetres deeper beneath the water’s surface by the year 2100.

The research team involving Prof Mumby says modelling suggests this would “open higher wave-energy windows” that would in turn increase sediment mobility, shoreline change and island overtopping.

“Climate-driven perturbations, specifically coral bleaching, can drive major declines in reef accretion potential,” Prof Mumby says.

“The most worrying end-point scenario is that if predictions of increasing bleaching are realised and result in more frequent mortality, reefs may become locked into permanent low-accretion-rate states, leading to increasing rates of submergence under all sea level-rise scenarios. Ocean acidification and thermal impacts on calcification represent additional threats.”

**Users say ...**

*The policy briefs were useful to assess existing policies and how the latter can be enhanced further.*
Prof Mumby also says that efforts to improve coral resilience at the local scale will remain important to minimise the rate at which the reefs become submerged.

“The more coral there is, the greater the rate at which reefs can keep up with rising sea level,” he says.

A copy of the paper, Loss of coral reef growth capacity to track future increases in sea level, is available on Nature’s website.

**Analysis of marine conservation governance**

An institutional analysis of marine conservation governance in El Nido was completed and submitted to the journal Conservation and Society in November 2018 by researchers at UPMSI. This paper describes how protected areas were established and amended in relation to the shifts in the governance system of the Philippines and influx of donor-assisted projects. It also discusses the need for improving governance capacity in El Nido, and in areas with similar contexts.

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**Users say ...**

*We used the MPA tools to validate the placement of the MPAs in Lanuza Bay. We used these tools to determine if sizes of the MPA adequately protects selected reef-associated fishes.*

**Users say ...**

*We used Fish SPACE to show if the size and number of the MPAs affect the fish caught and the number of reef-associated fishers. It was used to help show and validate with the local government staff and officials, and MPA managers, if the number and size of the MPAs were enough and if there was a need to put in place fisheries management strategies (e.g. gear restrictions, closed season for certain species).*

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**Our researchers say ...**

Dr Vera Horigue, The University of the Philippines Marine Science Institute

“The biggest impact for me during the rollout was when government officials and communities realisate that the few small marine reserves that they have were not enough to sustain the fishery. When they see the results of Fish SPACE simulations they would say, “hindi sapat” or “kulang”. And when asked what they can and would do next, they would say they would put up more and bigger MPAs. As a conservationist, this is a good start. It is something we could work with, because actions always begin when people recognise and accept that there is a problem and that it should be addressed. That’s what CCRES, Fish SPACE and the rest of the MPA toolbox did for the people we trained and worked with.”

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Dr Vera Horigue (pictured left) with Graceous Von Yip, a participant of the tools training workshop, Tagaytay.

Photo: L. Izquierdo
In focus: Indonesian partners plan MPAs with CCRES tools

NGO and government partners in Indonesia are now designing MPAs for 27 locations across 34 provinces using CCRES’s MPA toolbox.

WWF Indonesia and the MMAF were introduced to CCRES’s MPA toolbox at two workshops in 2017.

At these workshops, attendees set out to support improved MPA design for fisheries. They installed CCRES’s new marine planning software tools onto their own computers in order to design MPAs.

The activity focused on the benefits of effective MPAs, reef vulnerability and coral reef connectivity, as well as the overall coverage, size and placement of strict no-take fishery reserves.

“"In the past, MPAs were created to protect biodiversity. Now the focus is shifting towards designating areas based on building fisheries," says Prof Peter Mumby, CCRES Chief Scientist, who led the workshop together with Dr Nils Krueck (CCRES MPA Design Specialist), both from UQ.

The workshop was a collaboration between the CCRES project and Estra Divaria and Christian Handayani of WWF Indonesia — based on a related project funded by the Australian government (ARC Linkage). The workshop provided the opportunity for participants from diverse areas around Indonesia to share their experiences and knowledge of the systems and practicalities of MPA design.

Now in 2018, the learnings from the workshop are being applied across Indonesia.

Ms Divaria says there is more ocean data today than at any time in the past 100 years, but often it can be time-consuming and difficult for key stakeholders to use this data to inform management and conservation.

“The CCRES MPA tools have helped us to systematically determine the best possible scheme to optimize MPA design to support fisheries, in a user-friendly way even for practitioners with less scientific capacity,” she says.

“They also allow key stakeholders to discuss various scenarios to achieve conservation targets.”

“It was fantastic to see local NGOs taking our new connectivity optimization tool [the MPA and fisheries simulator] and already applying it to advise on MPA design questions in the Sunda Banda [a seascape within The Coral Triangle],” Dr Krueck says.

“It has been an inspiration for us at CCRES to hear the challenges these practitioners face, and for us to consider ideas for research to address those problems,” Prof Mumby says.
SYSTEMS ANALYSIS

(COMPONENT 2)

Key results

36  Number of locations where focus groups were held to build five system maps for socio-ecological problems

1417  Number of participants at SESAMME focus groups in Indonesia and Philippines during 2015–2017

19  Participants in dedicated SESAMME user-testing trial

Participants in the Jakarta tools trial.
Photo: L. Izquierdo
Impact and uptake up to December 2018

INDONESIA

• The use of SESAMME and SYSTORY by students from UNHAS at two islands in South Sulawesi (Kodingareng Lombo and Barrang Caddi) to bring to people’s attention that the reef environment acts as a natural barrier to the shoreline
• The Small Islands Initiative for a Plastic Free Ocean, funded by UQ’s Global Change Institute, will use SESAMME at four sites in Indonesia for focus group discussions about community-based waste management strategies and primary drivers, including supply chains, of single-use plastic in small island communities, among other issues

PHILIPPINES

• In the Philippines, SESAMME and SYSTORY have been used by the Eastern Visayas University in undergraduate and graduate teaching programs
• SYSTORY has been used by RARE at the workshops ‘Fishforever 2.0’ held in Lapu-Lapu (June) and ‘Adaptive Fishery Assessment and Management’ (AFAM) for Luzon cluster, held in Tagaytay (July) to demonstrate how different policy levers affect the outcome of marine ecosystem integrity
• SYSTORY has been used by the Guimaras Environment and Natural Resources Office, Province of Guimaras during the Summer Eco-Camp held in May as part of an information, education and communication campaign on coastal resources delivered to 50 youth participants

CCRES has built capacity in local partner teams to apply systems thinking and SESAMME beyond the project. This is evidenced by the El Nido Foundation (ENF) using SESAMME in a proposed reforestation project; PCSD using SESAMME in marine spatial planning projects; PSU using SESAMME in PhD projects and other research projects; and at least two partner participants integrating systems thinking into their higher degree research as a result of CCRES trainings

LEGACY PROJECT

• A proposal involving the uptake of SESAMME and SYSTORY was submitted to the GEF-funded Regional Pacific IW Ridge to Reef Program project ‘Develop National Ridge to Reef (R2R) Diagnostic Reports’ which would see the tools being used in 14 Pacific Island countries: Cook Islands, Federated States of Micronesia, Fiji, Kiribati, Nauru, Niue, Palau, Papua New Guinea, Republic of the Marshall Islands, Samoa, Solomon Islands, Tonga, Tuvalu and Vanuatu

Systems analysis tools training, Jakarta.
Photo: L. Izquierdo

Systems Simulation Model training, Makassar, Indonesia.
Photo: L. Izquierdo

Systems Simulation Model training, Makassar, Indonesia.
Photo: L. Izquierdo
2018 Activity updates

**SESAMME and SYSTORY publicly available**

The system analysis tools SESAMME and SYSTORY were beta tested by users in training sessions and then made publicly available from the Apple Store and Google Play in August.

In response to strong stakeholder feedback, Android versions of SESAMME and SYSTORY were also developed. PC and Mac versions (available via the CCRES website) for both tools were also developed.

Both tools have built in ‘help’ functions to support users.

**Systems Simulation Model refined**

The Systems Simulation Model was further refined during the year following feedback received in the training sessions. A new version of the model and user guide were released.

**Integration in the Filipino curriculum**

SESAMME and SYSTORY are being integrated into lesson plans for elementary, junior high, senior high and college students at PSU in the Philippines (see page 23 for more detail).

**Spotlight on SESAMME**

In collaboration with our partner organisation MMAF, CCRES organised a one-month trial of the SESAMME tool in Indonesia.

Nineteen people from MMAF units participated in two workshops — one at the beginning of the trial to learn how to use the tools, and the second at the end to provide feedback on the experience (see page 24 for more details).

**Users say ...**

*The SESAMME and SYSTORY tools were so useful in simulating future scenarios given the present conditions in the coastal communities of Tacloban City, Leyte, Philippines.*
**In focus:**

**Systems thinking to reach young minds**

CCRES systems analysis tools SESAMME and SYSTORY are being integrated into lesson plans for elementary, junior high, senior high and college students at Palawan State University in the Philippines.

A new K-12 curriculum rolled out in 2013, followed by implementation of Grade 11 and 12 curriculums just two years ago, has a vision of “holistically developed Filipinos with 21st Century skills”.

“Some of the key skills that we are building in students are critical thinking and complex problem solving, and systems thinking is a component of that,” says Marissa Pontillas, Faculty member at PSU’s College of Teacher Education.

Marissa was part of CCRES’s Systems Analysis team that developed the tools to assist systems thinking, including the SYSTORY and SESAMME apps which can be used on iPads, iPhones and — coming soon — Android devices, Windows PCs and Mac computers. She recognised the opportunity to integrate the tools into the curriculum at Palawan State University and beyond.

“We want our curriculum to be contextualized and localized. We always want to connect what our students are learning with their situation and their environment,” says Marissa.

“I think the fact that these tools were developed with El Nido as the pilot site will help the students become better systems thinkers. Systems thinking allows them to have a wider perspective — not just of the short term, but of the long-term too. They will think about the long-term effects and consequences of what we do with our resources, what activities we do, and the pressures that affect these resources and activities.”

So far, 22 PSU faculty members have been introduced to the tools in a recent seminar, to see their application and consider how they could be mapped to the curriculum and integrated into their teaching.

“We asked the participants to develop lesson plans to show how they would integrate them,” said Marissa.

“Once they’ve been further developed, we’ll share the lesson plans with other teachers to use as guides.

“Our younger students are interested in applications they can explore, so by using these tools, teachers will not find it difficult to teach systems thinking or topics like ecosystems.”

“In using the apps in teaching, the students will be motivated to learn because their generation enjoys innovative technology and gadgets,” says Rolex Sudara, a PSU teacher who has been involved in developing the lesson plans.

The lesson plans and teaching guides are still under development, but the aim is for CCRES knowledge tools to be made available to both basic education and college teachers across Palawan — for use in science and other disciplines.
In focus: Testing SESAMME

In collaboration with our partner organisation the Ministry of Marine Affairs and Fisheries, Indonesia, CCRES organised a one-month trial for the SESAMME tool.

Nineteen people from MMAF units participated in two workshops — one at the beginning of the trial to learn how to use the tools, and the second at the end to provide feedback on the experience.

The overwhelming majority (91%) said they would recommend or highly recommend using the tools for coastal management (see Figure 2).

Seventeen of the 19 participants reported using the tools during the trials, with 15 times the highest recorded use.

All participants successfully used the menu to navigate through SESAMME during the trial, with 64% saying they found the tool easy to navigate, 27% found it moderate, and 9% finding it difficult.

The participants created multiple maps, with 46% creating up to two maps; 39% up to four maps; and 15% up to six maps. Scenarios used for the maps included biodiversity, marine spatial planning, sustainability of fisheries, conservation programs and MPA analysis.

From these five themes, conservation planning was the highest application of the tool (see Figure 3), however all themes were identified as being applicable in participants' roles. Specific examples of how the tool was used included analysing the decline in marine mammals in a particular province, analysing the results of discussions on zoning plans at both the central and regional levels, and determining the weaknesses in conservation areas.

Some trial participants flagged technical issues in using the tools which will inform updates in any subsequent versions.

In addition to the Indonesian trial, CCRES sought feedback on the systems analysis tools from participants in the tools training workshops in Makassar and Tagaytay (see page 48 for more details on the survey outcomes).

One participant in the Makassar training said: “SYSTORY and SESAMME are very interesting tools that will help data collection and community engagement. It is very helpful with the visualisation and simulation.”

Another said: “The SESAMME and SYSTORY tools were so useful in simulating future scenarios given the present conditions in the coastal communities of Tacloban City in the Philippines.”

Users of the tools were very keen to see Android versions of SYSTORY and SESAMME which were subsequently developed as a result of this feedback. Modifications to the user interface and more functions have also been added in response to the feedback.
Graduates Gianina Decano and Eva Marie Ponce de Leon, from Palawan State University, together with Bryan Matillano, and trainers Russell Richards, UQ, and Novie Setianto, IPB-Bogor, at the systems analysis training at Tagaytay, Philippines, during April 2018. Photo: L. Izquierdo

Our researchers say ...
Dr Russell Richards, The University of Queensland

“The enthusiasm, input and testing from our in-country partners in CCRES have been invaluable in taking SESAMME from a concept to an engagement tool. SESAMME appears to have really connected with the people we have engaged with in our studies in the Philippines and Indonesia.”
BUSINESS DEVELOPMENT

(COMPARTMENT 2)

Key results

3 Eco-Biz Challenge winners and a runner-up announced in Selayar
3 Eco-Biz Challenge winners and a runner-up announced in El Nido
230+ Participants in Waste2Enterpise workshops at Taka Bonerate, Selayar
80+ Participants in Waste2Enterpise/My Future, My Oceans intervention workshop, Selayar

Eco-Biz Challenge business skills workshop, Puerto Princesa.
Photos: L. Izquierdo
Impact and uptake up to December 2018

INDONESIA
• The Eco-Biz Challenge has kick-started a small aquaculture business focusing on floating grouper and lobster growout cages; a conservation-of-mangroves business and educational tourism ‘One Mangrove One Student’; and a handicrafts shop with products made from recycled waste.
• New businesses are being created as a direct result of the Ecosystem-based Business Development (EbBD) program. After receiving EbBD training, villages in Selayar — Patikarya, Barat Lembongan, Gusung Barat and Bahuluang — are implementing community-based tourism through homestays.
• The EbBD approach has been used by the National Park Service in Taka Bonerate, Indonesia, in partnership with the DINAS (government unit) to promote sustainable tourism and small-scale home industries and obtain commitments for a number of biorock installations around Selayar to promote eco-tourism and support conservation efforts.
• Organised by DINAS and the Taka Bonerate National Park, the Waste2Enterprise (W2E) workshop was run by UQ in collaboration with LIPI as part of the National Park Jamboree. The workshop is an extension of the EbBD workshop that empowers villagers to use business solutions and community-based management to address the critical issue of ocean plastics.
• The largest sustainable seafood exporter in Indonesia is assessing the possibility of Selayar being the site of its second integrated sustainable small-scale fisheries program.

PHILIPPINES
• The Eco-Biz Challenge has generated businesses using coconut as an alternative to mangrove wood: eco-tourism in the mangroves; cultivating giant bamboo to reduce logging in native forests; and supplying ornamental native flowers to the tourism industry.

2018 Activity updates

Eco-Biz Challenge delivers
The El Nido Eco-Biz Challenge winners were announced in January in a ceremony involving local partners (see ‘In focus: Eco-Biz Challenge winners announced’ page 29). In Indonesia, the Eco-Biz Challenge winners progressed their business ideas, one of which involved recycled tyres. A six-month monitoring and mentoring program allowed CCRES to track the progress of the winners and semi-finalists in both pilot sites during the year. As part of the mentoring program, Dr Anna Phelan (UQ) in collaboration with the Econatural Society, visited Selayar in April to follow up with the winners.

EbBD at work in Selayar: Waste2Enterprise
CCRES’s EbBD tool is used when there is a need to increase the knowledge capacity and business skills in coastal communities to help address local economic and environmental challenges. It is the basis for the Waste2Enterprise (W2E) workshop which was rolled out in Selayar during the year in conjunction with CCRES partners DINAS and LIPI, led by Dr Anna Phelan (UQ) and Pak Firman Tri Ajie (LIPI).

W2E provides participants in low-resource coastal communities with adaptable strategies for improving waste management. The workshop provides participants in coastal communities with:
• a better understanding of available opportunities for capturing value from the plastic waste they collect in their village and coastlines; and
• ideas for sustainable enterprise-led solutions that support small-scale entrepreneurship and homegrown innovation.

The first W2E workshop or ‘waste management coaching clinic’ was run in conjunction with LIPI at Benteng, Selayar, with 62 participants in January.

In April the W2E workshop was held in three locations in Selayar as part of the Taka Bonerate National Park Jamboree. Dr Phelan (UQ) and Firman Tri Ajie (LIPI) delivered the first session on Tinabo Island attended by approximately 150 people, including local residents from neighbouring islands, divers and tour operators from Selayar and other parts of Indonesia, and a handful of international visitors. Workshop leaders then visited nearby Rajuni Island where they presented to a group of about 80 people, and then travelled onto Jinato to deliver the final workshop.
The content of the W2E workshop gives attendees a broad understanding of plastic’s origins and its impacts on marine animals and people’s health — both at the global and local scales. Dr Phelan shared an adaptable community-scale waste management plan template to help participants think about how they could create positive change.

The content and approach of the EbBD-based workshop aligns with the Indonesian Government’s policy for linking local economies and improving business supply chains across the archipelago.

The CCRES business team monitored the uptake of this integrated approach to small-scale fisheries management, shortening the supply chains of value-added products and promoting the role of women in artisanal fisheries.

In July the business development and behaviour change teams joined forces to run a further combined W2E and My Future, My Oceans workshop to address the waste issue in Parak village (see page 36 for more details).

Users say ...

“I learned that doing business is a step-by-step process. It is only now that I understand how important it is to study everything or all aspects of a business before actually creating one.”

Ana
In focus: Eco-Biz Challenge winners announced

In January, the El Nido Eco-Biz Challenge winners were selected from 56 original applicants and 28 semi-finalists. The three winners, Jonie Fernandez, Michael Magnol and Joenly Naranjo, and the runnerup, Sonia Yntas, were selected for their inventiveness and the positive impact of their eco-business ideas.

The winning ideas included eco-charcoal (using coconut as an alternative to mangrove wood for cooking); eco-tourism in the mangroves; sustainable horticulture (cultivating giant bamboo to reduce logging in native forests); and supplying ornamental native flowers to the tourism industry.

El Nido Mayor Nieves Rosento presented each winner with a cheque for PHP 50,000 (approximately AUD$1,500). A couple of the semi-finalists’ businesses also received funding and support from local non-government organisations. In this way, CCRES expanded awareness of the nascent entrepreneurs and their businesses, and alerted existing local organisations to new opportunities and pathways to support their local economy and coastal ecosystem simultaneously.

Local partners in the initiative included TKDC, El Nido LGU and PSU.

We also announced the Eco-Biz Challenge winners in our Indonesian pilot site Selayar where we had 143 applications and 53 semi-finalists engaged in the business skills training. The three winners were entrepreneurs with business ideas for educational eco-tourism, sustainable aquaculture and plastic waste management. These local entrepreneurs were:

- Muhammad Taufik: a small aquaculture business focusing on floating grouper and lobster grower cages. He is also propagating mangrove seeds in collaboration with another Eco-Biz finalist, Nur Hikmah
- Nur Hikmah: a small eco-tourism business called One Mangrove One Student, focusing on conservation of mangroves, awareness and educational tourism for local school children
- Dita Azzahrah: a small gallery which is focused on products, including handicrafts, made from plastic waste, as well as bags and small tables, made from recycled tyres.

The Eco-Biz Challenge in Indonesia was co-hosted by our partner organisation LIPI.
Legacy: Small islands initiative for a plastic-free ocean

The Global Change Institute (GCI) Flagship Project ‘Small Island Initiative for a Plastic Free Ocean’ led by Dr Anna Phelan and Professor Helen Ross commencing in 2019 is focused on reducing ocean plastic pollution in remote coastal communities.

This project is in collaboration with LIPI and will be conducted at four sites in Eastern Indonesia. The aim of the project is to examine factors contributing to ocean plastic pollution in remote, low-resource coastal communities and understand community dynamics related to the use and disposal of single use plastics. CCRES researchers, Dr Carl Smith (UQ) and Dr Novie Setianto (IPB Bogor), are also involved and plans are underway to use the CCRES tool SESAMME. Project findings will help identify key pathways for reducing and preventing single-use plastic leakage into the marine environment.

Proposal for marine waste recycling

A proposal (to be submitted to USAID) is currently being developed by PSU and the business development team on marine waste recycling involving the application of business and behaviour change tools.

Users say ...

“Environmental conservation has always been very important to me but before, I did not think that it could be used to create business opportunities. The Eco-Biz Challenge workshop made me realize that there are also businesses that can provide sufficient income and at the same time, promote environmental conservation.”

Bobby, Participant El Nido Eco-Biz Challenge
Our researchers say ...
Assoc Prof Damian Hine, The University of Queensland

“The most exciting thing for me is to see our tools being used and to see the difference that they make to the participants in our workshops. Participants come from villages and barangays and have never done any business training at all. After three days in our workshops we get almost all of them fully understanding the essential features of running a business. There is a lot of dependence on government and NGOs. What we need to do is develop enterprise-led solutions, that is, people who start their own business through their own innovations. The more of those that we have, and the more successful they are, then I think a lot more solutions can be achieved because we can’t just depend on government and NGOs.” (Assoc Prof Hine pictured centre)

Users say ...

“The Eco-Biz workshops made me re-evaluate the steps in my business. It also made me value the relations (with indigenous suppliers) that I have… they have helped me grow my business through the supply that they deliver.”

Sheba, Participant El Nido
Eco-Biz Challenge
# BEHAVIOUR CHANGE

**(COMPONENT 3)**

## Key results

<table>
<thead>
<tr>
<th>Number</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>144</td>
<td>Number of beneficiaries trained to be village heroes (champions of behaviour change) with <em>My Future, My Oceans</em></td>
</tr>
<tr>
<td>50+</td>
<td>Number of end-users trained to use tools, outputs in Indonesia and the Philippines</td>
</tr>
<tr>
<td>6</td>
<td>Number of locations in Indonesia where <em>FishCollab</em> is being used to strengthen coastal governance and alleviate fishers’ poverty</td>
</tr>
</tbody>
</table>
Impact and uptake to December 2018

INDONESIA

- *FishCollab* will be rolled out at five locations across Indonesia during 2018–19 — Langkat, North Sumatra; Lampung, South Sumatra; Demak, Central Java; West Nusa Tenggara, East Lombok; and Selayar, South Sulawesi — in a trial by LIPI to develop effective interventions for tackling poverty in fishing communities.
- Parak village, Selayar, has used *FishCollab* to prepare community-designed MPAs and a management plan that has been submitted for recognition and support by the provincial government.
- Following its use of *My Future, My Oceans*, in conjunction with the *EbBD* workshop, *Waste2Enterprise* (W2E), the Parak community at Selayar, Indonesia — with support from LIPI has established a garbage bank to create alternative livelihoods from the collection and value-adding of plastic waste.

PHILIPPINES

- *My Future, My Oceans* has been used by eco-tourism operator TKDC, in partnership with the CCRES project, to empower villagers to improve waste management near one of its resorts at El Nido in the province of Palawan.

2018 Activity updates

Validation for *My Future, My Oceans*

In May 2018 a pilot-test of the behaviour change tool *My Future, My Oceans* in Bebeladan village at the pilot site in the Philippines, El Nido, validated use of the tool outside Indonesia (see page 34 for more details). *My Future, My Oceans* was validated in a second village at the pilot site in Indonesia when it was used in conjunction with a *Waste2Enterprise* (W2E) workshop with the Parak village community (see page 36 for more details).

Users say...

"FishCollab [helps] to further expand collaboration between agencies."

"We will use FishCollab to explore stakeholders’ views in relation to managing the river fishery. It would be good if it overcomes the existing conflict or other problems associated with cultivation activities."
In focus: My Future, My Oceans comes to El Nido

The low-cost CCRES behaviour change tool *My Future, My Oceans* was piloted at El Nido in the province of Palawan, in the Philippines, in partnership with TKDC.

The trial sought to validate use of the tool outside of Indonesia where it has been used to improve waste management in a village on Selayar, the CCRES pilot site.

In the Philippines, the main behaviour targeted was plastic collection. Almost 100 women from two villages were involved. The activity was led by *My Future, My Oceans* leader Erik Simmons (UQ), in collaboration with Mariglo Laririt, Head of Environmental and Sustainability Initiatives, at El Nido Resorts, part of TKDC.

At El Nido, the core psychological competencies and behaviours targeted were plastic collection; problem solving skills; checking whether the fish participants consume are caught safely or by destructive methods; perceived responsibility for the state of the environment; satisfaction with life; and perceived impact of actions on the environment.

Enhancing the philanthropic research and community facilitation skills of local personnel, including barangay leaders, government officials and staff members from Ten Knots, as well as a group of students from Georgetown University, Washington DC (attending a TKDC summer internship program) was one of the objectives of this El Nido partnership.

Ms Laririt, also a member of the CCRES Technical Steering Committee, said: “This activity is providing unique opportunities for our interns to gain applied philanthropic research experience first-hand. They will assist with data collection, community outreach, and logistical support. They will also be trained to use the *My Future, My Oceans* tool.”

Mr Simmons, a PhD student with the Triple P Innovation Precinct group at UQ, says: “We measured outcomes at two points: directly prior to implementation and directly after the program. The results were reported to all involved parties and the outcomes in the Philippines were consistent with the results from our work in Indonesia.”
Our researchers say ...
Prof. Jamaluddin Jompa, Hasanuddin University

“Most Indonesians have not realised the significant roles of seagrasses, especially in the context of reducing pathogens that could endanger both people and nearby ecosystems. The findings show that we need to think of seagrasses as a national treasure. These findings will urge government and communities to consider allocating more seagrass ecosystems as “no take areas” and to restore seagrass habitats that have been badly degraded.”
In focus: 
CCRES tools combine for added impact

Researchers from the CCRES behaviour change and business development teams have delivered a new intervention designed to inspire coastal communities to create value from plastic waste.

Using the behaviour change tool My Future, My Oceans and a business development workshop, Waste2Enterprise (W2E), researchers trialled the program at Selayar, Indonesia, during July.

Both My Future, My Oceans and Waste2Enterprise had been used at Selayar but never together.

Previously, My Future, My Oceans has been used to improve waste management in Bontolebang village, Selayar. In this trial, shifts in human psychology and behaviour were sustained four months after it was delivered.

Since January the business team has been using Waste2Enterprise to spread the word among coastal communities about how to use business solutions and community-based management to address the critical issue of ocean plastics.

For the joint My Future, My Oceans/Waste2Enterprise activity, 96 women from two villages — Parak (intervention) and Padang (control) — were recruited for a four-day program that included facilitator training and participant workshops. Eleven psychometric indicators for women in both villages were measured before and after the trial.

“We found similar, consistent findings to our previous trials. Women felt empowered, and we witnessed demonstrable changes in behaviour. Integrating our behaviour change work with Waste2Enterprise provides these communities with a viable means to turn their behaviour into an alternative revenue stream,” says research leader Erik Simmons (UQ).

The Parak group posted higher post-trial scores for attitude and perceptions, including perceived plastic collection, problem solving skills and perceived responsibility for the environment. The results validate the use of My Future, My Oceans at a second village in Indonesia.

The last day of the trial was the Waste2Enterprise workshop. It included information and awareness sessions plus group activities and testimonials. The program was led by Dr Anna Phelan (UQ) and Pak Firman Tri Ajie (LIPI).

The aim of the workshop was to inform participants about the global challenge of ocean plastic and to empower them towards community-led waste management using specific examples and simple strategies. Participants were encouraged to develop their own business ideas for reducing, converting and collecting plastic waste to support sustainable livelihoods.

A W2E workbook which included a template for an adaptable community-scale waste management plan was shared with participants to help them think about how they can manage plastic collection, conversion and mitigation.

The women’s ideas included reducing the use of single-use plastics through reusable baskets and containers, expanding the existing garbage bank and establishing a recycling facility, looking at more innovative ways at being a ‘successful collector’, and exploring potential markets for handicrafts made from plastics.

“It was clear that many of the Parak women care deeply about their community and were very interested to explore enterprise-based solutions for addressing plastic waste management,” says Anna.

Women from Parak village, Selayar, Indonesia, brainstorm in a breakout group at the Waste2Enterprise workshop.

Photo: M. Paterson
Mapping coastal characteristics at Parak village, Selayar.
Photo: A. Abdurrahim
## PEOPLE AND ENGAGEMENT
(COMPONENT 3)

### Key results

<table>
<thead>
<tr>
<th>Metric</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of information-sharing and dissemination campaigns</td>
<td>50</td>
</tr>
<tr>
<td>Subscribers (eNews)</td>
<td>1,207</td>
</tr>
<tr>
<td>Followers</td>
<td>548</td>
</tr>
<tr>
<td>Followers</td>
<td>607</td>
</tr>
<tr>
<td>Website sessions</td>
<td>12,393</td>
</tr>
<tr>
<td>Website users</td>
<td>7,808</td>
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</tbody>
</table>
During the year, the Component 3 team focused on the promotion, uptake and adoption of the suite of CCRES tools to managers of marine/coastal and freshwater projects throughout the East Asian Pacific region. We worked closely with project leaders to refine the tools and supporting materials.

Activity updates

Communications materials
A range of communications materials were developed including toolkit guides, site reports and highlights reports to support this uptake of our tools. Eight training videos will support users of the tools post-project. A legacy video was made summarising the project’s achievements to encourage ongoing tool usage and partner collaboration.

Stakeholder events
We promoted the CCRES tools directly through presentations, interactive sessions, collateral, exhibition stands and social media outreach at these major stakeholder events:

- The third Targeted Regional Workshop for Global Environment Facility International Waters Projects from east Europe and Asia-Pacific and the First Annual Asia-Pacific Regional Network meeting, Bangkok, Thailand (April/May)
- The Asia-Pacific Coral Reef Symposium at Cebu, Philippines (June)
- Our Ocean Conference 2018, hosted by the Indonesian Ministry for Marine Affairs and Fisheries (MMAF), Bali, Indonesia (October)
- Global Environment Facility International Waters Conference, Marrakesh, Morocco (November)
- Partnerships in Environmental Management for the Seas of East Asia (PEMSEA) East Asian Seas (EAS) Congress 2018, Iloilo City, Philippines (November)

We also hosted closing events at the two pilot sites involving our country partners, local stakeholders and representatives from the communities of Selayar and El Nido.

Information and dissemination campaigns
In terms of Key Results Indicators for the project, Component 3 was required to deliver 40 (cumulative) information-sharing and dissemination campaigns by 30 June 2018. An information-sharing and dissemination campaign comprises three or more tactics delivered as part of a coordinated and integrated program of communications, engage and outreach activity.

During the period 1 January 2018 to 31 December 2018, the project delivered 10 campaigns:

1. **Tools Training workshop at Makassar, Indonesia (February)**
   - Workshop event, social media, promotional collateral, eNews, website, tools videos

2. **Tools Training workshop at Tagaytay, Philippines (April)**
   - Workshop event, social media, promotional collateral, eNews, website, tools videos

3. **The third Targeted Regional Workshop for Global Environment Facility (April/May) International Waters Projects from east Europe and Asia-Pacific and the First Annual Asia-Pacific Regional Network meeting, Bangkok, Thailand**
   - Presentations, workshops, social media, promotional collateral, eNews, web site update

4. **The Asia-Pacific Coral Reef Symposium at Cebu, Philippines (June)**
   - Exhibition, presentation, social media, promotional collateral, eNews, web site update

5. **Pilot site closing visit for Selayar, Indonesia (July)**
   - Stakeholder event, presentation, social media, site report, eNews, website update
PEOPLE AND ENGAGEMENT

6. **Our Ocean Conference, Bali (October)**
   — Exhibition stand, ocean talk/side-event, promotional collateral, social media, eNews

7. **International Waters Conference, Marrakesh (November)**
   — Exhibition stand, carousel clinic/side-event, promotional collateral, social media, eNews

8. **Pilot site closing visit** for El Nido, Philippines (November)
   — Stakeholder event, presentation, social media, site report, eNews, website update

9. **PEMSEA’s EAS Congress 2018** in Iloilo City, Philippines (November)
   — Exhibition stand, partnership hub/side-event, social media, promotional collateral, eNews

10. **CCRES eNews**, four editions in 2018 (March, June, September, December)
    — Promoted on social media (Facebook + Twitter), website latest news

These 10 campaigns, together with the 40 campaigns reported previously, brings to 50 the number of information-sharing and dissemination campaigns delivered by the project.

**Online communications**

Throughout the year, CCRES used online channels to communicate, engage with and reach out to beneficiaries and intermediaries.

Four editions of the **e-Newsletter** were written and published in 2018 with an average open rate of 35% and an average click through rate of 6%. There were 1,207 subscribers.

A **website** was maintained with news, videos, publications and images. Between 1 January and 31 December 2018, the CCRES website recorded 12,396 website sessions by 7,808 users, with 32,872 total page views and 24,333 unique page views. Around 60 people had registered to download the CCRES tools (excluding CCRES researchers and partners). The top page visited in 2018 was the **CCRES tools** landing page (see Figure 5).

*FIGURE 4. CCRES WEBSITE: MONTHLY PAGE VIEWS (2014–2018)*
PEOPLE AND ENGAGEMENT

Content was developed and posted on social media —

- **Facebook:** As at 31 December 2018, the CCRES Facebook page had 607 page likes. Between 1 January 2018 and 31 December 2018, 107 posts were made with an average post reach of 311

- **Twitter:** As at 31 December 2018, the CCRES Twitter page had 548 followers. Between 1 January 2018 and 31 December 2018, 121 tweets were posted — creating around 70,500 impressions

An estimated 3001 beneficiaries (47% women) have attended CCRES events (workshops, training courses, stakeholder forums, focus groups, closing visits and conference side-events) since the project began.

**FIGURE 5.** THE TOOLS PAGE WAS THE MOST VISITED ON THE CCRES WEBSITE IN 2018

Training workshops, Makassar, Indonesia had 33% (30 out of 90) women participants.

Photo: L. Izquierdo

Philippines Country Coordinator Noreen Follosco as Master of Ceremonies at the El Nido closing event.

Photo: L. Izquierdo
Activity updates

CCRES makes waves at coral reef symposium
Presenting to hundreds of attendees, CCRES made waves at the 4th Asia-Pacific Coral Reef Symposium (APCRS) in Cebu, Philippines in early June. With over 500 participants from more than 30 countries, the symposium was a global meeting of the minds to discuss the theme ‘Coral Reefs of the Asia Pacific: Working together amidst contemporary challenges’. The event presented an excellent opportunity for CCRES to spread the word about its work and tools.

CCRES was well represented on the program. Prof Perry Aliño (UPMSI) hosted a session on emerging trends in coral reef management: MPA and coral reefs. Professor Jamal Jompa (UNHAS) and Professor Peter Mumby (UQ) gave plenary speeches. Dr Vera Horigue (UPMSI) spoke about designing equitable marine reserve networks for fisheries management. Abdi Tunngal Priyanto (UQ) delivered a session on using a Bayesian belief network to prioritise management actions on coral reefs threatened by multiple stressors, highlighting the CCRES tool Reef React.

CCRES also hosted a trade stand coordinated by Kubi Follosco and Lyn Riveral (UPMSI).

“Many delegates were interested in learning more about the tools, and signed up for our newsletter and more updates. The enthusiasm for the project was inspiring.”

Ms Kubi Follosco

Taking our tools to GEF International Waters
A small CCRES team attended the third Targeted Regional Workshop for Global Environment Facility (GEF) International Waters (IW) Projects from east Europe and Asia-Pacific (30 April to 2 May) and the First Annual Asia-Pacific Regional Network meeting (3–4 May). The events were organised by the International Waters Learning Exchange and Resource Network (IW:LEARN), a GEF project implemented by the United Nations Development Programme (UNDP) and United Nations Environment Program (UNEP). The two events, held in Bangkok, Thailand, addressed knowledge platforms, innovative tools, legal and institutional frameworks, benefit sharing, and economic valuation.

“The IW:LEARN events offered CCRES a fantastic opportunity to share information about our tools with other GEF regional programs — a key pathway for the wider uptake of our tools.”

Project Manager Dr Liz Izquierdo

CCRES tools the antidote to ecosystem problems
CCRES participated in the Global Environment Facility’s 9th International Waters Conference in Marrakesh, Morocco — the signature event of the GEF IW Portfolio. The conference aims to facilitate cross-sectoral and GEF IW portfolio-wide learning and experience sharing. Almost 10% of the event’s 320 delegates attended the CCRES ‘carousel clinic’ as ‘patients’ with water ecosystem ‘problems’. The clinic began with a summary of how the tools developed by CCRES can assist people, governments and NGOs to improve coastal resources management and develop sustainable livelihoods. Around 76% of participants agreed the clinic increased their understanding of their pre-identified challenge and their subsequent capacity to implement appropriate tools and solutions.

CCRES tools in PEMSEA Knowledge Bank
Under a new partnership in knowledge management between PEMSEA and CCRES, the CCRES tools are now being hosted on the SEA Knowledge Bank which is a knowledge platform for policymakers, planners, managers, investors and other stakeholders to scale up Integrated Coastal Management (ICM) and investment in sustainable development of coasts and oceans across East Asia.
In focus: Networking with stakeholders to strengthen coastal management

Speed-dating, a doctor’s clinic and an ocean talk were three ways CCRES promoted its tools at regional and global oceans and water conferences during October and November 2018.

The activities showed conference delegates how the CCRES tools can be used individually or together to build system-wide solutions for strengthening oceans and water management worldwide.

At the Partnerships in Environmental Management for the Seas of East Asia (PEMSEA) East Asian Seas (EAS) Congress 2018 at Iloilo City, Philippines in November, 24 delegates joined our partnership hub — ‘Speed-dating with technical tools for strengthening coastal management’. The ‘dating’ was supervised by CCRES team members Carlie Dario and Dr Vera Horigue (UPMSI); Benjamin Adriano, Jr., (PCSD) and Gianina Decano (PSU); Assoc Prof Damian Hine (UQ), and Eva Marie Ponce de Leon (PSU); and Erik Simmons (UQ) and Dr Dedi Adhuri (LIPI).

Under a new partnership in knowledge management between PEMSEA and CCRES the CCRES tools were unveiled in the e-library of PEMSEA’s Seas of East Asia (SEA) Knowledge Bank. Mr Makoto Harunari, Technical Session Chair of the EAS Partnership Council, and Dr Liz Izquierdo, Project Manager, CCRES, launched the tools on the SEA Knowledge Bank.

At the Global Environment Facility’s International Waters Conference, at Marrakesh, Morocco, team leader Mark Paterson ran a ‘carousel’ clinic. Almost 10% of the event’s 320 delegates attended the CCRES clinic as ‘patients’ with water ecosystem ‘problems’. The patients represented GEF-IW marine, coastal and fresh water projects in the Caribbean, East Asian Seas, Africa and Europe and their ‘ailments’ covered:

- Analysing systems, pressures and resources, and modelling impacts
- Developing businesses that work in harmony with coastal ecosystems
- Encouraging government and community collaboration to strengthen governance
- Planning for healthy reefs and sustainable fisheries through more effective MPAs
- Fostering sustainable behaviours through promoting benefits, removing barriers

CCRES team leaders Damian Hine (Business Development — UQ), and Mark Paterson (Behaviour Change — Currie), used the tools to prescribe ‘treatments’.

For a ‘holistic’ remedy Assoc Prof Hine recommended the use of the tools to build system-wide solutions for strengthening the management of large, transboundary coastal, marine and freshwater ecosystems as part of the formulation and implementation of Strategic Action Programmes.

Seventy-six per cent of participants agreed the clinic increased their understanding of their pre-identified challenge and their subsequent capacity to implement appropriate tools and solutions.

At the Our Ocean Conference 2018, hosted by the Indonesian MMAF in Bali during October 2018, CCRES chief scientist Prof Peter Mumby and Dr Anna Phelan gave an ‘ocean talk’ on how the CCRES tools are being used to support local planning and management decisions that keep ecosystems healthy and sustain the services they provide to coastal communities.

CCRES hosted an exhibition site at each event. These stands displayed promotional materials, including toolkit guides, site reports, highlights reports and videos, as well as the tools.

The number of attendees at the partnership hub, carousel clinic and ocean talk brought the total number of participants at CCRES events (workshops, training courses, stakeholder forums, focus groups, closing visits and conference side-events) to 3001 since the project began.
Stakeholders review the Exit Report at the El Nido closing visit.

Photo: L. Izquierdo
In focus: Closing the project at our pilot sites

We formally closed the CCRES project at each of the pilot sites, reported on the project’s achievements to local stakeholders and thanked them for the integral part they played in the delivery of the project’s outcomes. Summary reports of our activities at each site were presented.

Hosted by the Secretary of the Selayar Islands Regency, Dr Marjani Sultan, at the local government offices in Benteng, the Selayar closing event in July was attended by Indonesian partners, including the Indonesian Institute of Sciences (LIPI), Bogor Agricultural University (IPB-Bogor) and the DINAS Marine Affairs & Fisheries, Selayar, as well as 50 government officials and community leaders.

Special guests and key speakers were LIPI’s Vice Chairman Prof Bambang Subiyanto, Dr Ario Damar, from IPB-Bogor’s Center for Coastal and Marine Resources Studies, Bogor, and Pak Makkawaru Daeng Masiga, Head of DINAS Marine Affairs & Fisheries, Selayar. An address of thanks was given by CCRES Component 3 team leader Mark Paterson (Currie).

El Nido’s closure event was held at Lio Beach. Representatives from our partner organisations including Palawan State University (PSU), the Palawan Council for Sustainable Development, El Nido Local Government and the El Nido Foundation attended the event. Project partners were joined by representatives from local institutions and the community, as well as the Ten Knots Development Corporation (TKDC) which played an important role in project rollout.

RJ de la Caizada from the El Nido local government opened the event with a brief overview of the project and its implementation in El Nido. CCRES presented a formal site report to stakeholders, and team members shared information on key aspects of the project.

Dr Carl Smith, The University of Queensland, gave a preview of the latest version of SESAMME now available for Android devices. Dr Vera Horigue, Marine Science Institute at the University of the Philippines Diliman, gave an overview of the Fish SPACE tool which is used to support and communicate relevant actions for marine reserve and fisheries management planning and decision-making.

Mariglo Laririt, TKDC, explained how the behaviour change tool My Future, My Oceans was rolled out in El Nido to help reduce plastic use.

Eva Ponce de Leon (PSU) explained the results of the Eco-Biz Challenge. Two winners of the challenge were also in attendance.

Gianina Decano (PSU) gave a summary of research conducted with El Nido households, businesses and tourists which informed the development of the tools.

Local stakeholders also shared their impressions of CCRES and the various tools they had been involved with.

“...The content of SYSTORY is really impressive,” said Elaine Saniel of TKDC.

“It’s five years of real and raw data from El Nido so imagine how much that data can give us in terms of predicting trends in the future.”

Andy Kagawad, a Barangay Councillor from Bebeladan, recognised the benefits which can be derived locally from Fish SPACE. “It’s really good because the people in our community realised the need to take care of the (coral reefs) so they need not go far when they go out to catch fish,” he said.
TOOLS TRAINING

Key results

474 Number of end-users attending 2018 tools training workshops

Systems analysis tools training, Makassar.
Photo: L. Izquierdo
Supporting end users in the use of our tools was a key focus in 2018 with two major training events held in Indonesia and the Philippines.

More than 80 representatives from government, NGOs, business, universities and other research institutes attended 10 training workshops at Makassar, Indonesia, in February. A program of 10 workshops was delivered by a team of trainers and facilitators from Indonesia, Australia, Costa Rica and the United States.

All participants were provided with an exit survey and 98% of respondents indicated that they or their organisation intended to use the CCRES tools in specific projects for reducing stress on coastal ecosystem services. Strong networks were also created at the event with some participants creating a What’s App discussion group to keep in contact and provide support to each other in the use of the tools tackling coastal management issues.

More than 90 local marine planning experts and coastal managers attended behaviour change, marine planning, systems analysis, and business development workshops at Tagaytay, Philippines during April.

Workshop participants came from national and local government agencies, NGOs, businesses in El Nido, universities and research institutes, and beyond. Feedback from participants in an exit survey showed that the quality of the workshops was highly regarded, with around 94% indicating they would use the CCRES tools in their work. Videos capturing participants’ experiences, an explanation of the tools and perspectives from project partners in the Philippines are now available on the CCRES YouTube channel.

Across these two training sessions approximately 97% of participants agreed or strongly agreed that following their involvement with the CCRES project, they saw benefits in using information on ecosystem services to support decision-making.

These two major events were augmented with a number of smaller training sessions held throughout the year including:

- Marine planning/Fish SPACE (Philippines) — Manila (July), Oriental Mindoro (September), Palawan (October), Batangas (October); as well as the Tanton Strait Protected Seascapes
• Marine Planning (Indonesia) — Aceh, Sutra — Sulewesi Tenggara Province, Seram Utara and Seram Utara Barat District — Seram Island, Maluku Province
• SESAMME and SYSTORY — Jakarta (October)
• SESAMME and SYSTORY — Puerto Princesa (November)
• Eco-Biz Challenge — El Nido (April)
• Waste2Enterprise — Benteng (January), and Tinabo, Rajani, Jinito (April)
• My Future, My Oceans — El Nido (July)
• My Future, My Oceans plus Waste2Enterprise — Selayar (July)

Seeking user feedback

In 2018, CCRES conducted three surveys with participants in our CCRES tools training workshops to gather specific feedback on our tools and their use. The feedback was used to assess the quality of the training, to make final refinements to some of the tools, as well as to provide an indication of uptake.

The first survey was completed by participants of the Makassar training in February (124 completed surveys) and in Tagaytay in March (210 completed). It gathered demographic data (e.g. organisation, gender) and asked questions on the helpfulness of the workshop and intended use of the CCRES tools.

Tagaytay survey respondents were mostly from government or academia and it was their first involvement with the CCRES tools. Positive feedback was received on the quality of workshops with most people saying they could see how the tools could be helpful for them or their organisation, as well as indicating that they planned to use them.

In Indonesia, participants were mainly from government, NGOs, academia and partner organisations. They agreed broadly that the workshops met their expectations. Most anticipated using CCRES tools in their organisation and could see benefits for conservation in doing so.

The second survey was sent to the same attendees in August as a follow up. It aimed to ascertain if they had used or planned to use the CCRES tools, and if so, for what purpose, were they helpful, and what support would they require if using the tools.

All survey respondents (51) intended to use the tools outside the training workshops, the majority (60%) having already tried them. The primary purpose of tool use was for ground work, with FishCollab being the tool respondents expected to use most.

The final survey was sent to all attendees who had responded to the previous survey because they had all stated that they intended to use, or had already used, the tools. It was also sent to 45 people who had downloaded tools from the website.

Questions from the second survey were repeated in the third survey, however focused on actual rather than planned tool use, with additional questions on frequency and to gauge a Net Promoter Score.

Only 16 responses were collected, but the results indicated FishCollab remains the most popular tool amongst these respondents with Fish SPACE, EbBD and the MPA optimization tools also seeing an upswing in use amongst this group of users.

Users remain interested in training to help with their ongoing use of the tools.

CCRES thanks all those who participated in the surveys as we have used the feedback in the final months of the project to refine the tools and our rollout activities.
PROJECT EVALUATION

All projects implemented through The World Bank are required to provide an Implementation Completion Report (ICR) to document the results achieved and lessons learned.

The evaluation process officially commenced in December when Mr Kevin McCall from The World Bank visited the Philippines and held interviews with a selection of partners and stakeholders, including the University of Philippines Marine Science Institute, Palawan State University and the Ten Knots Development Corporation. Mr McCall then travelled to Brisbane and interviewed the CCRES team in Australia, and Indonesia participants in early 2019. CCRES employed Dr Tundi Agardy to undertake a project evaluation and beneficiary assessment of the project, in order to provide necessary background for the ICR.

The initial project evaluation relied on project documents, outreach materials and interviews with team leaders, as well as technical advisory committee members and previously involved CCRES personnel. The main thrust of the interviews was to understand perceptions about the project goals and objectives, determine the extent to which these goals and objectives have been met, and derive lessons learned from both the development of tools and processes to enhance coral reef management, and the practical application of these tools at the two pilot sites.

Additionally, CCRES’ influence on other regions has been addressed, looking at the extent to which tools and approaches have been used in other geographical regions. Further structured discussions with intended beneficiaries will be undertaken, in concert with World Bank’s organisation of workshops in El Nido and Selayar, and additional meetings in Manila and Jakarta, before the comprehensive evaluation is completed.

The preliminary report identified some challenges faced by CCRES which can provide useful learnings for other World Bank projects. A key challenge was timing. Tool development finished at the end of year four (out of the five-year timeline), leaving only one year for dissemination and uptake. The other important challenge was a change to the initial target users for the tools established in the proposal and the impact of this on subsequent project implementation.

Other challenges identified related to institutional arrangements, clarity of project goals, effective integration and the difficulties associated with having pilot sites in two different countries.

In general, the preliminary report concluded that the project has been largely successful, delivering in a timely manner on the goals and objectives outlined in the project development objective (PDO). Sixteen tools that orient decision-makers and planners toward a better understanding of ecosystem values have undoubtedly enhanced understanding of trade-offs between development and conservation, and will enable better decision-making in the future.

On a wider societal level, easy-to-use tools such as SYSTORY have the potential to shift the mindsets of marine users. CCRES has been able to promote behaviour change as well, in ways that were not anticipated during the project design phase. Proven methods for catalysing nature-based business enterprises have spurred a lot of interest in developing new business plans. Collectively these achievements have the potential to promote development that is sustainable, thereby improving people’s lives without undue negative impacts on nature.

The results of the preliminary evaluation phase will feed into the final ICR which will be available on the World Bank’s website by June 2019.
Our People

Partners
We would like to thank our partners for their support and participation throughout the CCRES project. The project could not have delivered its outcomes without their vision, expertise and commitment.

International
- The World Bank
- Global Environment Facility
- The University of Queensland
  - Global Change Institute
  - School of Biological Sciences
- School of Agriculture and Food Sciences
- School of Civil Engineering
- UQ Business School
- School of Psychology
- Centre for Biodiversity and Conservation Science
- Cornell University
  - Center for Sustainable Global Enterprise, Johnson School of Management
- Department of Ecology and Evolutionary Biology
- University of California, Davis
- Currie Communications
- The University of Queensland
  - Global Environment Facility
- The University of Queensland
  - Global Change Institute
- School of Biological Sciences
- School of Agriculture and Food Sciences
- School of Civil Engineering
- UQ Business School
- School of Psychology
- Centre for Biodiversity and Conservation Science
- Cornell University
  - Center for Sustainable Global Enterprise, Johnson School of Management
- Department of Ecology and Evolutionary Biology
- University of California, Davis
- Currie Communications

Philippines
- University of the Philippines, Marine Science Institute
- Department of Environment and Natural Resources
  - Biodiversity Management Bureau
- El Nido-Taytay Managed Resource Protected Area Management Board
- Palawan Council for Sustainable Development and Staff
- El Nido Local Government
- Palawan State University
- Centre for Business Research and Development, De La Salle University
- El Nido Foundation

Indonesia
- Ministry for Marine Affairs and Fisheries
  - Secretary General of Ministry for Marine Affair and Fisheries
  - Directorate General of Management for Marine Spatial Management
  - BPSPL Makassar
  - Directorate for Marine Conservation and Biodiversity
  - Directorate for Marine Spatial Planning
- Indonesian Institute of Sciences (LIPI)
- Economic Research Centre, Deputy of Social Science and Humanities
- Population Research Centre, Deputy of Social Science and Humanities
- Society and Culture Research Centre, Deputy of Social Science and Humanities
- Bogor Agricultural University
  - Center for Coastal and Marine Resources Studies
- Hasanuddin University
  - Faculty of Marine Science and Fisheries for Post Graduate and Undergraduate Program
- DINAS Marine and Fisheries, Selayar

People
The outcomes of the CCRES project have been delivered due to the skills, expertise and commitment of a multi-disciplinary, cross-cultural team of 100+ scientists, academics, planners, practitioners and coordinators. We thank them again for their efforts.

Advisory Board
The CCRES Advisory Board provided independent oversight of the annual work plans and budgets; advice on the linkages and synergies with World Bank investment projects and other regional and national projects.
and activities; and advice on project outputs to policy and management. They met for the final time in August 2018.

Members of the CCRES Advisory Board are:

- Ms Cary Anne Cadman (The World Bank)
- Undersecretary Analiza Teh (Department of Environment and Natural Resources, the Philippines)
- Ms Carolina V. Figueroa-Geron (Philippines Rural Development Project)
- Dr Stephanie Sieber and Ms Maya Villaluz (Wealth Accounting for the Valuation of Ecosystem Services Project)
- Ms Aimee Gonzalez (Partnerships in Environmental Management for the Seas of East Asia, PEMSEA)
- Dr Zainal Arifin (Indonesian Institute of Sciences, Indonesia)
- Dr Firdaus Agung (COREMAP-CTI and Ministry of Marine Affairs and Fisheries, Indonesia)
- Professor Andrew Griffiths (The University of Queensland, Australia)
- Ms Liz Izquierdo (Project Director, Project Executing Agency)

**Leadership group**

The CCRES Leadership Group consists of the component team leaders and the project manager with external input as required. Leadership Group members are:

- Prof Peter Mumby, Chief Scientist (UQ)
- Assoc Prof Damian Hine (UQ)
- Dr Carl Smith (UQ)
- Mr Mark Paterson (Currie)
- Dr Liz Izquierdo (UQ)

**CCRES members**

**Management**

- Dr Liz Izquierdo, Project Manager (UQ)
- Ms Noreen (Kubi) Follosco, Philippines Country Coordinator (UPMSI)
- Ms Harjunani Kumoloraras, Indonesia Country Coordinator
- Ms Romelyn (Lyn) Riveral, Admin Assistant (UPMSI)
- Mr Roy Bero, El Nido Site Coordinator

**Marine Planning**

*Harnessing the value and market potential of coral reef and mangrove ecosystem services.*

**The University of Queensland**

- Prof Peter Mumby, Chief Scientist and Component Leader
- Prof Tom Baldock
- Dr David Callaghan
- Dr Nils Krueck
- Dr Alice Rogers

**University of California, Davis**

- Dr George Roff
- Dr Behnam Shabani

**Cornell University**

- Dr Jim Sanchirico
- Mr Ted Gilliland
- Ms Amanda Lindsay

**University of the Philippines**

- Prof Cesar Villanoy
- Dr Annette Junio-Menez
- Prof Perry Aliño
- Ms Bayosa Aya Carinio
- Dr Vera Horigue
- Ms Miledel Quibilan
- Ms Leilani Solera
- Mr Adrian Chester Balingit
- Ms Rouen Camille de Castro
- Mr Patrick Pata

**De La Salle University**

- Dr Al Licuanan
- Dr Maricar Samson

**Hasanuddin University**

- Prof Jamaluddin Jompa
- Ms Nur Abu
- Ms Lisda Haryani

**BPSPL Makassar (MMAF)**

- Mr Kris Handoko
- Mr Andi Jaya

**Ministry for Marine Affairs and Fisheries**

- Dr Ir. Subandono Diposaptono
- Mr Abdi Tunggal Priyanto
- Mr Arief Sudianto
- Mr Lantip Wratsangka

**DINAS Fisheries, Selayar**

- Mr Zul Janwar
- Mr Andi Penrang

**Technical Steering Committee**

A Technical Steering Committee supported the project with technical oversight of research activities and development of the tools. Committee members are:

- Prof Alasdair Edwards (University of Newcastle, UK)
- Dr Tiene Gunawan (Indonesia)
Systems Analysis
(Component 2)

Mapping socio-ecological systems, modelling resources, activities and pressures and decisions.

The University of Queensland
- Dr Carl Smith (Systems Analysis Team Leader)
- Dr Russell Richards
- Mr Siham Afatta Taruc
- Ms Melanie King

Bogor Agricultural University
- Dr Luky Adrianto
- Mr Suryo Kusumo
- Dr Novie Setianto

Palawan State University
- Engr Ma. Rosario Aynon Gonzales
- Dr Patrick Regoniel
- Engr Agustin Miraflores, Jr
- Prof Marissa Pontillas
- Ms Eva Marie Ponce de Leon
- Mr Dante P. Basaya
- Ms Precious Joy Latras
- Ms Gianina Decano
- Ms Maricel Elorde
- Dr Ronald Ona

Business Development
(Component 2)
Generating robust local economies that capture and sustain marine ecosystem services.

The University of Queensland
- Assoc Prof Damian Hine (Business Development Team Leader)
- Dr Anna Phelan
- Mr Andy Harvey
- Dr Sue McAvoy

Cornell University
- Prof Mark Milstein
- Mr Yasu Karakawa

De La Salle University
- Dr Arnel Onesimo Uy
- Dr Raymund Habaradas

Indonesian Institute of Sciences
- Mr Firman Tri Ajie
- Mr Bintang Dwitya Cahyono
- Dr Agus Eko Nugroho
- Ms Nur Hadiati Endah
- Mr Pangky Febriansyah

Behaviour Change
(Component 3)
Promoting behavioural change through outreach, decision support and regional learning.

Currie Communications
- Mr Mark Paterson (Component Leader)
- Ms Gabrielle Sheehan
- Ms Sophie Clayton
- Ms Paula Bradley

The University of Queensland
- Prof Matt Sanders
- Mr Erik Simmons
- Prof Helen Ross

Indonesian Institute of Sciences
- Dr Dedi Adhuri
- Mr Ali Yansyah Abdulrahim

Advisors
El Nido Local Government
- Mr Raffy Cabate
- Mr Rene Jay de la Calzada

DINAS Fisheries, Selayar
- Dr Ir. Marjani Sultan

University of the Philippines
- Prof Ed Gomez

Farewell to members of our Philippines team (L to R) Marissa Pontillas (PSU), Vera Horigue, Noreen Follosco, Romelyn Riveral, Miledel Quibilan (UPMSI) Eva Marie Ponce de Leon (PSU). Photo: G. Sheehan
ACRONYMS

CCRES — Capturing Coral Reef & Related Ecosystem Services project
DENR — Department of Environment and Natural Resources, through the Biodiversity Management Bureau
DINAS — Marine and Fisheries, Selayar
DLSU — De La Salle University
ENF — El Nido Foundation
El Nido LG — El Nido Local Government
GEF — Global Environment Facility
IPB-Bogor — Bogor Agricultural University, Center for Coastal and Marine Resources Studies
LIPI — Indonesian Institute of Sciences
MPA — marine protected area
MSP — marine spatial planning
MMAF — Ministry for Marine Affairs and Fisheries
PCSD — Palawan Council for Sustainable Development
PEMSEA — Partnerships in Environmental Management for the Seas of East Asia
PSU — Palawan State University
TKDC — Ten Knots Development Corporation
UQ — The University of Queensland
UNHAS — Hasanuddin University
UPMSI — University of the Philippines Marine Science Institute
APPENDIX 1: CCRES TOOLS

Marine planning

Marine Protected Areas (MPA) toolbox
The MPA toolbox is designed to help planners and policymakers make informed decisions about the total coverage, placement and local size of MPAs, and encompasses the following tools:

• MPA placement optimization tool
• MPA size optimization tool
• Fish SPACE
• Policy brief: Healthy fisheries through marine reserves
• Policy brief: Priority reefs for conservation and fisheries replenishment
• MPA and fisheries simulator

MPA placement optimization tool
The MPA placement tool helps users optimize larval dispersal around MPAs in order to achieve flexible management objectives, including both biodiversity conservation and fishery benefits.

MPA size optimization tool
This software helps users optimize decisions on the size of local MPAs by calculating the proportion of the possible maximum number of individuals of each target species that will be effectively protected in MPAs of various conceivable sizes.

MPA and fisheries simulator
The tool simulates the dynamics of fish populations and fishery catch with a focus on the impact of MPAs. Although the tool has been designed primarily for education and training purposes, it can be used to support decision making on MPAs.

Fish SPACE
Fish SPACE assists users to explore the benefits and impacts of different marine reserve network spatial configurations, with fisheries management strategies.

Policy brief: Healthy fisheries through marine reserves
This tool is a set of policy guidelines that can be used to set large-scale marine spatial planning targets, as well as small-scale MPA design.

Policy brief: Priority reefs for conservation and fisheries replenishment
This policy brief guides users on the characteristics of reef areas that are best suited to marine conservation efforts.

Policy brief: Reduced pathogenic bacteria through seagrass protection
This brief helps policy makers and leaders make informed decisions about managing seagrass, by demonstrating the value of seagrass which can reduce bacteria pathogenic to humans and marine life by up to 50%.

Reef React
Reef React assists users to predict alternate futures for coral reef ecosystems under various climate and human use scenarios to help guide policy and management interventions to reduce negative impacts.

Coastal Protection
Coastal Protection taps into a Bayesian Belief Network (BBN) to evaluate which reefs best protect important coastal infrastructure and communities. Users can apply the Coastal Protection model to coral reefs visible on GIS systems like Google Earth.
APPENDIX 1: CCRES TOOLS

Systems analysis

SESAMME

SESAMME is an app designed to facilitate group discussion about proposed coastal management changes. Available on Apple iOS devices, Windows PC and Android devices, the app draws on past and future trends to visually represent how different coastal zone problems interact with each other.

System Simulation Model

The System Simulation Model quantifies interactions between activities on land (such as farming and urban development), activities on water (such as fishing), coastal ecosystems (such as coral reefs and mangroves) and coastal resources (such as fish). It allows the user to simulate the behaviour of the coastal system over time.

SYSTORY

SYSTORY assists users to visualise influencing coastal dynamics and how these forces play out in alternative scenarios. Available on Apple iOS devices, Windows PC and Android devices, the app can be used for policy evaluation, community engagement and teaching.

Business development

Ecosystem-based Business Development (EbBD) Approach for Coastal Communities

The EbBD Approach is a process that uses ecosystem services and biodiversity as part of an overall sustainable development strategy, to help support sustainable livelihoods and local economic development in low resource coastal communities.

Eco-Biz Challenge

The Eco-Biz Challenge is a business plan competition, including business skills training, to encourage businesses that are environmentally and socially sustainable. Local government, NGOs, private sector leaders and educational institutes are encouraged to use the competition to encourage sustainability focused innovation.

Behaviour change

My Future, My Oceans

The My Future, My Oceans tool is designed to foster sustainable, environmentally responsible behaviours in low-resource coastal households. The process first assesses current habits and values, then actively engages community members to shift attitudes toward environmental issues.

FishCollab

FishCollab assists governments, communities and NGOs to work together to improve coastal management. It enables users to identify key stake-holders, develop networks, analyse policy, analyse and reduce conflict, and identify opportunities and challenges.
APPENDIX 2: JOURNAL PUBLICATIONS


Submitted

Baldock T.E., Shabani B., Callaghan D.P An open source Bayesian Belief Network for estimating the hydrodynamics and shoreline response behind fringing reefs subject to climate changes and reef degradation. Submitted to Environmental Modelling and Software.


Capturing Coral Reef and Related Ecosystem Services

The Capturing Coral Reef and Related Ecosystem Services (CCRES) project is a regional technical support project that unlocks new, sustainable income streams for coastal communities in the East Asia-Pacific region. CCRES has developed knowledge products — which inform the design of global, regional and national projects, plans and policies — and technical models and planning tools which assist users to strengthen community-based coastal resource management.