Below Pollution at El Nido town foreshore, Palawan, Philippines, is a priority for government officials trying to balance coastal development with environmental (and community) health. (R Martinez)
## CONTENTS

<table>
<thead>
<tr>
<th>Page</th>
<th>Section</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>LEADERSHIP MESSAGE</td>
</tr>
<tr>
<td>5</td>
<td>SCIENCE AND DISCOVERY</td>
</tr>
<tr>
<td>11</td>
<td>INNOVATION AND PRODUCT DESIGN</td>
</tr>
<tr>
<td>13</td>
<td>PEOPLE AND ENGAGEMENT</td>
</tr>
<tr>
<td>21</td>
<td>VIEW FROM THE FRONTLINE</td>
</tr>
</tbody>
</table>
LEADERSHIP
MESSAGE

NEW KNOWLEDGE HOLDS KEY TO UNLOCKING ECOSYSTEM VALUE

Research is essential if we are to find ways to enhance livelihoods, manage food security, improve community health and wellbeing, and sustain coastal ecosystems.

CCRES is undertaking research which creates knowledge, innovation that unlocks value from this knowledge, and engagement which shares research-based technical products and models.

Our activities at two coastal pilot sites in the East Asia-Pacific region encompass ecosystem services, business innovation, system dynamics and behavioural change.

The 2014 Annual Report noted that ‘crossing research boundaries can be a challenge in itself’ however, there is a ‘huge power in bringing people from different disciplines and backgrounds together’. This has never been more evident than now as the project rolls out in the municipality of El Nido in Palawan province, Philippines, and at Selayar in South Sulawesi, Indonesia.

This year started with a major marine spatial planning workshop, a stakeholder forum involving more than 50 scientists and coastal planners, and the launch of the CCRES project in Selayar.

During the past six months our team has been working together on key collaborative opportunities, and is undertaking the fieldwork required to develop the projected tools and models (see Side Panel).

The CCRES project development objective is to: design and support the uptake of innovative models for valuing mangrove, seagrass and coral reef ecosystem services with the potential to enhance the sustainability of marine-based enterprise and marine spatial planning in select coastal communities in Indonesia and the Philippines. CCRES aims to help communities capture more of the benefits from healthy ecosystems and promote conservation, by demonstrating the links between ecosystem health, local benefit capture and community welfare.

Following the completion of our scoping year in 2014, the big increase in our activity during the first half of 2015 shows we are well on the way to accomplishing this objective.
However, these outputs would not be viable without understanding the most effective means of engaging and communicating with our beneficiaries and stakeholders in Indonesia and the Philippines.

This is why the CCRES team continues to involve our in-country partners in the planning of research, the design of technical products and the delivery of outputs.

Our next challenge will be to decide how we share the knowledge we create with a wider audience — to scale up at regional and global levels and to ensure replication across multiple forums.

Leadership Group
Melanie King  Senior Advisor
Peter Mumby  Chief Scientist
Mark Milstein  Team Leader, Business Development
Carl Smith  Team Leader, Systems Thinking
Mark Paterson  Team Leader, Communications & Engagement

Left Deploying tiles during reef complexity work at El Nido, Philippines. (C Castro)
Top Early morning fishing at El Nido, Philippines. (T Gilliland)
Above A tile used to quantify algal growth (M Quibilan)
The development of models and tools designed to link the consequences of decisions with ecosystem health, sustainable livelihoods and community development is underway.

Some are stand-alone components that will be linked into a more complete cross-system integrated model at a later stage.

**MODEL 1**  
**FOOD WEB MODEL**  
A new model which accounts for the influence of coral reef structure and the health on community dynamics

**MODEL 2**  
**CORAL REEF TRAJECTORY MODEL**  
A modification to an existing model to reflect coral recovery rates observed in Indonesia and the Philippines to capture the effects of natural and anthropogenic stressors on future coral trajectories

**MODEL 3**  
**IMPACTS OF DESTRUCTIVE FISHING**  
A management tool to estimate when a reef was last bombed and how long it might take to recover

**MODEL 4**  
**BROAD-SCALE AND HYDRODYNAMIC MODELS**  
Models of wave energy and hydrodynamics across reefs and behind reefs and at shorelines backed by important habitats

**MODEL 5**  
**BIO-LEWIE MODEL**  
The Bio-LEWIE model is a pairing of a bio-economic model and a Local Economy-Wide Impact Evaluation model. It is a flexible model that can be used to examine a variety of questions related to the interactions between economic growth and coastal resources

**MODEL 6**  
**ECOSYSTEM SERVICE SCENARIO MODEL — FILTRATION SERVICES OF SEAGRASS AND MANGROVES**  
Assess the magnitude by which intact coastal seagrass meadows filter pollutants to benefit both human and reef health and to quantify the value of this ecosystem service

**MODEL 7**  
**FISH-BE**  
Expansion of FISH-BE to consider the health of mangrove, seagrass and coral reef habitats, tourism and coastal land use changes

**MODEL 8**  
**SYSTEMS ANALYSIS AND MODELLING**  
Development of simulation models to identify leverage points within socio-ecological systems where changes in existing resource use or business activity could lead to large system-wide ecological, economic and social benefits

**MODEL 9**  
**BUSINESS MODEL DEVELOPMENT AND EVALUATION**  
Application of management science tools and techniques to evaluate the competitiveness and profitability of conceived changes to private enterprise

**TOOL #1**  
**MARINE RESERVE DESIGN PRINCIPLES**

**TOOL #2**  
**MARINE SPATIAL PLANNING WEBSITE**  
Development and launch of MSP website with information, data, methods and sources for MSP
IN BRIEF

JANUARY
Making natural capital part of MSPs
Researchers and government officials from the Philippines and Indonesia met at The University of Queensland (UQ), Brisbane, Australia, during January to decide how to incorporate ecosystem services into marine spatial planning in Indonesia and the Philippines.

FEBRUARY
Influence of seagrass filtration on environmental and human health
Following initial success in documenting the role of seagrass in filtering coral and human pathogens from reefs adjacent to coastal islands in Indonesia, teams led by Hasanuddin University and Cornell University are examining role of seagrass beds for improving seaweed farming businesses. Together these studies will allow us to model the ecosystem service value of seagrasses to human health, coral reef health and algal farming.

MARCH
Understanding mangroves as sediment traps
A team from the University of the Philippines Marine Science Institute (UPMSI), Manila, were in the field at El Nido, Palawan, during March measuring rates of sedimentation in mangroves over a gradient of genera-specific zones. Mangroves are renowned for trapping sediments, a process that helps in stabilising the coast and regulating water quality.

APRIL
Mapping the local economy in El Nido
The gathering of data through household, business and tourist surveys for the development of the Bio-LEWIE model began at El Nido, Philippines, during April. Ultimately, the work will help in understanding how activities like fisheries, tourism, and marine conservation affect a coastal community’s economy.

MAY
Surveys of reef complexity get underway
Dr Alice Rogers from UQ and her team undertook reef surveys at El Nido, Philippines, for incorporation into a reef complexity model during May. The model is designed to estimate the productivity and carrying capacity of reef fisheries, in relation to spatial variability in primary productivity and reef structural complexity and health.

JUNE
Spatial modelling of fisheries and MPAs
Researchers from UQ, UPMSI, De La Salle University and UP Los Baños met in Manila, Philippines, during June to talk about opportunities for collaboration in research on spatially-explicit fisheries, including such topics as Marine Protected Areas (MPAs) function, connectivity, carrying capacity and the development of decision-support tools.
**GENERATING ECONOMIC INSIGHTS INTO LOCAL ECONOMIES**

The first model to pair bio-economics with a Local Economy-Wide Impact Evaluation model (Bio-LEWIE model) is being developed by CCRES at El Nido, Palawan, Philippines.

Led by Professor Jim Sanchirico and PhD scholar Mr Ted Gilliland from the University of California, Davis, the work seeks to understand and respond to the economics of tourism and fishing in the municipality.

This work aims to assess:

1. Tourists’ willingness to pay for improvements in coastal resources
2. How growth in tourism will affect (a) different sectors and households of the El Nido economy, and (b) fishing pressure in the El Nido fishery
3. How fishermen allocate their time and effort, and how these allocations will respond to marine conservation interventions in the fishery (e.g. the creation of a Marine Protected Area).

These questions are fundamental to the objectives of CCRES. Considering the importance of tourism to El Nido, mapping the benefits of coastal resources to business opportunities requires an understanding of how tourist expenditures will respond to changes in the quality of coastal resources. Part of the data collection effort will be to survey tourists about their expenditures and how these might change if there were a change to coastal resources (i.e. contingent valuation surveys). These results will be valuable for assessing the viability of different business opportunities considered in business development activities.

Considering the flexibility of the Bio-LEWIE modelling tool, it can also be used to estimate the impacts of other changes to the ecological and economic systems of El Nido.

One of the most valuable aspects of the Bio-LEWIE is the ability to test how the labour force will respond to changes in the economy.

For example, if tourism grows, the Bio-LEWIE can predict how this will affect the pressure on coastal resources such as fishing. This ability to predict quantitatively the effect of changes in business activities can help inform the choice of development activities.

Ted Gilliland is building the bio-economic model to answer these questions. He and one of our Philippine partners, the Palawan State University (PSU), recently completed nine weeks of field work in El Nido, where they gathered household, tourist, and business information to input into the model.

All three surveys were successfully carried out at El Nido. Households, businesses and tourists were sampled randomly to generate a snapshot of the El Nido economy. The surveys focus particular attention on tourism-related activities (including tourists’ expenditures) and fishing-related activities, as these are two primary livelihoods for the El Nido community.

Data concerning the economic activities taking place at El Nido were collected using three survey forms. For the household survey, approximately 460 households were surveyed. For the business survey, approximately 275 businesses were surveyed. For the tourist survey approximately 433 tourists were surveyed. These data are currently being processed in order to use them to parameterise an economic model of the El Nido economy that can be used to test the impact of different policy scenarios at El Nido.
VALUING CORAL REEF FISHERIES, PRODUCTIVITY, IN RELATION TO HABITAT QUALITY

In order to provide estimates of the value of coral reef fisheries and their potential to change through time at the two pilot sites (El Nido and Selayar), a food web model for coral reefs that accounts for the influence of coral reef structure and health on community dynamics is being developed.

The basis of the model has already been developed for the Caribbean (Rogers et al. 2014), yet in order to answer the key questions of the CCRES project and apply the tool to El Nido and Selayar, there will be several activities: i) Model development and refinement, ii) Data collection and experimentation, iii) Model testing and validation and iv) Scaling up model predictions for marine spatial planning.

This year has seen the team making progress in each of these activities. Dr Alice Rogers and her team commenced fieldwork at El Nido in May, collecting data to develop a preliminary food web model and make initial estimates on carrying capacity.

The model is being designed to estimate the productivity and carrying capacity of reef fisheries at El Nido in relation to spatial variability in primary productivity and reef structural complexity and health.

In addition, Dr Rogers wanted to quantify reef metrics that are indicators of reef resilience (algal turf heights and coral recruit abundance), and supplement and continue long-term monitoring in the area conducted by the University of Philippines Marine Science Institute (UPMSI) since 1996.

During the 10-day field visit, the team conducted extensive surveys at seven reef locations in Bacuit Bay, ranging from inner bay to more exposed sites.

The locations monitored were:
- Depeldet
- Dibuluan
- Pinalis
- Tres Marias
- Twin Rocks
- Dilumacad (Helicopter Island)
- East Matinloc (Hidden Beach)

Data collected will be analysed with key results and outcomes to be made available in coming months.

The team will also be working towards creating an app/video game that is representative of the fisheries productivity model to help to raise awareness and increase understanding of the drivers of fish production and the importance of reef health for fisheries values.
INTEGRATING ECOSYSTEM SERVICES WITH MSP

Developing a framework for marine spatial planning (MSP) and marine protected areas (MPAs), addressing multiple objectives, considering multiple resource uses and recognising trade-offs between various objectives, is a key objective for CCRES.

In January, a team of researchers and government officials from the Philippines and Indonesia met to commence the development of a research strategy to incorporate the provision of ecosystem services into marine spatial planning in Indonesia and the Philippines. The team is seeking to develop tools and datasets relating to the value of services such as fisheries, coastal protection and tourism.

In collaboration with national, regional and local governments CCRES also hopes to build capacity in marine spatial planning and provide expertise and support for the development of plans that maximise the value and long-term sustainability of coastal habitats for local communities.

The week-long talks by workshop attendees focused on two pilot sites, El Nido, on the island of Palawan in the Philippines, and Selayar, situated in South Sulawesi, Indonesia.

The workshop provided the first step in developing this strategy and established a venue for collaboration between in-country partners and CCRES members with expertise in GIS and MSP. The workshop achieved a mutual understanding of the marine spatial planning process in both countries, and outlined together a strategy for the CCRES project to target its research to support ongoing and future planning activities.

Attendees comprised UQ scientists and representatives of the project’s partners from Indonesia and the Philippines, including Mr Lantip Wratsangka, Mr Zul Janwar, Mr Andi Jaya, Ms Norievill B. Espana, Mr Nick Wolff, Dr Alice Rogers, Dr Ir Marjani Sultan, Mrs Rosanna Griffith-Mumby, Prof Peter Mumby, Mr Kris Handoko, Mr Abdi Tunggal Priyanto, Ms Tries Razak and Mr Arief Sudianto.

Below: Marine spatial planning workshop delegates at The University of Queensland. (M King)
MEASURING SEDIMENTATION RATES IN MANGROVES AND SEAGRASS BEDS

The services which mangroves and seagrasses provide to coastal communities across the East Asia-Pacific region include preventing beach erosion and regulating water quality.

By trapping sediment (‘sedimentation’), including fine particles that might otherwise stress adjacent coral reefs, mangroves and seagrasses stabilise beachfronts and filter water entering lagoons.

Among the research activities of CCRES in El Nido on the island of Palawan in the Philippines is to measure rates of sedimentation in mangroves over a gradient of genera-specific zones.

The mangroves of Barangays Aberawan and Manlag in El Nido are old, natural growth lining the banks of rivers in the area and extending seaward to Bacuit Bay.

The assorted forms of several resident genera contribute to a complex lattice of gnarled roots, stems, and branches. In Manlag, the mangrove forest is fronted by expansive seagrass meadows populated by hardy, long-lived Enhalus species.

These sites, along with another on Cadlao Island, are helping CCRES researchers from De La Salle University (DLSU) and the University of the Philippines Marine Science Institute (UPMSI) better understand the role of mangroves and seagrass in stabilising the coast and regulating water quality.

One field activity involves the deployment of settling disks to measure just how much sediment accumulates in the different mangrove zones. Another is sediment characterisation to potentially determine likely origins. Growth patterns of the seagrass Enhalus are also being analysed because these reflect changes in sediment elevation.

The mangrove and seagrass research team is led by Dr Cai Samson from DLSU, Manila. The team’s field trip in March was its third outing, with a fourth taken soon after.

Above UPMSI’s Kubi Follosco (second left) and DLSU’s Cai Samson (far right) with members of the local community on their third field visit to El Nido for the CCRES project. (G Albano)
SPOTLIGHT ON SPATIAL PLANNING MODELS, TOOLS

A working group of scientists from four universities in the Philippines and Australia has been formed to research spatial modeling of fisheries and marine protected areas (MPAs).

The researchers — from The University of Queensland, UP Marine Science Institute (UPMSI), De La Salle University and UP Los Baños — met at a workshop in Manila, Philippines, during June.

The aim of the workshop was to explore collaborative research opportunities on the subject of developing models and tools for fisheries management and MPA network design.

The first key discussion focused on collaboration in the development of a spatially-explicit version of the fisheries management tool FISH-BE (Licuanan et al. 2006). Workshop participants agreed on a plan to incorporate the effect of habitat quality on reef fish recovery and carrying capacity within a reserve.

They also discussed how to include the influence of larval connectivity.

The second discussion was about a research project to explore and quantify the importance of MPA network design, a study ideally suited to the Philippines where many small MPAs are common, and the question of where to place them is important.

A team of collaborators, who will work together to address a list of novel research questions about the value of MPA network design (e.g. versus ad-hoc MPA placement for conservation and fisheries targets), was identified.

Timelines were put in place to compile data and develop a model to address these questions, and publish results.

Participants also shared research interests and respective progress, and discussed other ‘wild-card’ research questions that might be addressed together as a team in the near future.

In closing, the group resolved to reconvene in Manila prior to the annual planning forum in February 2016.
INNOVATION AND PRODUCT DESIGN

IN BRIEF

FEBRUARY

Preparing for El Nido focus group talks
During February our Philippine partners undertook training and trial focus group discussions with community members in Puerto Princesa prior to commencing the full roll-out at El Nido. Exploring the key problems of food insecurity, water quality, fisheries and mangroves, the CCRES Systems Thinking team is seeking to gain an understanding of how communities use and interact with ecosystem services, and how these interactions, together with external factors, have led to problems such as resource degradation, resource-use conflicts, failed or dwindling livelihoods or persistent poverty.

MARCH

Food insecurity FGDs kick off at El Nido
A series of focus group discussions, led by our local partners the El Nido Foundation, Inc. (ENFI) and El Nido local government, were run across all 18 barangays in the El Nido Municipality began in March. The sessions sought to gain an understanding of food insecurity in the area, looking at how communities utilise and interact with resources and ecosystem services, and how these interactions, along with external factors, have led to problems such as resource degradation, resource-use conflicts, failed or dwindling livelihoods or persistent poverty.

APRIL–MAY

Understanding the communities’ perspectives
Teams from Philippine partner institutions the Palawan State University (PSU) and the Palawan Council for Sustainable Development (PCSD) ran community focus group discussions on fisheries decline, mangrove loss, and water quality in selected barangays in El Nido during April-May. The teams gathered community perceptions on resources, their current state, and how this has changed as a consequence of human activities and other various pressures. Through the interactive sessions, participants were encouraged to recognise relationships between their actions and the resources they depend on, and to think through possible actions towards more sustainable resource use.

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IN-COUNTRY PARTNERS ROLL OUT FOCUS GROUPS

In rural barangays of the Municipality of El Nido in Palawan province in the Philippines, many families depend on fisheries and agriculture for food and livelihoods.

How these families use and interact with ecosystem services, and how these interactions, along with external factors, have led to problems, such as resource degradation, resource-use conflicts, failed or dwindling livelihoods or persistent poverty, has been the subject of conversations at focus groups led by local CCRES partners.

There are four teams of local partners conducting these focus groups, with each team addressing a different problem:

1. The El Nido Foundation team is addressing the problem of food insecurity
2. A team from the Palawan Council for Sustainable Development (PCSD) is addressing the problem of mangrove loss
3. The first of two teams from the Palawan State University (PSU) is addressing the problem of fish catch decline
4. A second team from PSU is addressing water pollution

The data collected at these focus groups will be used to map the links between ecological and socio-economic systems and identify how ecosystem services can be maintained or enhanced.

The PSU team members — Marissa Pontillas, Eva Marie Ponce de Leon, and Gianina Decano — led focus group discussions in some of these communities to learn how the state of fisheries resources has changed over time, and what activities and pressures may be influencing this.

Respondents have also been encouraged to think through possible actions towards more sustainable fisheries use.

Mangrove loss is perceived as a key problem at El Nido, as in many areas in the Philippines. The PCSD team — Glenda Cadigal, Grace Palatino, Jess Bream, and Benjie Adriano — conducted focus group discussions in selected El Nido communities to help them articulate and recognise the drivers and activities affecting mangroves in their area. The FGDs also enable participants to think through potential solutions to these issues.

In a rapidly-developing coastal town like El Nido concerns about water quality are bound to arise. A team from PSU, consisting of Patrick Regionel, Aynon Gonzales, Roy Bero, and Mark Buncag, ran a series of focus group discussions to understand how water quality may be affected by local activities in and around the coast, as well as by other external pressures.
PEOPLE AND ENGAGEMENT

IN BRIEF

FEBRUARY

Coming together: 2015 Planning Workshop
More than 50 scientists and coastal planners from Indonesia, the Philippines, the United States and Australia attended the CCRES Annual Planning Forum at Makassar, Indonesia. Indonesian officials — representing national, provincial and district levels of government — attended the four-day meeting in the capital of South Sulawesi during February.

FEBRUARY

Launching CCRES in Selayar, Indonesia
The island of Selayar, our pilot site in Indonesia, officially welcomed CCRES during February. We were humbled by the greeting from DINAS Fisheries chief Pak Marjani, police chief Pak Hidayat and the wider community and an official launch by Selayar’s Vice Bupati, H. Saiful Arif.

The Vice Bupati said the Selayar Government was proud Selayar had been chosen as the sole CCRES pilot site in Indonesia.

MAY

CCRES Advisory Board meets at El Nido
The second annual meeting of the CCRES Advisory Board was hosted at El Nido, Palawan, during May. During their visit members of the Advisory Board observed the geography, issues and challenges at our Philippines pilot site and how the CCRES research outputs will assist in providing local planning officials with answers to these challenges.

JUNE

‘Green light’ for field work in Indonesia
The roll-out of field-based activities at Selayar, Indonesia, is set to begin, following the submission of research permits for international researchers. The permits, together with Memorandums of Understanding with local partners the Ministry for Marine Affairs and Fisheries (MMAF), Bogor Agricultural University (IPB) and the Indonesian Institute of Sciences (LIPI), means research will be underway in early August 2015.
“THESE COMMUNITIES WANT THE BEST FOR THEIR CHILDREN. THEY WANT THEM TO HAVE BETTER EDUCATION, BETTER HEALTH, AND A BETTER QUALITY OF LIFE AND THEY’RE MOTIVATED TO WORK WITH CCRES TO SHAPE THE SOLUTION.”

JOHN PICKERING
ENGAGING PARENTS TO PROMOTE BEHAVIOUR CHANGE

Educating people about the benefits of the science behind sustainability has often failed to promote changes in the way coastal communities interact with their environment.

So CCRES is taking a new and holistic approach to tackle the complex problem of empowering coastal communities to undertake sustainable fishing and protect coral reefs.

This innovative approach is centred on the Triple P — Positive Parenting Program at The University of Queensland (UQ) which has helped millions of families across the world.

Researchers from across behavioural sciences, engineering, business, and marine environmental management faculties at UQ are investigating whether the behavioural principles of Triple P can be adapted and integrated as part of the solution to sustain coastal ecosystems in the East Asia-Pacific region.

Established by Professor Matt Sanders as part of his PhD in 1980, Triple P has reached more than four million families across 25 countries. It’s founded on the concept that fostering stable foundations through positive behavioural change within the family can boost the happiness and health of wider communities.

Triple P is a model of intervention that is becoming recognised by policymakers, philanthropists, and educators as a significant strategic priority for societies worldwide.

John Pickering, Head of Innovation and Engagement, from Professor Sanders’s group, will lead this collaborative research for CCRES. The collaboration is built on a belief that solutions to complex problems can only emerge from a multi-disciplinary effort.

The idea of bringing together parenting experts, behavioural scientists, chemical and civil engineers, marine biologists, agricultural scientists, economists, and innovation technology experts might be unfamiliar, yet it also might be the very key to unlocking the solution.

During a visit to Selayar, Indonesia during February the single, strongest message from local people was that they don’t want to see their children go through the same hardships they had.

“These communities want the best for their children. They want them to have better education, better health, and a better quality of life and they’re motivated to work with CCRES to shape the solution,” said Mr Pickering.

Left Market day in Benteng, Selayar, Indonesia. (J Pickering)
Top Beach pollution on the west coast of Selayar is more of a problem during the western monsoon season (October–March). (J Pickering)
Above John Pickering (right) during his visit to Selayar. (P Bradley)
CCRES GETS WARM WELCOME IN SELAYAR

The island of Selayar’s Vice Bupati, H. Saiful Arif officially welcomed the CCRES project to our pilot site in South Sulawesi, Indonesia, during February. The Vice Bupati said the Selayar Government was proud Selayar had been chosen as the sole CCRES pilot site in Indonesia and he committed his full support to the project.

During the visit, the CCRES team did site investigations to map out future activities on the island, and met with a large number of government and community members to discuss the issues, challenges and potential way forward for the project’s activities in the site.

On the eve of the visit the team hosted a stakeholder forum involving more than 50 scientists and coastal planners in Makassar, the capital of South Sulawesi. It was agreed during the forum that engagement with partners and participants from the Philippines and Indonesia will be critical in ensuring the project’s activities continue on-ground and the project’s models, tools and products are taken up into practice and decision-making.
Prof. Jamal Jompa, University of Hasanuddin, Makassar, Yuni Kumoloraras, CCRES Country Coordinator (Indonesia), and Mrs Deny Hidayati, LIPI, Jakarta, during the visit to Selayar. (M Paterson)
Indonesian officials — representing national, provincial and district levels of government — included representatives from the Ministry for Marine Affairs and Fisheries (MMAF) e.g. Directorate of Spatial Planning for Marine Coastal and Small Islands, Directorate Marine Conservation Areas and Fish Species, BPSPL Makassar, BPSPL Denpasar, LKKPN Pekanbaru, BPSPL Padang, LPSPL Sorong; Dinas Marine and Fisheries in South Sulawesi; Dinas Marine and Fisheries in Selayar and COREMAP-CTI.

They were joined by leading scientists from Bogor Agricultural University, Bogor, the Indonesian Institute of Sciences (LIPI), Jakarta, and the University of Hasanuddin, Makassar.

The forum led to the development of the work programs for the implementation of project activities in Selayar, identification of local partners to work with international researchers to undertake the activities, and an overall understanding of the environment by all project team members.
Above: Siham Afatta (left), UQ; Novie Sentianto, Bogor, Suryo Kusuma, Bogor, and Amehr Hukim, from KKP, flank a village head (centre) during a visit to Selayar communities, following the official welcome. (M King)

Right: Kubi Follosco, University of the Philippines Marine Science Institute, Manila, admires the craftwork of a women’s basket-making cooperative during a tour of enterprises at Selayar during February. (P Bradley)
PARTNERS HOLD KEYS TO STAKEHOLDER RELATIONSHIPS

OUR PARTNERS AND collaborators are core to how the project undertakes activities within the countries where we are working and at the broader regional level.

The fortunes of CCRES will depend in no small part on the partnerships the project forms with groups from the private, public and non-profit sectors in the Philippines and Indonesia.

We are proud to announce the following partners and collaborators:

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

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 Unit
- El Nido Foundation, Inc.
- Palawan State University
- De La Salle University

Indonesia
- Ministry for Marine Affairs and Fisheries
- Lembaga Ilmu Pengetahuan Indonesia (LIPI)
- Bogor Agricultural University, Center for Coastal and Marine Resources Studies
- University of Hasanuddin
- DINAS Marine and Fisheries, Selayar

Above (L to R) Dr Firdaus Agung, Mr Adrian Ross, Ms Miledel (Mags) Quibilan, Dr Zainal Arifin, Undersecretary Anna Teh, Ms Melanie King and Dr Maya Villaluz. (G Sheehan)
VIEW FROM THE FRONTLINE

THE VALUE OF COLLABORATION FOR UNDERSTANDING THE VALUE OF ECOSYSTEM SERVICES

By Joleah Lamb (Cornell University) & Nur Abu (Hasanuddin University)

INDONESIA IS SURROUNDED by amazing coral reefs where more than half of the coastal population relies on reef fish as a primary source of animal protein.

Additionally, terrestrial-based agriculture provides employment for over 40 percent of the nation, indicating the necessity for a healthy interface between marine and terrestrial environments. Threats to human health, food security and ecosystem services are growing in developing coastal areas, in part due to increases in the spread of diseases. We believe there may be natural mechanisms to reduce levels of disease-causing pollutants entering coastal waters. Ecosystem filtration of toxins, nutrients and pathogenic microorganisms provided by coastal ecosystems, such as seagrasses, mangroves and bivalves have not yet been examined as tools to moderate human and coral reef pathogens in the field.

CCRES has provided a strong partnership between Hasanuddin University and Cornell University to focus on examining this novel concept. Over the past year, Nur, myself and numerous Indonesian and international colleagues have led a series of studies suggesting that seagrass meadows in Indonesia are capable of moderating resident microbial communities and potentially pathogenic bacteria that cause disease in humans and several coral reef organisms.

In addition, reef-building corals located adjacent to seagrass meadows have significant reductions in two globally devastating coral diseases — novel findings for both Indonesian reefs and reefs across the world.

This project has been instrumental in supporting our research and friendships — the work we do in Indonesia will ultimately benefit the communities that we see every day while in the field. It’s very rewarding as a scientist to work on the front line.

Next up! Seaweed farming is frequently practised as an alternative to improve economic conditions and to reduce fishing pressure and over exploited fisheries, however disease outbreaks threaten the value of this industry and human livelihood. Our teams are using field and lab-based studies to understand the role healthy seagrasses play in moderating water quality and pathogenic bacteria that impact seaweed farmers in Indonesia. Together these studies will allow us to model the ecosystem service value of seagrasses to human health, coral reef health and algal farming. We are really looking forward to the next field season in October.
The Capturing Coral Reef and Related Ecosystem Services (CCRES) Project is a regional technical support project that seeks to unlock new, sustainable income streams for coastal communities in the East Asia-Pacific region. CCRES will develop knowledge products — which inform the design of global, regional and national projects, plans and policies — and technical models and planning tools which assist with preparation of community-based coastal resource management plans.

PROJECT EXECUTING AGENCY
The Global Change Institute at The University of Queensland, is an independent source of game-changing research, ideas and advice for addressing the challenges of global change. GCI advances discovery, creates solutions and advocates responses that meet the challenges presented by climate change, technological innovation and population change.

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