



# **Cost Efficiency of Integrated Approaches to Population and Coastal Resource Management: Evidence From The Philippines**

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# PHE Links in the Philippines



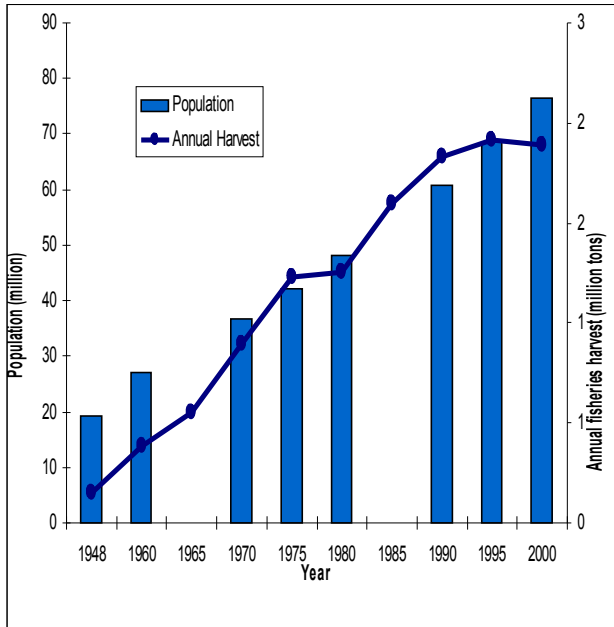
## Environment Facts

- 1 of 17 mega diverse countries
- Global epicenter of marine biodiversity
- High environment stress due to population and consumption
  - < 5% of reefs excellent condition (White & Cruz Trinidad 1998)

## Marine Hotspot populations

- Exceptionally high growth rates i.e., TawiTawi (5.6%)
- Population densities exceed 500 people/Km<sup>2</sup> (Danajon Reef)
- Half of people under age 17 years

# Fishing Dependent

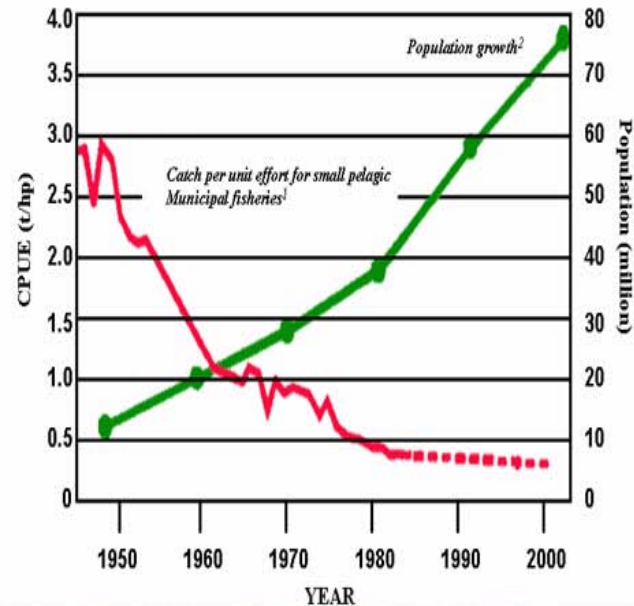


Annual trend of Philippine marine fisheries harvest & human population [FISH Project 2007]

- **Fish is primary protein source**
- **Fishing industry employs 1 million (5% of national labor force)**
- **Contributes \$1.35 billion to economy**
- **Increasing demand → overfishing**
  - **Fish being harvested at a level 30% to 50% higher than natural production capacity [World Bank 2005]**
  - **Annual harvest no longer keeping pace with population growth [FISH 2007]**

# Destructive Fishing

Table 1. Inverse relationship between Population Growth and Fish Catch: Philippines: 1950-2000



**As fish catch declines, poor fishers resort to more efficient but also more destructive methods of extraction**

**In order to feed their families and maintain their income**

**“If current trends of population growth and coastal resource exploitation continue, availability and affordability of fish to provide a crucial protein source for the Philippines will be lost” (DENR, DA-BFAR 1999)**



# IPOPCORM Approach

- **Uses a symbiotic strategy to link sectors**
- **Focuses on food security from the sea**
- **Targets fishers living in high-growth marine conservation priority areas**
- **Goal**
- “Improve quality of life of fishing-dependent communities while maintaining diversity and productivity of life-sustaining coastal ecosystems”



# Intervention Mix



**FP/RH & ASRH**



**CRM and Habitat Protection**



**Policy Advocacy**



**Economic Development**

# Operations Research

**Test IPOPCORM's central hypothesis:**



***"There will be a statistically significant improvement in CRM outcomes and RH/FP outcomes by delivering these services in an integrated fashion as opposed to delivering either intervention in isolation"***

- **Quasi-experimental evaluation design**
- **Difference-in-difference approach and logistic regression were the statistical tools used to test the hypothesis**



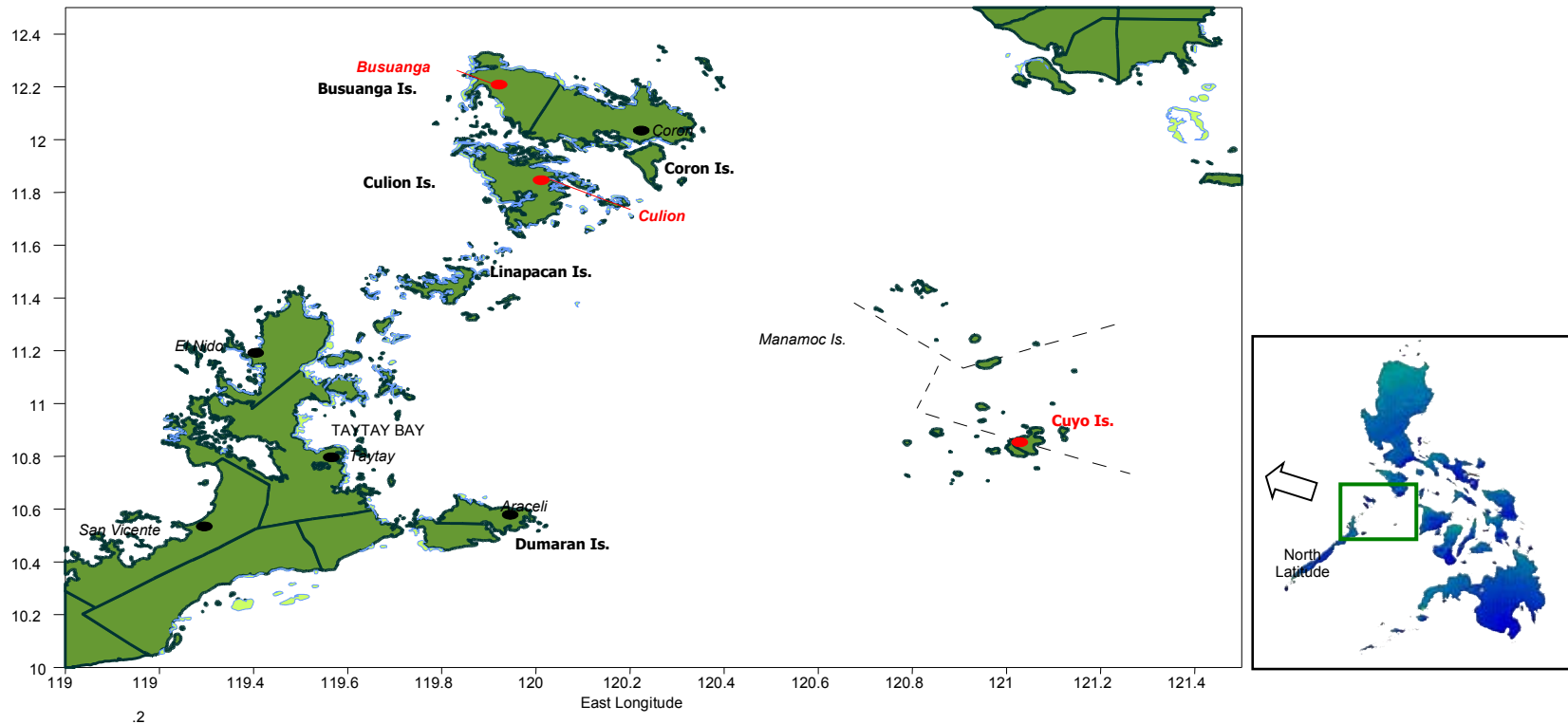
# Quasi-experimental design

## 3 Intervention Groups

	Identifier	Description of the Intervention
Intervention 1	$X_1$	The IPOPCORM intervention ( $X_2 + X_3$ )
Intervention 2	$X_2$	The RH intervention 
Intervention 3	$X_3$	The CRM intervention 



# Operations Research Sites





# Indicators for CRM Dependent Variables

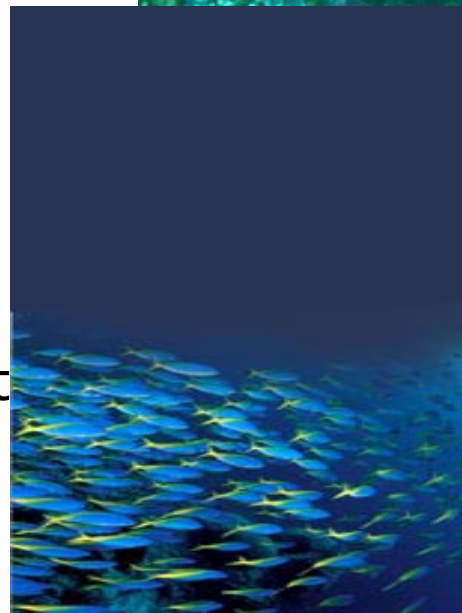
## Benthic Lifeform (coral)

- live coral coverage
- coral mortality index
- coral development and condition and succession indices



## Reef Fish

- species richness (all and target species)
- biomass (total species and target)
- size frequency (target species)



## Mangrove Condition

- Volume
- Density
- Mean Density at Breast Height
- Mean Height
- Regeneration



# Indicators for RH and Food Security Dependent Variables

## ReproHealth Indicators

- Parity (No. Children ever born to WRA)
- Contraceptive Prevalence among WRA
- Sexual activity among youth (15-24)
- Contraceptive use by youth during first and last sex

## Food Security (proxy indicators)

- Households with full-time fisher
- Know someone personally that uses dynamite in fishing
- Know someone personally that uses cyanide in fishing



# Methods

## ❑ **Pre-intervention (2001) and post-intervention (2007) measurement of dependent variables**

## ❑ **2 types of surveys- conducted by research partners**

- Community household survey
  - 400 randomly sampled households/site
  - 400 randomly selected respondents/site
- Biophysical survey
  - REA of near-shore ecosystems
  - Same GPS coordinates for 2001 and 2007 surveys

## ❑ **Data Analysis Methods**

**CRM Variables** - Ordinary Least Squares (OLS) regression analysis , Statistical significance = 0.05 levels

**RH & FS Variables** - OLS and Probit regression analyses , Statistical significance = 0.10



# Results of Regression Analysis

- **Statistically significant increases in coral and mangrove condition indices and RH practices were observed in the IPOPCORM site**
- **Which also experienced significant declines in fishing effort and reported use of dynamite and cyanide.**
- **By comparison, the sectoral approaches each generated fewer positive and statistically significant trends for both CRM and RH indicators.**
- **IPOPCORM cost less to field than the combined cost of the sectoral approaches**



# Conclusions & Implications

- ❑ **These data support IPOPCORM's central hypothesis that integrated approaches yield higher impact and are cost efficient**
- **Lesson: RH lends sustainability to CRM interventions, while CRM provides a comprehensible context for coastal people to recognize the necessity of limiting family size to achieve food security**
- **Implication: It will be difficult to ensure long term sustainability of CRM and prevent over use of natural resources unless integrated forms of coastal management that combine conservation with family planning are delivered simultaneously**