Sunset at El Nido, our pilot site in the Philippines.
Photo: R. Martinez
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Fish trap, Bontomatene, on the west coast of Selayar, Indonesia.
Photo: M. Paterson
LEADERSHIP MESSAGE

“Solving the most pressing challenges of our time requires that we capture the imagination, passion and knowledge of the many, rather than a select few.”

Dr Sara Farley
Co-Founder and Chief Operating Officer, Global Knowledge Initiative

The goal of harnessing the value of ecosystem services, building viable business enterprises and promoting behavioural change in the coastal communities of developing countries is ambitious.

It demands a strategy of capturing, developing, sharing and effectively using the knowledge, experiences and practices essential for achieving sustainable development objectives and targets.

So, the Capturing Coral Reef and Related Ecosystem Services (CCRES) project is developing a knowledge management platform — information, channels, tools and networks — to execute this strategy.

However, we have learned that before you can form knowledge partnerships and establish pathways to adoption questions about the ‘who’ and ‘how’ of making it happen need to be answered.

These include:

- How do we capture the imagination, passion and knowledge of the many?
- How do we create the necessary knowledge partnerships and knowledge pathways?
- How do we harness certain kinds of knowledge in taking small steps towards effective management?
- How do we think smarter in sharing and utilising our collective resources?

These questions and more are part of the complexity of the CCRES project as we not only undertake research to explore key challenges impacting on the East Asia-Pacific region, but also in deciding how we develop and promote tools for strengthening coastal ecosystem management.

To be effective the technical outputs from our research, innovation and engagement activities — knowledge products and management tools — need to be applicable, accessible, useful, scalable and transferable.

So, we need consistent approaches which recognise the breadth and complexity of capturing knowledge and sharing it. We need to include the right people and make the case for their involvement. We need to clearly understand the problems or challenges we are attempting to solve.

But, above all, we need to collaborate with our stakeholder networks and include people in the process — and more importantly, we need to recognise that it takes time to involve people and achieve results.

As the CCRES project has completed its second year, we are now in full implementation mode with the research effort, and already this is demonstrating early wins and achievements in producing outputs and information which our direct beneficiaries are using in their coastal planning.

Furthermore, we have been working with stakeholders and end-users to ensure our outputs are user-friendly and in ensuring that ultimately, knowledge sharing can and should facilitate enhanced capacity and performance of development projects, and impact investments for sustainable development.

We are proud to present this second Annual Report, showcasing the huge effort from everyone in our team and the commitment from our stakeholders in working with us to build an effective knowledge management platform.

Melanie King
Professor Peter Mumby
Mark Paterson
Professor Mark Milstein
Dr Carl Smith
2015 HIGHLIGHTS

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

FEBRUARY
Coming together in South Sulawesi
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.

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 Dr Marjani Sultan, police chief AKBP Mohammad Hidayat Berkatulla and the wider community, and an official launch by Selayar’s Vice Bupati, H. Saiful Arif.

APRIL
Modelling 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. The work will help in understanding how activities like fisheries, tourism, and marine conservation affect a coastal community’s economy.

Talking food insecurity with communities
In March–April a series of food insecurity focus group discussions, led by our Palawan partners El Nido Foundation (ENF) and the El Nido Local Government Unit (LGU), was run across all 18 barangays in the El Nido municipality.

MARCH
Understanding mangroves as sediment traps
A team from the University of the Philippines Marine Science Institute (UP MSI) and De La Salle University (DLSU) was in the field at El Nido, Palawan, 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.

Analysing new, viable business opportunities
Our market development team from the Center for Sustainable Global Enterprise at Cornell University spent time in El Nido interviewing people from the community, public and private sectors to assess potential business opportunities that could generate revenue, support livelihoods, and offer products and services to end the destruction of critical mangrove forests.

MAY
Surveying reef structural complexity, health
Dr Alice Rogers from UQ and her team undertook reef surveys at El Nido, Philippines, for incorporation into a reef complexity model. 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.
Understanding perspectives on resources
Teams from the Palawan State University (PSU) and the Palawan Council for Sustainable Development (PCSD) ran community focus group discussions on fisheries, mangroves and water quality across the El Nido barangays. While gathering information on how the community perceives changes to resources through activities, community representatives were encouraged to think through possible actions towards more sustainable resource use.

CCRES Advisory Board meets at El Nido
The second annual meeting of the CCRES Advisory Board was hosted at El Nido, Palawan, Philippines. 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
Spatial modelling of fisheries and MPAs
Researchers from UQ, UP MSI, De La Salle University and UP Los Baños met in Manila, Philippines, 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.

JULY
‘Green light’ for fieldwork in Indonesia
CCRES was granted the research permit for international researchers that enabled the team to start field-based activities at Selayar, our pilot site in Indonesia. Field work started during August.

Study reveals climate change is “unfair”
Nicholas Wolff, lead author of a new paper published in Global Change Biology, revealed the coral reefs of Australia and US will be less impacted by climate change than is “fair”. Coral bleaching will become more frequent as human-induced climate change warms up the oceans.

Training for second set of focus groups
Dr Carl Smith and Dr Russell Richards, from UQ, were back in Puerto Princesa to train the Philippines partners, Palawan Council for Sustainable Development Staff, Palawan State University, the El Nido Foundation, Inc. and the El Nido local government, for the second round of systems analysis FGDs.

AUGUST
Studying the value of seagrass to seaweed farming
Dr Joleah Lamb, Cornell University, and Dr Syafyuddin Yusuf, Hasanuddin University, surveyed corals adjacent to coastal islands in Indonesia for signs of disease. Following success documenting the role of seagrass in filtering coral and human pathogens from reefs, the team is investigating the role of seagrass beds for improving seaweed farming businesses.

SEPTEMBER
Seeking to generate robust local economies
The business development activity commenced in the Philippines with Prof Mark Milstein, Mr Yasuhiro Karakawa (Cornell University) and Dr Sue McAvoy (UQ), undertaking the first round of business discussions analysing current businesses at El Nido, Philippines, with the aim of identifying potential economic opportunities for coastal communities.
OCTOBER

Moving towards resilient ecosystems
Team members from the UP Marine Science Institute and De La Salle University attended the 13th National Symposium on Marine Science, a biennial conference convened by the Philippine Association of Marine Science (PAMS). The conference was titled “Moving Towards Resilient Ecosystems” with many of the CCRES researchers presenting their research at this major national symposium, which is a key pathway for information dissemination for the project.

Holding talks with fishers at Selayar
The first round of focus group discussions kicked off in Selayar, Indonesia. Led by Dr Luky Adrianto, Dr Novie Setianto, Dr Suryo Kusumo from the Centre for Coastal and Marine Resource Studies at Bogor Agricultural University, Indonesia and Mr Siham Afatta (UQ), these talks focused on fishers and understanding the problems facing the decline in fisheries in Selayar.

NOVEMBER

Convening an EAS Congress workshop
We were proud to join PEMSEA and the World Bank to co-convene the Knowledge Management workshop at the PEMSEA 2015 East Asian Seas Congress held in Da Nang, Viet Nam. Members of the CCRES team delivered presentations and joined panels to discuss how leading organisations and projects are using ecosystems valuation, systems thinking and business innovation to manage sustainable development in coastal communities in the East Asian Seas region.

Linking law, policy to on-ground problems
The systems analysis Philippines team conducted a municipal-level focus group with members of the El Nido local government, as well as some relevant participants from the provincial level. As part of the system analysis, the session reviewed current policies and programs, identified new policies and programs and identified policy and program priorities and actions, based on the results of previous focus groups with community members at El Nido.

Navigating governance and institutions
An innovation histories workshop, led by Dr Vera Horigue, from UP MSI, was conducted during November at Puerto Princesa, Palawan, to describe the transformation of coastal resource governance and the evolution of multi-sectoral planning and marine spatial planning at our pilot site in the Philippines, El Nido.

Valuing coral reef fisheries productivity
Dr Alice Rogers and Nicholas Wolff from UQ, Pak Andi Jaya and Pak Zul Janwar of DINAS Marine and Fisheries, Selayar, Indonesia, and Pak Kris Handoko, MMAF, Indonesia, undertook further broad-scale reef assessments on the east coast of Selayar. The fieldwork collected data for the habitat maps and scaling-up model predictions relating to potential fisheries productivity on reefs of varying habitat quality.

Marine Protected Area Design Workshop
The UP MSI team participated in a Marine Protected Area (MPA) Design Workshop organised by the USAID funded Eco-FISH Project. From this workshop, the team learned about the Suitability, Sensitivity and Susceptibility and Governance Socio-ecological Integrated Systems Framework for designing socio-ecological MPA networks for the Philippine context, with the aim of value adding by introducing the CCRES tools and models to these frameworks.
TOOLKIT GUIDE

INNOVATIVE TOOLS FOR VALUING ECOSYSTEMS, SUSTAINING BUSINESS AND PROMOTING CHANGE

The CCRES project is developing innovative tools for use by coastal managers and planners to improve ecosystem health and community welfare.

The tools under development will demonstrate the tangible links between ecosystem health and community welfare, and strengthen implementation of coastal ecosystem management plans.

SCIENCE & DISCOVERY

VALUING ECOSYSTEMS

Tool #1 FOOD WEB MODEL
This model accounts for the influence of coral reef structure and health on the dynamics of a coastal community. The model will assist coastal managers from government and community agencies to estimate the value of coral reef fisheries and their potential to change over time.

Tool #2 CORAL REEF TRAJECTORY MODEL
This is a tool to predict the response of coral reefs to a variety of stressors including typhoons, coral bleaching, pollution and overfishing. Users will enter the state of their reef and create management scenarios, and then explore the probable reef response.

Tool #3 COASTAL PROTECTION
User interface that accesses thousands of underlying model runs of the effect of coral reefs in reducing wave height and beach erosion. Users select the reef size, shape, and depth that best represents their circumstances to explore the degree to which reefs create coastal protection.

Tool #4 BIO-LEWIE
This 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.

Tool #5 INVEST+
A model that values the filtration service of seagrasses meadows and mangroves. This tool helps determine the past and project future impacts of habitat loss by using various levels of conservation and climate scenarios (i.e. restoration or business-as-usual). In collaboration with the Natural Capital Project this model will be incorporated into the freely available InVEST toolkit.

Tool #6 FISH-BE
This is a spatially explicit fish population and fishing model that can be used to guide Marine Protected Area (MPA) network designs and marine spatial plans by demonstrating potential fisheries productivity, given varying levels of habitat quality, protection and fishing pressure.
Tools for marine protected area (MPA) design

Tool #7 MARINE PROTECTED AREA DESIGN MODULE FOR USE WITH MARXAN
This MPA design module represents a new extension to the widely used Marxan software (www.uq.edu.au/marxan). It allows users to incorporate quantitative estimates of the transport of marine larvae by ocean currents in order to achieve maximum biodiversity conservation and fishery benefits of MPAs. Following initial introduction of underlying concepts and parameterisation, the module will allow Marxan users to apply larval dispersal optimisation by generating Marxan input files in Excel.

Tool #8 ADVISORY BRIEF — OPTIMAL MARINE RESERVE SIZE AND COVERAGE FOR FISHERIES
A framework of spatially-implicit and spatially-explicit fishery models is available to estimate mean reserve sizes and overall levels of reserve coverage providing for maximum fishery benefits. Critical data for robust model predictions include the status of local fisheries, and measurements of adult home ranges and larval dispersal distances. Even if no quantitative information is available, generic model predictions can support informed decision-making.

Tool #9 MSP ONLINE
A website for marine spatial planning www.marinespatialecologylab.org/ccres_msp

Tools for systems analysis

Tool #10 SESAMME
SESAMME is an iPad app, which enables researchers and stakeholders to build interactive pictures of socio-ecological systems. It was designed to capture information about system components (such as resources, activities, pressures and decisions) from local communities and help them visualise how these components interact. CCRES is using SESAMME to understand specific socio-ecological problems of fish catch decline, mangrove loss, water pollution and food insecurity in the East Asia-Pacific region.

Tools for storytelling

Tool #11 SYSTORY (SYSTEMS STORYTELLING TOOL)
A simulation and storytelling tool that helps managers to understand and visualise the dynamics of socio-ecological problems and assess the influence of alternative scenarios on system trajectories over time. The tool will be available on PC, tablet and the Internet.

Tools for business analysis

Tool #12 BUSINESS ANALYSIS TOOLKIT
Models that enable business and non-business professionals to better evaluate value chains, pricing, competitive dynamics, market segmentation, and profitability; and to assess how changes to existing businesses and/or investments in new business concepts in a given industry or sector can better align local economic activity with long-term marine ecosystem health and value.

Tools for knowledge management

Tool #13 CCRESNET
A knowledge management platform, involving influential stakeholders and information channels, for sharing best practice in coastal management, planning, regulation and policymaking.

Tools for empowering people

Tool #14 KNOWBEST
A set of guidelines for best practice in knowledge management for individuals and institutions implementing coastal ecosystem management plans. They outline principles for scaling up the use of technical knowledge and innovative tools for coastal resource managers, planners and policymakers.

Tool #15 FUTURE LEADERS NETWORK
A program for building leadership capacity in coastal decision-makers. It prepares young scientists, planners and managers for their future roles in dealing with the environment, social and economic challenges facing coastal communities. It equips them with skills to solve problems and to use tools to create lasting solutions across disciplines and boundaries.

Tool #16 CCRESCHANGE
A program of behaviour change that helps coastal communities modify the way they interact with coral reefs. It seeks to reduce the risk factors causing individuals to damage the reef, while offering insights and case studies for enhancing the factors that lead to protection of coral reefs. Building on the principles of Triple P, a scientifically-researched behavioural intervention, the program takes a systems approach to behavioural change.
SCIENCE & DISCOVERY

QUANTIFYING THE VALUE AND MARKET POTENTIAL OF CORAL REEF AND MANGROVE ECOSYSTEM SERVICES

GENERATING ECONOMIC INSIGHTS INTO LOCAL ECONOMIES

The first model to pair bio-economics with a Local Economy-Wide Impact Evaluation (Bio-LEWIE) model is being developed by CCRES at El Nido, Palawan, Philippines. Led by Professor Jim Sanchirico, Professor Ed Taylor and Mr Ted Gilliland at the University of California (Davis) the work seeks to understand and respond to the economics of tourism and fishing in the municipality.

The work aims to assess tourists’ willingness to pay for improvements in coastal resources; how growth in tourism will affect different sectors and households and fishing pressure at El Nido; and how fishermen allocate their time and effort and how these allocations will respond to marine conservation interventions in the fishery.

The Bio-LEWIE modelling tool can be used to estimate the impacts of changes to the ecological and economic systems of El Nido. The Bio-LEWIE has 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 the effect of changes in business activities can help inform the choice of development activities.

In April and May, UC Davis and a team of enumerators from the Palawan State University conducted surveys to gather household, tourist, and business information to input into the model. Approximately 460 households, 275 businesses and 433 tourists were sampled randomly to generate a snapshot of the El Nido economy. The surveys focused particular attention on tourism-related activities and fishing-related activities, as these are two primary livelihoods for the El Nido community. The tourist survey involved visitors from Germany, China, Japan, the United States, the Philippines and other countries.

The team is analysing the data and developing the modelling tool to simulate how changes in marine conservation will affect the local economy. Initial results show that there are important linkages between economic sectors in the El Nido economy that must be accounted for when assessing how tourism will affect fishing pressure and how fishers allocate their effort over space and time. They also show that tourists would spend more time and money at El Nido if reef quality were higher.

KEY POINTS

- Tourism does affect fishing pressure and how fishermen allocate their effort over space and time
- Tourists will spend more time and money at El Nido if coral reef quality is higher
MEET THE TEAM

JIM SANCHIRICO, ENVIRONMENTAL ECONOMIST

FOR Dr Jim Sanchirico, one of the most satisfying pursuits in his life, personally and professionally, is helping others to achieve their potential.

Whether coaching Davis High School students to ski faster, PhD students to award-winning dissertations, or whole communities to sustainable practices, Jim is happiest when working with others to reach a shared goal.

So when Jim, an environmental economist at the University of California (Davis), was invited to join the CCRES team he was eager to get involved.

“I’ve made a conscious effort to shift my research agenda to a broad focus on sustainable fishery management and the provision of ecosystem services in developing countries,” Jim says.

He recognises that CCRES represents a significant effort by the World Bank and project partners to boost the conservation capabilities of developing nations in the East Asia-Pacific region.

“My research group is building models of the local economy that include fishing and non-fishing households, local businesses (restaurants, stores, etc.) and the tourism sector in El Nido. These models use survey data collected by the team, to predict the labour allocation decisions made by households. We can predict the likely amount of labour available to the fishing, farming, retail, construction and other industries.”

By closely examining the ecological and economic conditions under which locals make the decision to go fishing, Jim and his team can map out how marine conservation efforts will impact the livelihoods of local residents. These maps can be then be used by local planners to understand the likely consequences of any conservation actions they take.

Jim, who recently coached a student to an Association of Environmental and Resource Economists (AERE) Outstanding Dissertation Award, says he looks forward to coaching coastal planners in the Philippines and Indonesia to create award-winning conservation programs.

“I’m very supportive of the CCRES mission to improve the practice of conservation. The consideration and inclusion of local livelihoods is helping to move conservation practices in the right direction,” he says.

“This project presents another chance to work with (CCRES chief scientist) Peter Mumby and other researchers from The University of Queensland. We have worked together on previous projects, and I’m excited to collaborate once again.

“Finally, I appreciate that CCRES, as a consortium of researchers, is working at a scale much larger than that at which I typically operate.”

The size and scope of the CCRES project means that Jim is now part of an interdisciplinary endeavour that includes research, systems thinking, business development, communication and training.

“I see my role as bridging the gap between components, with my research exploring the connection between the ecology of environment, household livelihoods and local businesses,” Jim says.
VALUING CORAL REEF FISHERIES PRODUCTIVITY, IN RELATION TO HABITAT

El Nido, Palawan (Philippines)

Assisting coastal managers to provide estimates for the value of coral reef fisheries and their potential to change over time is the primary objective of the development of a food web model, which will assist in predicting coral reef fisheries productivity.

This year has seen increased activity in the collection of data to parameterise preliminary models for the pilot sites of El Nido, Philippines, and Selayar, Indonesia.

The team, led by Dr Alice Rogers at The University of Queensland, carried out detailed surveys of key reef sites at El Nido. At each site the team collected information on the benthic composition and structural complexity of reefs for input into food web models. In addition, they carried out a study to obtain estimates of benthic primary productivity across Bacuit Bay.

Fish surveys, turf algae measurements and coral recruit surveys were also carried out to obtain information on the current condition, and resilience of reefs in the region. Initial analyses of this data have been conducted.

Results reflect known high fishing pressure in the area, demonstrating the relative absence of large-bodied fish. Early results also reflect variability between sites and between fish families.

Further analyses of field data from El Nido will continue in 2016, including the finalisation of the preliminary food web model and subsequent model simulations to estimate carrying capacity and productivity.

KEY POINTS

- Results in El Nido reflect known high fishing pressure in the area, demonstrating the relative absence of large-bodied fish

1 Deploying tiles during reef complexity work at El Nido, Philippines. Photo: C. Castro
2 A tile used to quantify algal growth. Photo: M. Quibilan
3 Measuring recruits. Photo: M. Quibilan
Selayar, South Sulawesi (Indonesia)

The preliminary food web model for Selayar is almost complete, due in part to increased field work undertaken by the research team from UQ, MMAF and the DINAS Marine and Fisheries in Selayar. The aim of the fieldwork was to capture information at a broad spatial scale to understand and document key habitat types on the island, including reefs damaged by destructive fishing.

Initial model predictions indicate that a number of locations on the western coast of Selayar have complex habitats that are likely to be capable of supporting productive fisheries. However, current fish biomasses are low, and size-distributions indicate few large-bodied fish, reflective of high fishing pressure. Model predictions, as well as observed fish communities show that reef areas that have been bombed support very few fish. The relative difference between the best and worse reefs with respect to potential fish production may be as much as four-fold.

Data on benthic composition, reef fish communities, turfs and coral recruits was obtained to develop an understanding of the current state of reef communities and reef resilience. These data were collected at sites on the western coast including areas that have been protected, areas that suffer obvious signs of sedimentation, and patches of bomb damage. Analyses reveal a number of key findings:

i) Fish biomass is low in general indicating high fishing pressure;

ii) Marine conservation areas support a higher biomass of some families, specifically sacrids (parrotfish);

iii) Areas damaged by dynamite fishing support extremely low biomasses, if any fish;

iv) Coral cover is relatively high, particularly on the reef around Pasi Gusung (~50%), but also on sedimented reefs in the south (~30%) and exploited reefs in the north (30%); and

v) Thick algal turfs make up around 10% of benthic cover, indicating reduced grazing function and potentially low reef resilience.

KEY POINTS

• Preliminary food web model for Selayar almost complete

• Locations on the western coast of Selayar have complex habitats that are likely to be capable of supporting productive fisheries

• Reef areas that have been bombed support very few fish

• The relative difference between the best and worse reefs with respect to potential fish production may be as much as four-fold

• Data, together with new, high-resolution satellite imagery, model predictions and maps of potential fisheries productivity, will be used in marine spatial planning

1 Benteng Harbour, Selayar, Indonesia. 
   Photo: M. Paterson

2 Dr Joleah Lamb (Cornell University) and Dr Syafyuddin Yusuf (Hasanuddin University) survey corals for signs of disease. 
   Photo: C. Couch

3 The port at Benteng. 
   Photo: M. Paterson
MEET THE TEAM
ZUL JANWAR

WHEN Pak Zul Janwar isn’t hanging off the back of a manta tow surveying coral reefs, he enjoys diving and travelling, eating fried chicken with chilli sauce and the musical stylings of 1980s rock group Van Halen.

His favourite quote captures the approach he applies to his work in coastal ecosystems management:

“The problem is not the problem. The problem is your attitude to the problem.”
— Captain Jack Sparrow, Pirates of the Caribbean

The work Pak Zul does with the CCRES project seeks to balance management of coral reef health with the business goals of coastal communities.

He first began working with CCRES during August 2014.

“I work with CCRES to provide assistance to local government by developing marine spatial plans. These plans combine analysis of the biophysical conditions (coral reefs) with the commercial activities of the community,” he says.

“The aim is to produce a plan that can be implemented by the Selayar Government to reduce pressure on coral reefs and also protect the incomes of local people, now and into the future.”

Pak Zul Janwar is a firm believer in decision-making guided by scientific principles.

“Marine spatial planning should be supported by accurate data. CCRES is unique in its approach to spatial and business planning and it has helped me to further my understanding of data collection and analysis.”

Pak Zul tested his new-found understanding by participating as part of the Component I team in a series of dives at Selayar, Indonesia, to assess the condition of the coral reefs in a broad-scale survey.

“We used a combination of diving, snorkelling and manta tows to observe the reef and the bottom substrate in several locations,” he says.

In case you are wondering, a manta tow involves a researcher (with a snorkel) being pulled behind a motor boat whilst gripping a board and writing down assessments based on their observations. It’s considered a low-cost and effective way for researchers to survey large areas.

Pak Zul has successfully completed a Masters degree in the management of coastal and marine resources through Bogor Agricultural University and Bremen University. He is now in charge of managing local Marine Conversation Areas, Marine Resources and Fisheries Surveillance for DINAS Marine and Fisheries, Selayar.

And in case you’re wondering, again, his favourite Van Halen song is “I can’t stop loving you”.

Pak Zul Janwar during a manta tow, surveying coral reefs at Selayar.
Photo: N. Wolff
A young boy swims in the seagrass meadows surrounding small islands of the Spermonde Archipelago in Indonesia. Photo: J. Lamb.
CURRENT AND FUTURE IMPACTS OF DESTRUCTIVE FISHING ON REEF ECOSYSTEM SERVICES

Broad scale surveys were carried out using manta tow on both the western and eastern coasts of Selayar to assess the extent of damage from bomb fishing. The aim is that the surveys, along with detailed satellite imagery, will enable the team to estimate how much damage has occurred.

Initial analyses indicate that bomb damage is far more extensive on the eastern side of the island where there are very few villages, or people to watch over the reef. The team aim to use the data to develop a tool incorporating geographical features and distances from human populations, that may help to predict where, both locally and in the broader region, might be more susceptible to illegal bomb fishing.

Using detailed surveys on reefs the team has been able to parameterise food web models and get some preliminary estimates of the loss in value that can occur to a reef fishery if habitats are bombed. The initial estimate is a maximum of around a four-fold difference in potential production (in the absence of fishing) between a good site, and one that has been bombed.

STUDYING VALUE OF SEAGRASS TO SEAWEED FARMING, HUMAN HEALTH

The role of seagrass beds for improving seaweed farming businesses is being studied by research teams at Hasanuddin University, Indonesia, and Cornell University, United States.

The new study follows the teams’ success documenting the role of seagrass in filtering pathogens from reefs adjacent to coastal islands in Indonesia. Together these two studies promise to allow the CCRES project to model the ecosystem service value of seagrasses to human health, coral reef health and algal farming.

Threats to human health are growing in developing coastal areas, in part due to increases in the spread of diseases. However, there may be natural mechanisms to reduce levels of disease-causing pollutants entering coastal waters. The 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.

During the past year Dr Joleah Lamb, Cornell University, Nur Abu, Hasanuddin University, and Indonesian and international colleagues have been examining this novel concept.

The group has led studies suggesting that seagrass meadows in Indonesia are capable of reducing the effects of 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 and reefs across the world.

There may be a natural way to reduce levels of disease-causing pollutants entering coastal reefs. Ecosystem filtration of toxins, nutrients and pathogenic microorganisms provided by coastal seagrasses and mangroves are one of the potentially highest value ecosystem services provided by natural marine ecosystems. This research is quantifying the benefits and value of the filtration ecosystem service and revealing the linkages between the health of marine ecosystems and their ability to filter.

This research activity aims to assess the level by which intact seagrass meadows reduce pollutants to both humans and reef health in coastal regions of Indonesia. To undertake the study, the island of Barang Caddi was selected.

The initial results have shown there are 34 potentially pathogenic bacteria (genus-level) which impact humans, coral reef fishes and coral reef invertebrates found in the seawater samples.

Furthermore, the team found a four-fold average decrease in total potentially pathogenic bacteria (genus-level) found per litre of seawater within seagrass meadows compared to outside of seagrass meadows.

Lastly, it was found that microbial communities colonising native, artificial and transplanted seagrass blades (biofilms) within seagrass meadows are significantly different than outside of seagrass meadows.

**KEY POINTS**

- 34 potentially pathogenic bacteria found which impact on humans, coral reef fishes and coral reef invertebrates
- 4-fold average decrease in total potentially pathogenic bacteria found per litre of seawater within seagrass meadows compared to outside of seagrass meadows
- Microbial communities within seagrass meadows are significantly different than outside seagrass meadows

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1 Dr Joleah Lamb, Cornell University, and Nur Abu, Hasanuddin University, surveying harvested seaweed for signs of disease. 
Photo: T. Abhy

2 Seaweed mariculture, Selayar. 
Photo: M. King
ASSESSING THE INFLUENCE OF SEAGRASS ON DISEASE IN SEAWEED FARMS

SEAWEED farming is frequently practised as an alternative livelihood and to reduce fishing pressure on over exploited fisheries. However disease outbreaks threaten the value of this industry and livelihoods. The teams from Hasanuddin and Cornell universities 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. Their study aims to:

- Determine the influence of nearby seagrass meadows on diseases that impact seaweed farms,
- Assess the role of environmental factors in influencing seaweed disease.

Seventeen sites cultivating seaweed in coastal areas in southwest Sulawesi have been chosen for the study. Nine of these sites cultivate seaweed in coastal areas without seagrass meadows and eight sites cultivate seaweed within seagrass meadows. At each site, the team randomly selected three 50m transects and identified every seaweed species and further categorised it as either diseased, compromised (bleach and/or overgrown by ascidians, sponges or algae) or healthy (no visual signs of disease). Data in this study was derived from examining 8,876 individual seaweeds.

Early results show that all farming communities are concerned with disease levels of their seaweed farms, and there is uncertainty within these farming communities as to whether seagrass meadows influence the diseases of seaweeds. The study is also showing that seaweed disease prevalence ranged from 1 percent to 79 percent, with an average of 15 percent of farmed seaweeds surveyed affected by disease. Further analyses are underway to assess the influence of seagrass meadows and environmental variables on diseases that affect seaweeds.

KEY POINTS

- Farming communities are concerned with disease levels of their seaweed farms
- Uncertainty within farming communities as to whether seagrass meadows influence the diseases of seaweed
DESIGNING MARINE RESERVES TO RECONCILE ECOSYSTEM SERVICE TRADE-OFFS

Marine reserves have become one of the most widely adopted tools in managing the biodiversity and food security of tropical coastal areas. Despite advances in the design of marine reserve networks, several challenges remain, including that the design criteria for achieving biodiversity conservation are strikingly different to those for managing fisheries (food security).

CCRES is creating a comprehensive strategy for marine reserve design that serves multiple objectives, including biodiversity and fisheries provisioning, whilst explicitly considering requirements for reducing threats and enhancing climate change resilience.

To do this, researchers are defining connectivity objectives for biodiversity, fisheries and climate change resilience, considering:

a) the diverse life history strategies of multiple species; and
b) the integrated impacts of human-induced threats and climate change on habitat quality and larval dispersal potential.

The work will then examine the trade-offs that exist among the different objectives and use the trade-off curves to identify win-win or ‘almost-win-almost-win’ outcomes.

FISH-BE FOR MANAGERS

Researchers from UP MSI and DLSU are working on improving the definition of fishery carrying capacity of coastal waters to consider the health of coastal habitats (mangroves, seagrass, and corals as well as soft-substrate and open water areas).

Activities undertaken include focusing on reviewing parameters, data gathering, and model development. Progress through the year has included the finalisation of key parameters of the model and limited to:

a) Initial standing stock biomass of fish (both reef fish and pelagic stocks);
b) Fish population growth rates;
c) Spillover rates;
d) Habitat area, extent, condition, and complexity; and,
e) Fishing mortality.

Additional parameters will include fish recruitment derived from the connectivity model, which will be built into the growth parameters, and area and extent of sediment plumes, which represents a land-based threat that can cause degradation of coral reefs, consequently affecting fish populations.

Work on the fisheries component is progressing well with the fishing maps almost completed. The maps are to be used to calculate nearest fishing grounds and the path distances. Once the maps and other household fisheries data are ready, the team will be able to estimate the distance fishers’ travel and use it as one of the parameters to describe fishing behaviour.

MEASURING SEDIMENTATION IN OLD-GROWTH MANGROVE ZONES, SEAGRASSES

The services which mangroves and seagrasses provide to coastal communities 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 at El Nido is a project to measure rates of sedimentation in the mangroves of Aberawan and Manlag over a gradient of genera-specific zones. This field work for this project has been completed.

One activity involved the deployment of settling disks (sediment traps) to measure how much sediment accumulates inside the different mangrove zones and seagrass beds. In 2014, the traps were left on-site for 177 days, and in 2015, for 58 days.

A similar pattern of sedimentation was observed across sites, though respective mangrove zones with the highest sedimentation varied. Zones with high sediment volume appear to correspond with areas with higher stem density.

In Aberawan, the middle zone had the highest volume of sediment deposition, while in Manlag, the seaward zone demonstrated highest deposition. On Cadlao Island, the landward zone showed greatest accumulation. These results further support the role of healthy and dense mangrove vegetation in trapping sediment and, consequently, in stabilising the coast and regulating water quality.
Across sites, the landward zone was mostly muddy, the middle zone sandy-muddy, and the seaward zone predominantly sandy. Such characterisation is expected to provide further insight into how various mangrove types function in reducing coastal erosion.

Cumulative vertical displacement of rhizomes of the seagrass *E. acoroides* can be used as a proxy for the relative amount of sediment being deposited in an area. Data has shown that there is higher cumulative vertical displacement in Aberawan where the seagrass beds are patchy, than in Manlag where these are more extensive. This demonstrates that seagrass density may fulfill an important function in filtering upland runoff in surveyed sites.

Presently, the mangroves in Manlag and Aberawan are capable of mitigating the impacts of sedimentation on adjacent seagrass beds and coral reefs. These must be appropriately managed to address the greater siltation issue in Bacuit Bay.

**KEY POINTS**

- Potential interventions include protecting mangroves as ecotourism zones, evaluating upland development in relation to its impact on coastal ecosystems and resources, and regulating activities on seagrass beds.

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1 UP MSI’s Kubi Follosco (second left) and DLSU’s Cai Sampson (far right) with members of the local community at El Nido.
Photo: G. Albano

2 Mangroves along the Philippines coast.
Photo: G. Sheehan

3 Measuring growth patterns of seagrass (*Thalassia hemprichii*).
Photo: M. Samson

4 Sediment captured in the settling disk placed in the mangroves, Manlag, Palawan.
Photo: G. Albano
DEVELOPING A FRAMEWORK FOR MARINE RESERVE NETWORK DESIGN

A framework for marine reserve network design that considers multiple threats and their effects on the variability of biophysical conditions is being developed by the CCRES project.

The research team at the UP MSI participated in the Marine Protected Area (MPA) Design Workshop organised by the USAID funded Eco-FISH Project, held during November 2015.

From this workshop, the UP MSI team learned about the Suitability Sensitivity and Susceptibility and Governance Socio-ecological Integrated Systems Framework for designing socio-ecological MPA networks for the Philippines context.

The team has been discussing how to improve these existing frameworks by incorporating the use of the tools and models that the CCRES project is developing. Fieldwork for this task has been moved to the latter part of Year 3 of the project (2016), or in the early months of Year 4 (2017) in order to finalise the models.

BALANCING ECONOMIC GROWTH AND CONSERVATION IN MSP

Many coastal areas in the Asia-Pacific region are struggling to balance economic growth with the need for more extensive, and more effective, protection of coastal environments and the biodiversity they contain.

While Marine Protected Areas (MPAs) can be useful tools in safeguarding natural resources, their sometimes irregular establishment has created conflict with other coastal zone activities, including ecotourism, demersal fishing and aquaculture, port development, waste management and even disaster risk mitigation.

Advances in Marine Spatial Planning (MSP) can provide decision support for community based resource management, explicitly considering the trade-offs that exist in multiple resource-use environments during an iterative process of participatory planning.

Integrating ecosystem service information into MSP has proven useful for articulating connections between human activities that are often considered in isolation, aligning diverse stakeholders around common goals, making implicit decisions explicit, and ultimately coming to a common understanding around a marine spatial plan that balances diverse interests.

Engaging with the community from the outset at the pilot sites, CCRES is working together to provide a demonstration of how to integrate:

(i) Maps of ecosystem service flow;
(ii) Priority sites for marine reserve designation, and;
(iii) The requirements of businesses into a comprehensive plan that attempts to avoid conflict and enhance services and wellbeing.

The project is also working with governments to review existing frameworks for determining coastal vulnerability and considering how these can be refined for use in a MSP context.
VULNERABILITY OF REEFS TO NATURAL AND ANTHROPOGENIC STRESSORS

An analytical coral reef trajectory model originally developed for the Great Barrier Reef is being modified to reflect coral recovery rates observed in Indonesia and the Philippines and can be utilised for national-scale marine spatial planning.

A suite of environmental data layers, including those required to assess reef vulnerability, have been processed, analysed and formatted for GIS for Indonesia. A collaboration between Professor Peter Mumby and Nicholas Wolff (UQ) and Dr Subandono and his team from the Marine Spatial Planning Unit, Ministry of Marine Affairs and Fisheries — is demonstrating the provision of technical assistance with ongoing national scale marine spatial planning.

The research team is focusing on preparing Indonesia-wide scale layers that can be incorporated directly into national marine spatial planning including assessment of reef vulnerability. To assist with a request to determine the best locations for port development and with determining locations suitable for future tourism development, the team has prepared layers that represent shipping activity (important for port development) and water clarity (important for tourism).

In addition to shipping and water clarity, the team has also processed and analysed the following layers, all at a national, Indonesian-wide scale: historical thermal stress, future thermal stress, updated coral reef habitat, bathymetry and elevation, observed wave height, observed tropical storm tracks, population density, and important species distributions.

A key output from the work will be the provision of a tool that enables managers to predict bombing severity based on reef proximity to villages. Initial analysis from Selayar suggests a link between bomb damage and population density, with proportion damage increasing with decreasing population. A plausible explanation is that locals help deter bombing (from non-local fishers) on their nearby reefs.

KEY POINTS
- Initial analysis from Selayar suggests a link between bomb damage and population density, with proportion of damage increasing with decreasing population.
- Key output will be the provision of a tool that enables managers to predict bombing severity based on reef proximity to villages.
MAKING ECOSYSTEM SERVICES PART OF MSP

A research strategy to incorporate the provision of ecosystem services into marine spatial planning in Indonesia and the Philippines was the aim of a workshop at The University of Queensland (UQ) during January.

The week-long talks by workshop attendees focused on two pilot sites, El Nido, the Philippines, and Selayar, Indonesia. The Takabonerate National Park near Selayar includes the world’s third biggest coral atoll.

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.

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 modelling of fisheries and marine protected areas (MPAs). The researchers from UQ, UP MSI, DLSU and UP Los Baños — met at a workshop in Manila, Philippines, during June.

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

Discussion focused on collaboration in the development of a spatially explicit version of the fisheries management tool FISH-BE. Workshop participants agreed on a plan to incorporate the effect of habitat quality on reef fish recovery and carrying capacity within a reserve into the model, as well as the inclusion of larval connectivity into the management tool.

A research project to explore and quantify the importance of MPA network design was also discussed. This is a study ideally suited to the Philippines which has many small MPAs, 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.

MARINE SPATIAL PLANNING WEBSITE IS ‘LIVE’

The Marine Spatial Planning Working Group website has been launched, providing an online forum for the unique challenges of marine spatial planning (MSP) in the East Asia-Pacific region. For now, the site focuses mainly on key data sources for MSP, including the processing and analysis steps required to prepare data for GIS applications that serve as a foundation for MSP. A technical report, prepared specifically for the analysis of thermal stress data, is available on the site. The site includes a list of important resources, such as widely-used MSP software and tools.

In the coming years, the site will highlight various CCRES models and tools, with instructions on how they can be incorporated within MSP frameworks. During the ongoing development phase, the site will be hosted by the Marine Spatial Ecology Lab (www.marinespatialecologylab.org/ccres_msp) at UQ. The final product will be hosted on the CCRES website, with the hope that it will become an important resource for the global MSP community.

KEY POINTS

• Marine Spatial Planning Working Group website launched
GENERATING ROBUST LOCAL ECONOMIES THAT CAPTURE 
AND SUSTAIN MARINE ECOSYSTEM SERVICES

UNDERSTANDING DYNAMICS IN COASTAL COMMUNITIES

In 2015 the Systems Analysis team ran community focus group discussions (FGDs) about fish catch decline, mangrove loss, water pollution and food insecurity in the Philippines and Indonesia. More than 1,000 participants attended 132 FGDs at El Nido, Philippines. Twenty participants from the El Nido local government and Palawan provincial government attended a special Municipal FGD. Scoping and the first round of FGDs were completed at Selayar, Indonesia. These 17 FGDs, attended by 300 people, focused on the decline of coral reef fisheries.

The purpose of the first round of FGDs was to capture the mental models of participants, and in particular, capture their knowledge about the following in relation to each of the problems targeted at El Nido and Selayar:

- Activities related to the problem (activities perceived to be both good and bad), e.g. fishing, mangrove cutting, no take zones
- Resources affected by activities, e.g. fish, mangroves, seagrass, coral reefs, water. The current amount/state of the resources is also identified
- Trends in Activities and Resources: past, expected future and desired future trends
- Pressures that have influenced past trends in activities and resources, e.g. population growth, tourism growth, poverty, pollution, climate change
- Trends in Pressures: past, expected future and desired future trends
- Interactions: direct interactions between resources, activities and pressures (i.e., resource-resource, activity-resource, pressure-resource, pressure-activity, activity-activity and pressure-pressure interactions) and the polarity of these interactions (positive, negative)
- Decisions that stakeholders could make to address problematic trends in resources, activities or pressures

The second round of FGDs involved mental model updates, reviews and learning from the mental models of others. Here, the mental models (consisting of Activities, Resources, Pressures, Trends, Interactions and Decisions) coming from each FGD conducted in the first round are updated based on the combined findings across all FGDs conducted in the first round and from other information sources (such as publications and prior research). These updates are then presented back to the same people that participated in the first round of FGDs for their review and comment.

The FGDs conducted in both El Nido and Selayar were run according to a script, which is a logical and repeatable process that allows the results of multiple FGDs to be compared. The script is supported by an iPad app, developed by the systems analysis team, called SESAMME (Socio-Ecological Systems App for Mental Model Elicitation). SESAMME allows the activities, resources, pressures, trends, interactions, decisions, and the state of resources mentioned by FGD participants, to be captured visually using icons that are dragged and dropped onto a map. This allows participants to see the information being captured during an FGD and to visualise how system components interact.

SESAMME and the FGD process has attracted interest from several groups and organisations who wish to apply it beyond the CCRES project. All of our local partners involved in the system analysis activity in both the Philippines and Indonesia are using SESAMME in projects outside of CCRES.
KEY POINTS

- Two rounds of FGDs at El Nido and first round of FGDs at Selayar completed
- First Municipal FGD at El Nido completed
- Reports and conceptual system models for four socio-ecological problems at El Nido and one socio-ecological problem at Selayar completed
- FGD scripts and SESAMME iPad app (beta version) developed

SYSTEMS MODELLING ACTIVITY OUTCOMES FOR 2015

- Five local partner teams (four in the Philippines and one in Indonesia) trained in systems thinking, the FGD process and the SESAMME iPad app
- Capacity built in five local partner teams to apply systems thinking and SESAMME beyond the CCRES project. This is evidenced by the following:
  - 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
  - IPB using SESAMME in their teaching programs
  - At least two partner participants integrating systems thinking into their higher degree research as a result of CCRES training
- Approximately 1100 participants engaged in the Philippines via the El Nido FGDs (covering the community, local government and provincial government) and 300 participants engaged in Indonesia via the Selayar FGDs
- Widespread interest in the application of SESAMME and the FGD process beyond the CCRES project
NEW SESAMME APP MAPS COASTAL SYSTEMS

SESAMME, an iPad app, which enables researchers and stakeholders to build interactive pictures of socio-ecological systems, was unveiled at PEMSEA’s East Asian Seas 2015 Congress at Da Nang, Viet Nam, during November 2015.

SESAMME was designed to capture information about system components (such as resources, activities, pressures and decisions) from local communities and help them visualise how these components interact.

The app is being used by the CCRES project to understand specific socio-ecological problems of fish catch decline, mangrove loss, water pollution and food insecurity in the East Asia-Pacific region.

SESAMME stands for Socio-Ecological Systems App for Mental Model Elicitation.

SESAMME is the ‘brainchild’ of CCRES researchers Dr Russell Richards and Dr Carl Smith from the UQ School of Agriculture and Food Sciences. It has been developed in consultation with the project’s partners in Indonesia and the Philippines.

Says Dr Richards: “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.”

SESAMME is one of several CCRES technical models and planning tools being developed to assist coastal planners, managers and policymakers prepare community-based resource management plans.

SESAMME will be available through the app store in 2016.

KEY POINTS

- SESAMME is an iPad app which enables researchers and stakeholders to build interactive pictures of socio-ecological systems
- SESAMME was unveiled at PEMSEA’s East Asian Seas 2015 Congress and will be available through the app store in 2016
MEET THE TEAM
NOVIE SETIANTO, SYSTEMS THINKER

FOR Novie Setianto CCRES connects his curiosity in systems thinking with interdisciplinary research and stakeholder engagement for the first time.

“The systems approach of CCRES enables me to translate systems theory — which I explored in my thesis — into a real-world activity. It’s fascinating,” Novie says.

“I’ve worked with multiple stakeholders before, yet never really used participatory systems thinking. Not at this level. Being part of CCRES gives me the opportunity to see the systems as a whole.”

Novie is a post-doc at one of the CCRES project’s in-country partners, the Center for Coastal and Marine Resources at Bogor Agricultural University, Indonesia. He is also a graduate from The University of Queensland in Australia.

“Working with different stakeholder groups to map their socio-ecological systems is very challenging, yet interesting,” says Novie. “Hopefully, we can find some leverage points in the systems, so that we can propose decisions to improve the situations.

“We’re using and developing a unique iPad app called SESAMME to encourage stakeholders participation. Judging from participants’ engagement, I’m convinced SESAMME is an effective tool to help participants to speak and participate in the discussion.”

In 2013 Novie’s research was acknowledged by the global systems scientist community when he received an award at the International Society for the Systems Sciences (ISSS) 57th annual conference in Viet Nam for his PhD paper.

As part of the CCRES systems thinking team, Novie is working with colleagues from Indonesia and Australia, seeking to develop a dynamic model of the systems in the coastal area of Selayar, the CCRES project’s pilot site in Indonesia.

The team’s first round of focus group discussions with villagers and fishers at several locations on the island of Selayar were held in October 2015. The data gathered was analysed and shared with participants during January 2016.

“We do have a common problem which has been identified by participants during the focus groups. Now, we’re finalising rich picture-maps. Soon, we should be able to identify the systems loops in readiness to do the systems modelling.”

Simulation models will be developed to identify leverage points within the socio-ecological systems where changes in existing resource use or business activity can lead to large system-wide ecological, economic and social benefits.
ANALYSING Viable BUSINESS OPPORTUNITIES FOR COASTAL COMMUNITIES

The business analysis activity got underway during March when a team from the Center for Sustainable Global Enterprise (CSGE) at Cornell University visited El Nido, Philippines.

The team is assessing potential business opportunities that could generate revenue, support livelihoods, and offer products and services which can end destruction of mangrove forests. Interviews were conducted with people from the community public and private sectors.

Mangroves provide an essential breeding habitat for the fisheries on which the growing population of El Nido, located in northern Palawan, is dependent for subsistence and livelihood. Yet, demand for charcoal fuel from the local community, which is growing at 4.7% per year, has been leading to increased illegal harvesting of mangrove forests in the municipality.
The CGSE team conducted their analysis and recommendations with the goal of making their business decision tools accessible and available to local decision-makers for similar analyses of other business opportunities in the future in line with the goals of the CCRES project.

The team, comprising Team Leader Mark Milstein, Becky Gitonga, Zach Perlstein, Alison (Ali) Rohrs and Chris Whylie, was assisted by local partner El Nido Foundation, operating as site coordinator.

During September to December field work by Prof Milstein, Mr Yasuhiro Karakawa, and Dr Sue McAvoy, focused on primary data collection in the hospitality/tourism and business related to the production of value-added goods.

Economic opportunities are causing the hospitality and tourism industry — including hotels, restaurants, tour boat operators, retail operations, and other related activity — to grow rapidly, putting tremendous pressure on marine ecosystem resources and leading to increases in air and water pollution, waste, and resource consumption that are quickly exceeding ecosystem carrying capacities.

The limited production of value-added goods in the region hinders the development of alternative livelihoods, contributes to the transfer of economic value to distal geographic locations, and deprives the region of valuable commercial income and tax revenue.

By December, draft sector reports were being finalised for distribution to CCRES partners and stakeholders in early 2016.

**KEY POINTS**

- Mangroves, which provide an essential breeding habitat for the fisheries, are under threat from illegal harvesting for charcoal production
- Economic opportunities are causing the hospitality and tourism industry to grow rapidly, putting tremendous pressure on marine ecosystem resources
- The limited production of value-added goods in the El Nido municipality hinders the development of alternative livelihoods

1. Irma Rose ‘Maius’ Marcelo, (far left) from the El Nido Foundation, assisted the CGSE team, including Zach Perlstein, Alison (Ali) Rohrs, Becky Gitonga and Chris Whylie, during its visit to El Nido during March.
   Photo: M. Milstein

2. Local women and girls weave products for the tourist trade, El Nido Palawan.
   Photo: G. Sheehan

   Photo: G. Sheehan
THE empowerment of in-country partners by international scientists to study local socio-ecological problems makes CCRES special, John Pontillas says.

As project development officer in the Office of the Executive Director — Special Concerns at the Palawan Council for Sustainable Development (PCSD), John coordinates a team running focus groups with coastal communities in the Philippines for CCRES.

“As part of the implementing arm of the CCRES project,” says John, “We’ve been trained by great scientists in the rigours of doing research and reporting the findings,” he says.

“Another special characteristic of CCRES is the use of systems mapping and modelling for the analysis of key ecosystem concerns. This approach provides a non-linear analysis within and between the different ecosystem components, and between ecosystem components and the socio-economic system.”

John’s employer, the PCSD, one of CCRES’ project partners, is responsible for the governance and implementation of, and formulation of policy directions for, the Strategic Environmental Plan for Palawan.

John’s role involves inspiring everyone in his team to be happy, productive and give their best. Considering the scope of work the busy team delivers for CCRES, in addition to its regular functions for the PCSD, this is no easy task.

“The CCRES project provides a new platform and perspective on understanding communities and their environment and for the communities to do the same. It also offers a new way of mainstreaming ecosystem services to local communities and harnessing these to capture the benefits by way of innovative interventions,” John says.

John says the PCSD views these projects as experimental initiatives, not yet for full roll-out and thus are at what he describes as the “knowledge incubation stage”. His unit acquires relevant knowledge and assesses their potential for application in Palawan.

He considers forums and conferences as opportunities to share his ideas and the findings from the research in which he is involved. His co-authorship of research papers in journals has achieved well-deserved recognition among colleagues and professionals.

Perhaps what makes John most proud, however, is seeing former staff under his guidance finding their place in the wheels of government, exhibiting excellence and independence in ideas, and adopting high moral ethics in their work.

Clearly, empowering people by building their capacity is close to John’s heart. To quote his favourite line from the Bible: “To those much is given, much is expected.” (Luke 12:48)
PEOPLE & ENGAGEMENT

PROMOTING BEHAVIOURAL CHANGE THROUGH OUTREACH, DECISION SUPPORT AND REGIONAL LEARNING

The CCRES project is ensuring a solid knowledge management platform is developed to support the project’s knowledge and technical outputs at local, national, regional and global levels.

During 2015, the communication, engagement and outreach team, in collaboration with researchers, partners and stakeholders, delivered four information dissemination campaigns and continued:

1. Delivering communications designed to promote uptake of project outputs:
   a. The ccres.net website recorded 12,000 visits and 24,654 page views from 9280 visitors;
   b. Social media channels Twitter and Facebook gained 252 followers and 238 likes respectively;
   c. The size of the e-newsletter distribution grew to 800, with a 20% open rate achieved by editions published in February, May and August;
   d. One media release was distributed, supporting the paper, Climate change impact on coral reefs “not fair”, published in Global Change Biology during July; and
   e. Collateral, including t-shirts, postcards, banners, visual stories and product branding, was made to support outreach in Indonesia, the Philippines and Viet Nam.

2. Working with established networks of stakeholders to develop conduits for access to pathways of influence:
   a. The hosting of the 2015 Planning Workshop attended by 50 marine and coastal scientists, planners and managers from the Philippines, Indonesia, the United States and Australia, during February;
   b. The appointment of national, provincial and local “in-country” partners in Indonesia, representing the government, scientific and university sectors, during July.
   c. The delivery of presentations, including the keynote plenary, at the 13th Philippine Association of Marine Scientists (PAMS), conference, in General Santos City at Mindanao, Philippines October; and
   d. The convening of the Application of Knowledge Management in Scaling up Partnership Investments in a Blue Economy workshop at the PEMSEA East Asian Seas Congress 2015 at Da Nang, Viet Nam, during November.
3. Analysing individual values, drivers, social networks and policies;
   a. Meetings with community and government at Selayar, Indonesia, during February to gauge interest in a behaviour change program for families, households and villages; and
   b. Preliminary field research as part of the first round of focus group discussions (FGDs) with community fishers and their families at Selayar during August.

This work, led by the Triple P project at UQ, seeks to understand the levers for behavioural change at the local community level and the institutional level at the pilot sites, to link to strategies to promote change in intentions of users of coastal and marine resources.

4. Establishing effective arrangements to ensure integration of science to policy and management:
   a. The release of plans for establishing Future Leaders Network, a program of capacity-building for emerging leaders in coastal resource management; and
   b. Research into the beliefs, perceptions and preferences of community and institutional leaders, in terms of governance systems for MPA and MSP implementation in Palawan, the Philippines.

UNDERSTANDING GOVERNANCE SYSTEMS FOR MPA NETWORK AND MSP IMPLEMENTATION

The CCRES project seeks to understand how different stakeholders perceive marine protected area (MPA) networks and marine spatial planning (MSP).

Led by Dr Vera Horigue from UP MSI the activity is investigating stakeholder knowledge and perceptions on different approaches to establishing MPA networks, and the management of multiple resource-use zones at El Nido, Palawan, in the Philippines.

Approaches to establish MPA networks include scaling up or coordinating local establishment, and scaling down regional (broader scale) designs.

Palawan has the potential to scale down a regional design because managers at both the provincial and municipal governance levels are represented in the Palawan Council for Sustainable Development (PCSD). The PCSD is a multi-sectoral and interdisciplinary body that influences the planning and development trajectory, and resource management approaches in Palawan. Its members can collectively decide and act to implement a provincial MPA network design.

Moreover, the governance research activity will enable the team to evaluate how the existing multi-level governance structure in Palawan can adapt and embed conservation planning processes in MSP processes.

The following methods are being used to achieve the governance research objectives:

- Institutional analysis was conducted to evaluate the current status of marine resource governance, to be able to recommend policy amendments and/or interventions, and management strategies; and
• Key Informant Interviews (KII) were conducted to describe the beliefs, perceptions and preferences of community and institutional leaders. These KII were conducted in three parts:
  1. How these leaders value ecosystem services, and prioritise management actions;
  2. Their knowledge, beliefs and preferences for MPA networks and MSP; and
  3. The relationships of people and institutions that have been significant, and have influenced the changes that have occurred at El Nido.

• An Innovation Histories Workshop, which was conducted at Puerto Princesa, Palawan, to describe the transformation of coastal resource governance, resource-use, and evolution of multi-sectoral planning in the pilot study site.

By understanding the current government system this study can help the CCRES project provide meaningful and appropriate management recommendations at El Nido and in Palawan. Specifically, it can help identify leverage points and make specific recommendations that can enhance existing policies and institutional arrangements (i.e. structure, process, and standards) to facilitate the uptake of CCRES tools, MPA network design recommendations, and how to apply MSP at the pilot study site, and the Philippines.

KEY POINTS

• Leaders have different preferences in terms of ranking, rationalising and rating various ecosystem services based on their personal ideals and backgrounds.

• Understanding coastal resource governance requires looking at the entire system – policies, institutional arrangements and dynamics.

• Key Informant Interviews were conducted to describe the beliefs, perceptions and preferences of community and institutional leaders.

1 Clown fish, El Nido. Photo: T. Baldock
2 Dr Michael Pido, Palawan State University, reads a finished group timeline at the Innovation History Workshop. Photo: K. Follosco
ENGAGING PARENTS TO PROMOTE BEHAVIOUR CHANGE

The CCRES project 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 Triple P — the Positive Parenting Program at 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 is based 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’ group, is leading this collaborative research for CCRES. The collaboration is built on the belief that the solution 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, but it also might be the very key to unlocking solutions.
MEET THE TEAM
KUBI FOLLOSCO, COUNTRY COORDINATOR

FOR Kubi Follosco, making a difference in people’s lives has been a recurring theme.

This is true whether it is in local communities through her role in the CCRES project or even before as a teacher and a trainer.

“I am very proud when I see my students and trainees apply the knowledge I helped them learn. Some have even gone on to teach and share the knowledge themselves.”

She recently read something that resonates with her vision for coastal ecosystems.

“The boundaries of nature (are) far more important than the boundaries of nations.”

— *The Way of Kings* by Brandon Sanderson

Kubi says she has learned a lot about herself — professionally and personally — since she began working with the CCRES project. “This is the first time I’ve taken on such a large responsibility for a project. It has been challenging, and fulfilling, in turns,” she says.

Since stepping in as country coordinator for the Philippines, she has been involved in a lot of cross-disciplinary project coordination and management in the Philippines. Like a conductor, she harmonises activities and approaches, connecting people and providing advice.

“CCRES has the potential to make a difference in local communities in the Philippines and the rest of the region, where coastal ecosystems are essential to life and livelihoods but are also severely threatened,” she says.

“I am especially interested in how the tools being developed will assist stakeholders in making decisions about prevailing issues (e.g., resolving conflicts in multiple-use areas; equitable access to ecosystem services among stakeholders) at scales that can yield the greatest and/or maximum impact.”

Again, Kubi is all about working with people to make an impact.

“Working with CCRES has put me in touch with a roster of scientists and researchers with different interests, backgrounds and specialisations, not to mention personalities. In the last two years, I have learned from and shared rich experiences with the different team members.”

In her position, based at UP MSI, Kubi is also the one who is in charge of representing the project externally at meetings and similar gatherings with local partners and other stakeholders.

She might travel around a lot. However, as a book lover, she said “unlike a lot of people, I like waiting in airports because I get to read”. She called herself “a fantasy and science fiction junkie” and thinks there is a lot of overlooked wisdom in fantasy novels.

Her favourite book? *Dune* by Frank Herbert.
Together, CCRES and the World Bank convened the Application of knowledge management in scaling up public and private sector investments in a blue economy workshop at PEMSEA’s East Asian Seas Congress at Da Nang, Viet Nam, during November.

Representatives from government, donor agencies, regional projects, research institutes, NGOs and the private sector workshoped the many tools, platforms, networks and relationships which make up knowledge management partnerships and pathways.

The plenary was presented by Dr Sara Farley, Chief Operating Officer, Global Knowledge Initiative, Washington DC and the workshop was chaired by CCRES Senior Advisor Melanie King.

Capturing, developing, sharing, and effectively using good practices, experiences and knowledge to achieve sustainable development objectives and targets is a real challenge.

Knowledge management should enhance the capacity and performance of development projects and impact investments for sustainable development of coastal communities.

The workshop reached several conclusions which will be published in a guide to best practice in knowledge management for coastal management. These conclusions include:

1. **It is all about people and capacity building**

2. You need to understand the **problem or challenge** before you can move forward

3. **Need to make the case** for involvement on complex challenges — focus on issues, challenges or problems — what do people relate to?

4. **Highly dependent on ‘buy-in’ or political will** of influential or key people i.e. the right message to the right people at the right time
5. Tools: the best way to share and experience is by **including your audience** in the development and implementation.

6. Mechanisms for sharing: are many but how do we **optimise and better utilise** the networks, tools, information?

7. It takes time and timeframes need to be adjusted.

Also at the conference CCRES Chief Scientist Professor Peter Mumby from UQ was keynote speaker for a session about the valuation of coastal ecosystem services, Team Leader, Business Development, Professor Mark Milstein, Cornell University, featured on a panel that discussed investing in the blue economy and Dr Russell Richards from the UQ School of Agriculture and Food Sciences, presented during the knowledge management workshop.

**UP MSI HEADS TO PAMS, DELIVERS KEYNOTES**

CCRES team members from UP MSI and DLSU attended the 13th National Symposium on Marine Science in General Santos City at Mindanao, Philippines, during October 2015.

“High biodiversity builds resilience” was the main message in the keynote address delivered by the UP MSI’s Dr Perry Aliño at the symposium, which is convened biennially by the Philippine Association of Marine Scientists (PAMS), now in its 25th year.

In celebrating the rich history of marine science research in the Philippines, Dr Cesar Villanoy of the UP MSI gave a plenary about the evolution of physical oceanography approaches in the country.

The symposium’s theme was “Moving towards Resilient Ecosystems,” with more than 300 papers presented on range of key topics, including ecosystem function, structure and identity; ecosystem disturbance or change; and man, environment and society.

CCRES postdoc Dr Vera Horigue of the UP MSI facilitated a session on “Connectivity, MPA networks and large marine ecosystems”, where she also presented initial results of a spatially-explicit version of the fisheries management tool FISH-BE. Also in this session, PhD scholar Leilani Solera of the UP MSI gave a lively talk on how connectivity information changes with model resolution.

PhD scholar Bayosa Aya Carinño of the Institute of Environmental Science and Meteorology (IESM) in UP Diliman presented a preliminary run of the Soil and Water Assessment Tool (SWAT) to evaluate the state of the watersheds draining into Bacuit Bay in the CCRES pilot site El Nido, Palawan.

Masters student Anabel Gammaru talked about high resolution measurements of hydrodynamics in the fringing reefs of Miniloc and Shimizu Islands in El Nido.

Dr Cai Samson of DLSU sought to measure how efficient mangroves and seagrass beds are in filtering upland sediment runoff by describing her sediment trapping experiments in El Nido. Dr Al Licuanan of DLSU was also at the Symposium, and presented some of his own work on coral reef assessment in the Philippines.

PhD student Miledel Quibilan, who is doing collaborative research with CCRES, showed some of her dissertation work on spatio-temporal patterns of coral settlement.

Dr Al Licuanan (DLSU), Dr Cesar Villanoy, Dr Vera Horigue, Miledel Quibilan, Kubi Follosco and Dr Perry Aliño (UP MSI) at PAMS13.

Photo: PCCU
CARY Anne Cadman feels grateful for having had the opportunity to work in every tropical rainforest on the planet.

Cary Anne also feels proud of the results she and her colleagues have achieved. Their work has reduced the adverse environmental impacts of hydroelectric dams in Brazil and improved the capacity of environmental management in the Brazilian Amazon.

As a biologist with extensive experience in environmental management, Cary Anne has also previously led projects focused on climate change in Sub-Saharan Africa.

In her role as the World Bank’s Task Team Leader for the CCRES project this experience, together with her skills in strategic planning, mission supervision and project management, is invaluable.

“My job is to ensure timely implementation of the project, working in tandem with The University of Queensland (the executing agency for the project),” Cary Anne says.

“I work to address any obstacles that might prevent disbursement or progression of the project. I also manage the fiduciary risks (financial management and procurement) and any other considerations that may arise throughout the course of year.”

Cary Anne is the Environment Sector Coordinator for the World Bank in Indonesia, and is charged with the responsibility of leading the organisation’s Blue Economy Program. She is also leading multiple projects as a co-leader of the Indonesia Coral Reef Rehabilitation and Management Program (COREMAP-CTI).

Cary Anne shares an ambitious vision for the future of the CCRES project.

“CCRES is an important research project as it will serve to inform a number of coastal and marine investment and development projects in East Asia,” she says. “It will play a special role in Indonesia, as it informs the approach and tools adopted as part of the broader Blue Economy Program.

“On a global level, it will effect transformational change by shifting countries onto a more sustainable and inclusive path.”

By leading a research project that seeks to quantify the value and market potential of coastal ecosystems, Cary Anne is now connected with the ‘rainforests of the ocean’, coral reefs.
COMING TOGETHER: 2015 PLANNING WORKSHOP

More than 50 scientists and coastal planners from Indonesia, the Philippines, the United States and Australia attended the first CCRES Annual Planning Workshop in February. Indonesian officials — representing national, provincial and district levels of government — included representatives from the Ministry for Marine Affairs and Fisheries (MMAF) and COREMAP-CTI. They were joined by scientists from LIPI, Bogor Agricultural University and the University of Hasanuddin.

Guest Indonesian presenters included Dr Subandono Diposaptono, Director of Spatial Planning for Ocean, Coast and Small Islands (MMAF); Dr Zainal Arifin, Director, Research Centre for Oceanography, LIPI, and Professor Jamaluddin Jompa, University of Hasanuddin, Makassar.

Also attending were delegates from the University of the Philippines, The University of Queensland, Currie Communications (Australia) and Cornell University (United States).

SELAYAR WELCOMES CCRES WITH OPEN ARMS

In February, Selayar, CCRES’s pilot site in Indonesia, officially welcomed the project to the archipelago in South Sulawesi, situated between the Java and Banda seas.

The team was greeted by DINAS Fisheries chief Dr Marjani Sultan, police chief AKBP Mohammad Hidayat Berkatulla and the wider community and an official launch by Selayar’s Vice Bupati, H. Saiful Arif.

The official welcome to Selayar for CCRES included a ceremony rich with tradition and culture. Photos: P. Bradley, M. Milstein, M. Paterson
BUILDING LOCAL CAPACITY

CCRES seeks to work with local partners and build capacity where possible.

During 2015, international researchers forged partnerships with national, provincial and local partners to assist in the development and implementation of the research activities.

Examples of this local capacity-building can be seen with the fisheries valuation work whereby the team is partnering with staff from MMAF (Kris Handoko and Andi Jaya) and DINAS Fisheries, Selayar (Dr Pak Marjani and Zul Janwar) to undertake the fieldwork, analyse field data and produce a presentation for local stakeholders, including local government officials, on the activities carried out, the key findings, and the plans for the future.

This work will be used to better define management actions for incorporation into the marine spatial planning of the islands. The team has since produced a data and methods report outlining initial results and reef survey protocols, and has worked together on training of novel survey methods that may be included in future monitoring programs.

The same team is also working closely with members of the Marine Spatial Planning unit from the Ministry of Marine Affairs and Fisheries in Jakarta, Indonesia, to assist in determining the best locations for port development and with determining locations suitable for future tourism development as part of the marine spatial plans.

At El Nido, Philippines, members of the El Nido Foundation joined the fisheries survey team at Tres Marias to observe activities and participate in new survey techniques. The team discussed techniques that did not form part of the standard monitoring surveys, and the reasons why this specific data is collected to parameterise the food web models.

At Selayar, the team comprising of members from MMAF and the DINAS of Fisheries for Selayar were also introduced to novel survey methods that may be included in future monitoring programs. The whole team worked together to analyse field data and produce a presentation for local stakeholders, including local government officials, on the activities carried out, the key findings, and the plans for the future.

Above: CCRES Senior Advisor Melanie King with Selayar’s Vice Bupati, H. Saiful Arif at the official launch. Below: A message to CCRES at the launch about one of Selayar’s goals for engagement. Photo: M. Paterson

Pak Jusman, Head of Taka Bonerate National Park, Professor Jamaluddin Jompa, police chief Pak Hidayat and Senior Advisor Melanie King.
PROJECT PARTNERS

CCRES welcomes partners in Indonesia

The CCRES project appointed national, provincial and local partners in Indonesia, representing the government, scientific and university sectors, during July 2015.

These partners and collaborators, comprising national, provincial and local institutions, are:

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

The success of CCRES depends in no small part on our in-country partners in the Philippines and Indonesia. Partners and collaborators are the cornerstones of our in-country activity.

The collaboration with partners at pilot sites at Selayar, Indonesia, and El Nido, Philippines, encompasses the valuation of ecosystem services, the development of business tools and promoting behavioural change among decision-makers in coastal communities.

The involvement of coastal managers and planners in the design of the project, the rollout of research and the delivery of outputs ensures the tools under development will be used.

Our partners in Indonesia join the following CCRES 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

Novie Setianto, Siham Afatta, Luki Adrianto and Suryo Kusumo, from our systems analysis partner in Indonesia, the Center for Coastal and Marine Resources Studies, Bogor Agricultural University.

Photo: M. Paterson
OUR PEOPLE

CCRES researchers Bayosa Aya Carino, Leilani Solera, Zul Janwar and Miledel Quibilan at Palawan, Philippines.
Photo: M. Quibilan

ADVISORY BOARD

The CCRES Advisory Board provides 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 and linkages on project outputs to policy and management.

The members of the CCRES Advisory Board are:

- Ms Cary Anne Cadman (World Bank)
- Undersecretary Analiza Teh (Department of Environment and Natural Resources, 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)
- Mr Adrian Ross (Partnerships in Environmental Management for the Seas of East Asia, PEMSEA)
- Dr Zainal Arifin (Lembaga Ilmu Pengetahuan Indonesia (LIPI))
- Dr Firdaus Agung (COREMAP-CTI and Ministry of Marine Affairs and Fisheries, Indonesia)
- Professor Andrew Griffiths (The University of Queensland)
- Ms Melanie King, Ex-officio (Senior Advisor, Project Executing Agency)

TECHNICAL STEERING COMMITTEE

A Technical Steering Committee has been convened to support the project with technical oversight of activities and to guide strategic direction.

The committee members are:

- Professor Alasdair Edwards (University of Newcastle, UK);
- Dr Tiene Gunawan (Indonesia); and
- Anthony Hooten (AJH Environmental Services, USA).

LEADERSHIP GROUP

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

- Professor Peter Mumby, Chief Scientist (The University of Queensland)
- Professor Mark Milstein (Cornell University)
- Dr Carl Smith (The University of Queensland)
- Mr Mark Paterson (Currie Communications)
- Ms Melanie King (The University of Queensland)
FOCUS ON “ACCESSIBLE” PRODUCTS CRITICAL

THE knowledge and tools developed by CCRES should be accessible, scalable and transferable beyond the East-Asia Pacific region, according to the project’s Advisory Board.

During May 2015 the CCRES Advisory Board, met at the project’s pilot site in the Philippines, El Nido, to review the project’s blueprint for 2015–16, as well as the years ahead.

During the visit the Advisory Board observed the geography, issues and challenges at El Nido and gained an understanding of how the CCRES research outputs and technical tools will assist in providing local planning officials with answers to these challenges.

The Advisory Board provided input on the pathways to adoption and identified touchpoints within their own organisations for knowledge-sharing. They also endorsed the concept of a technical steering committee to peer-review the CCRES project and support its successful execution.

Attendees included Ms Milidel Quibilan and Ms Kubi Follosco from the UP MSI, Pak Yaya Mulyana and Ibu Anita Setianingsih from COREMAP CTI; Ms Gabrielle Sheehan from Currie Communications; and Ms Kristen Sampson from the Project Executing Agency, UQ Global Change Institute.

CCRES MEMBERS

Management
- Ms Melanie King, Senior Advisor
- Ms Phoebe Coulon-McIntosh, Project Officer (Oct–present)
- Ms Noreen (Kubi) Follosco, Philippines Country Coordinator (Aug–present)
- Ms Harjunani Kumoloraras, Indonesia Country Coordinator
- Ms Milidel (Mags) Quibilan Philippines Country Coordinator (Jan–Aug)
- Ms Romelyn (Lyn) Riveral, Admin Assistant, Philippines
- Ms Kristen Sampson, Program Manager (Jan–Nov)

Component One
Science & Discovery
Harnessing the value and market potential of coral reef and mangrove ecosystem services

The University of Queensland
- Professor Peter Mumby, Chief Scientist and Team Leader
- Professor Tom Baldock
- Dr Alice Rogers
- Mr Nicholas Wolff
- Dr David Callaghan
- Dr Behnam Shabani

University of California, Davis
- Professor Jim Sanchirico
- Mr Ted Gilliland

Cornell University
- Professor Drew Harvell
- Dr Joleah Lamb

(L to R) Dr Firdaus Agung, Mr Adrian Ross, Ms Milidel (Mags) Quibilan, Dr Zainai Ariffin, Undersecretary Analiza Teh, Ms Melanie King and Dr Maya Villaluz at El Nido.
Photo: G. Sheehan
University of the Philippines
• Professor Cesar Villanoy
• Professor Perry Aliño
• Ms Leilani Solera
• Dr Vera Horigue
• Ms Bayosa Aya Caríño

De La Salle University
• Dr Al Licuanan
• Dr Maricar Samson

Hasanuddin University
• Professor Jamaluddin Jompa
• Ms Nur Abu

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

Component Two
Systems & Innovation
Generating robust local economies that capture and sustain marine ecosystem services

Cornell University
• Professor Mark Milstein, Activity Leader (Philippines)
• Mr Yasu Karakawa

The University of Queensland
• Dr Carl Smith, Activity Leader
• Dr Russell Richards
• Mr Siham Afatta
• Ms Melanie King
• Dr Sue McAvoy
• Dr Damian Hine, Activity Leader (Indonesia)

Palawan State University
• Engr Ma. Rosario Aynon Gonzales
• Dr Patrick Regoniel
• Mr Roy Bero
• Engr Agustin Miraflores, Jr
• Professor Marissa Pontillas
• Ms Eva Marie Ponce de Leon
• Ms Gianina Decano
• Mr Mark Buncag

Palawan Council for Sustainable Development Staff
• Mr John Francisco Pontillas
• Ms Glenda Cadigal
• Mr Benjamin Adriano, Jr
• Mr Raul Maximo
• Mr Jesus Bream
• Ms Mary Grace Palatino
• Ms Janet Felizarte

El Nido Local Government
• Mr Rogelio Manlavi
• Ms Meriam Arzaga
• Mr Jayson Badilla
• Mr Donald Arzaga
• Ms Joy Bascongada

Center for Coastal and Marine Resources, Bogor Agricultural University
• Dr Luki Adrianto
• Mr Suryo Kusumo
• Mr Novie Setianto
• Dr Ario Damar

Component Three
People & Engagement
Promoting behavioural change through outreach, decision support and regional learning

Currie Communications
• Mr Mark Paterson, Team Leader
• Ms Gabrielle Sheehan

The University of Queensland
• Ms Melanie King
• Professor Matt Sanders
• Mr John Pickering

ADVISORS

Ministry for Marine Affairs and Fisheries
• Ibu Sri Atmini, Secretary to the Directorate General for Marine Coastal and Small Island Affairs

El Nido Local Government
• Mr Raffy Cabate

DINAS Fisheries, Selayar
• Dr Ir. Marjani Sultan

* The El Nido Foundation Inc. acted as El Nido Site Coordinator from July 2014 until November 2015.
Determination: Russell Richards, UQ (centre), helps the locals of Mabini Barangay, El Nido, to rescue their Jeepney from a slippery slope whilst en route to a focus group discussion. The attempt ultimately fails, but undeterred, Russell and colleagues Carl Smith, UQ, and Matus Marcelo, from ENF, insert themselves into a motorcycle side-car (inset) for the rest of the journey, arriving heroically and mud spattered for the start of the focus group.

Photos: C. Smith and IR. Marcelo
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, 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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**CONNECT WITH US**

**CAPTURING CORAL REEF AND RELATED ECOSYSTEM SERVICES**

Join our community  
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- ccresnet

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El Nido, the Philippines.  
Photo: C. Castro