Dynamics of the *Vibrio* abundance related to changes in benthic composition at Polhena reef, Southern Sri Lanka.

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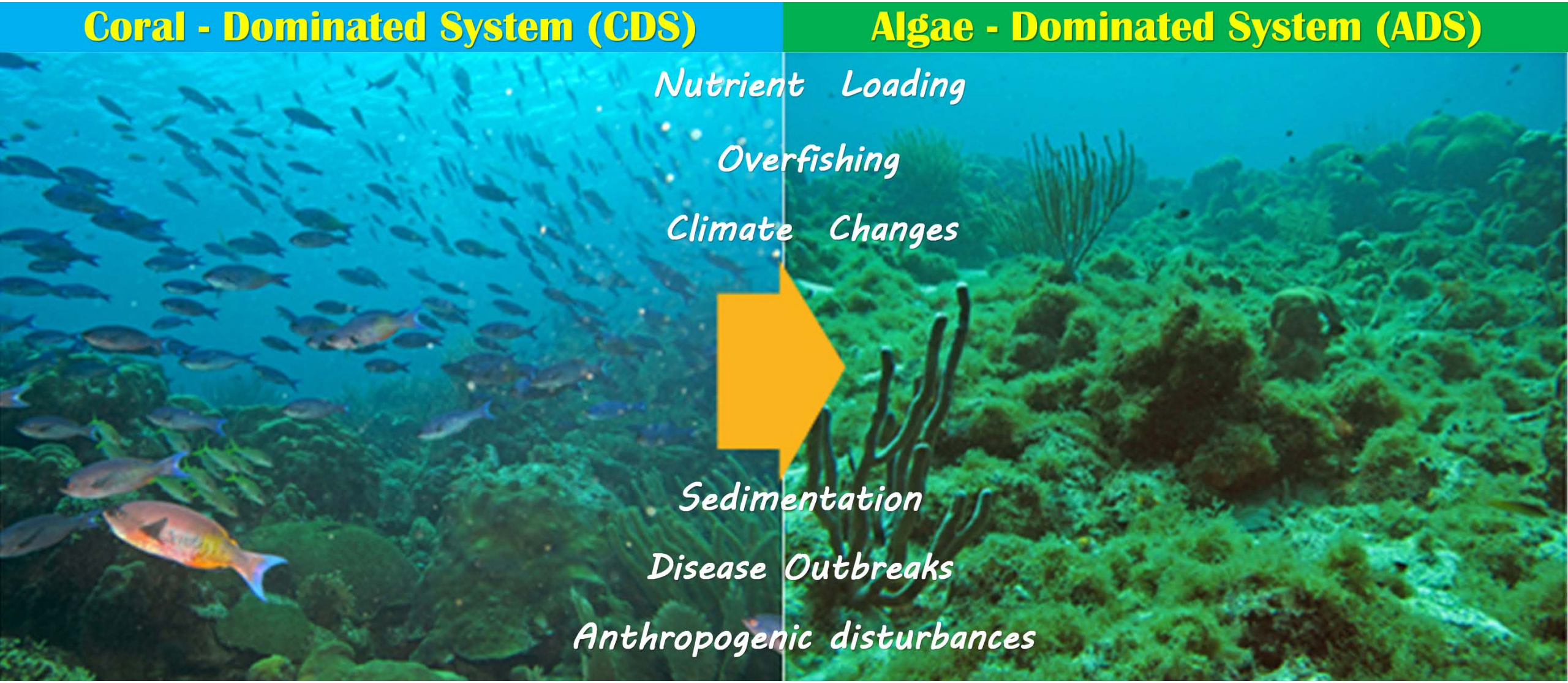
Phase shift is a global problem

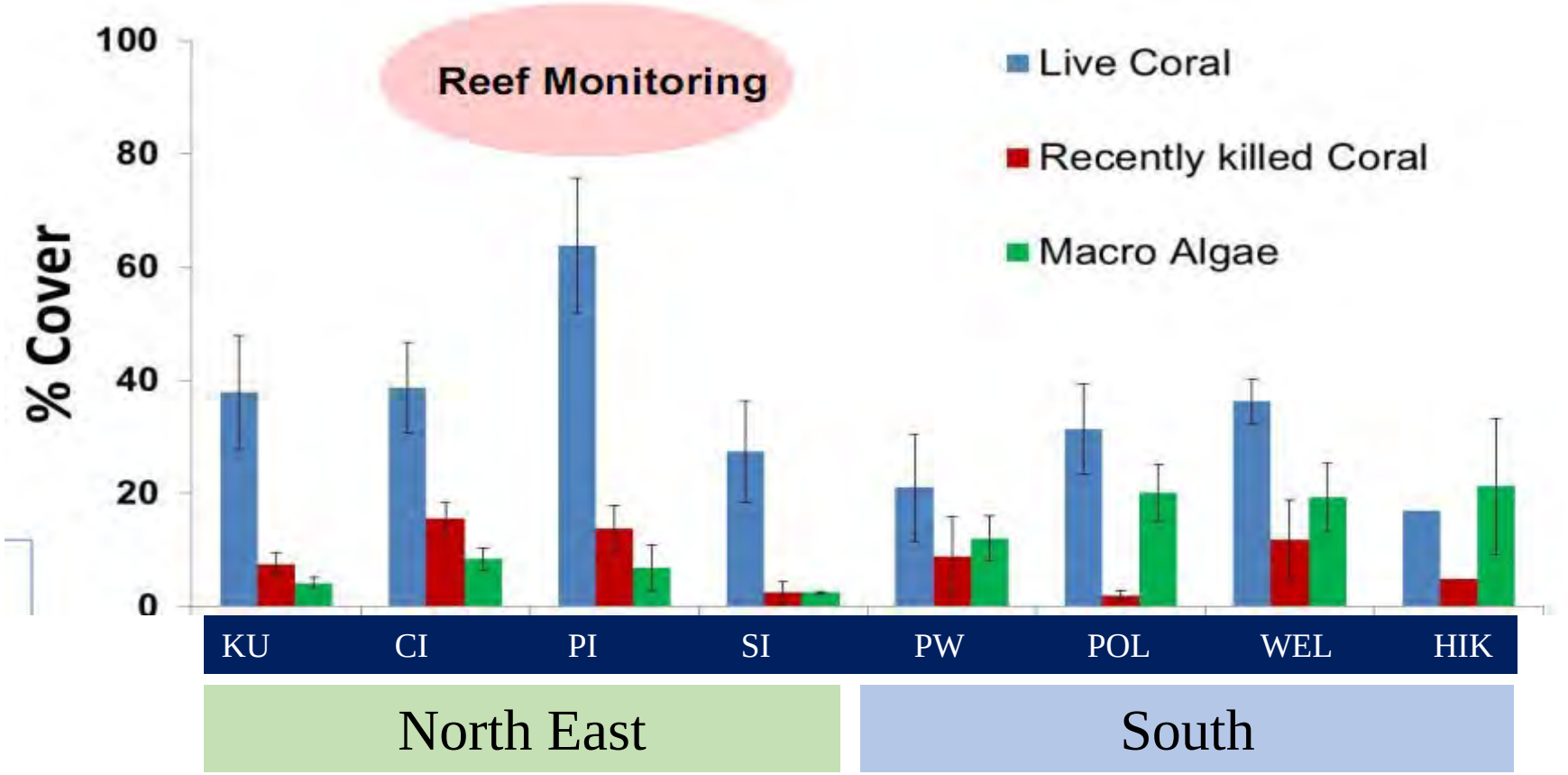


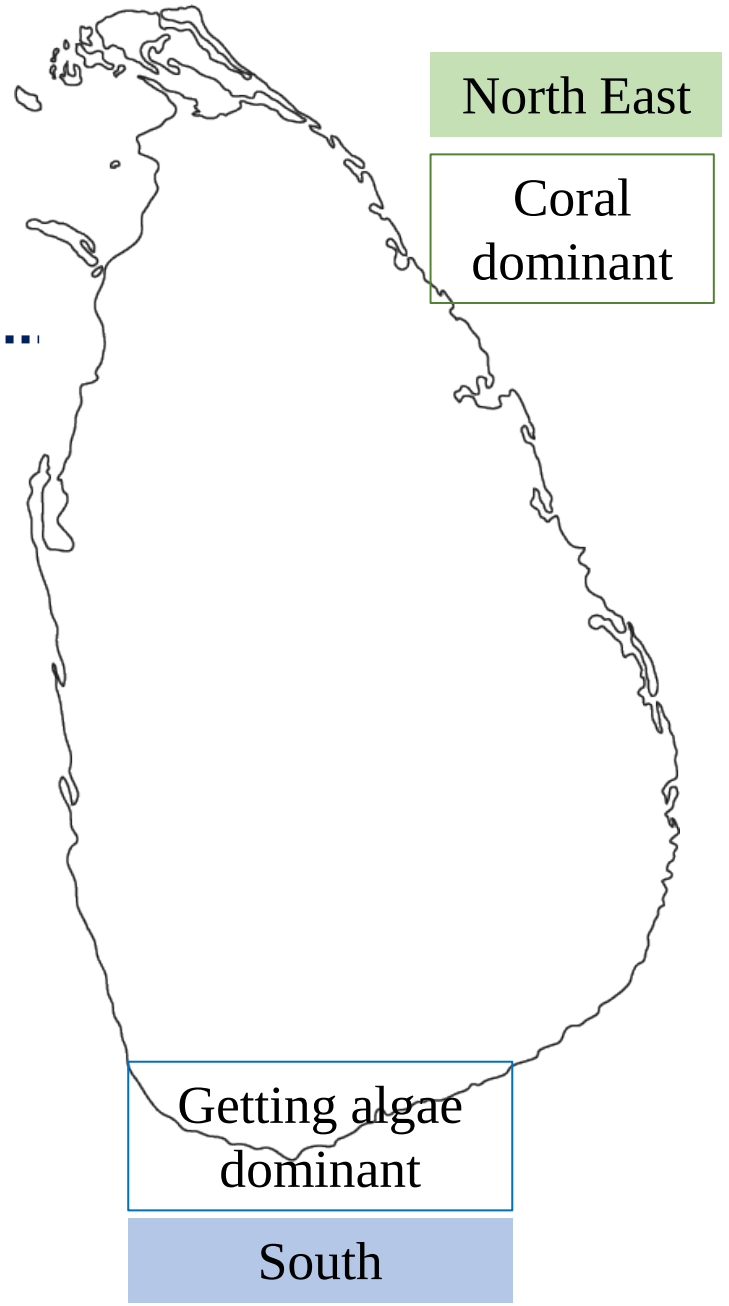
(Vroom, 2011; Sandin *et al.*, 2008; Glynn 1996; Hughes *et al.* 2003; Hoegh-Guldberg *et al.*, 2007)

Status of Coral Reefs in Sri Lanka: A Microbial perspective

Mohamed Fairoz M.F, Gunathilake S, Weerathunga S.C, Fayas M.B, Halgahawaththe S.C and Rohwer F.

ABSTRACT ID:27946.





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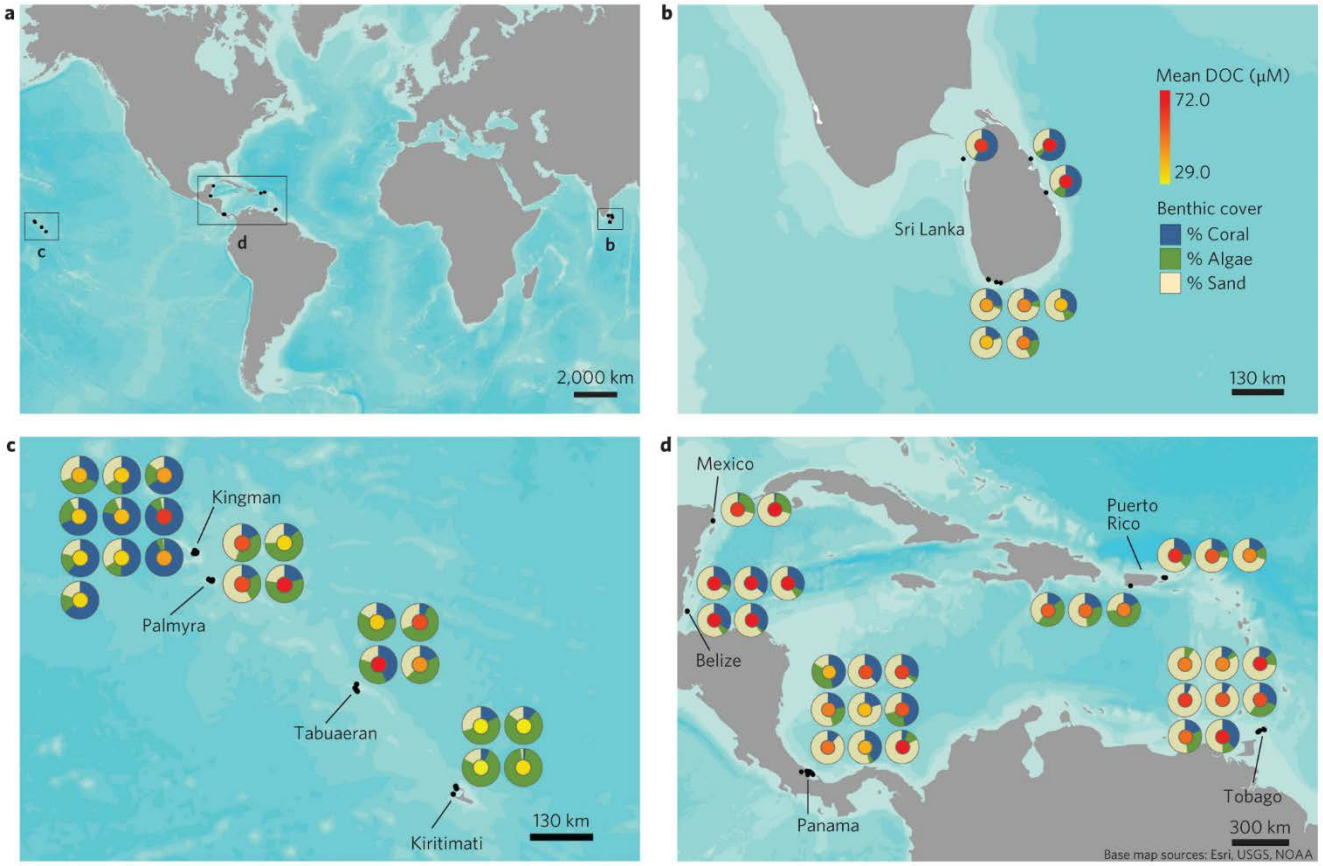
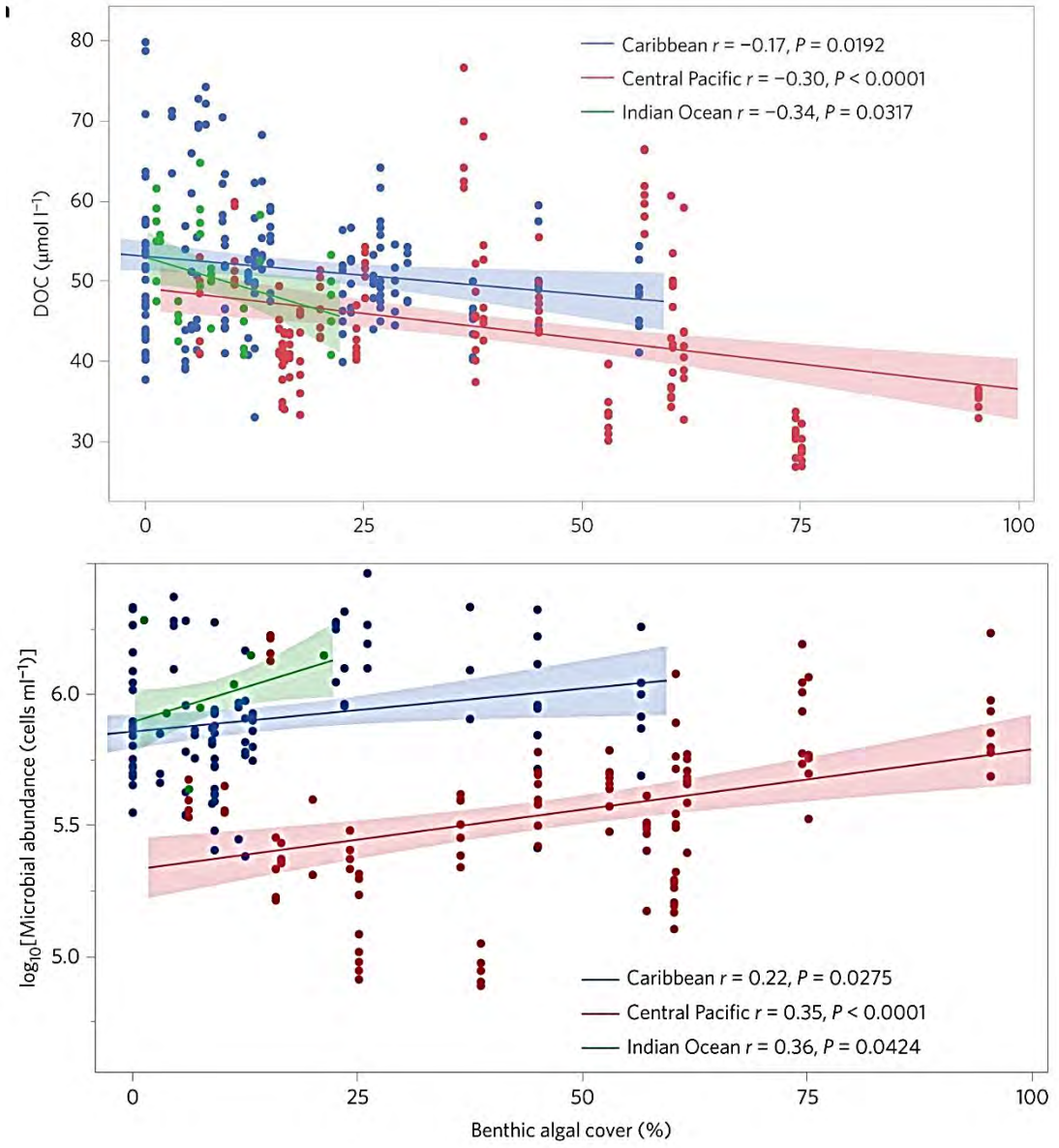
Global microbialization of coral reefs

Andreas F. Haas[1*†], Mohamed F. M. Fairoz[2†], Linda W. Kelly[1], Craig E. Nelson[3], Elizabeth A. Dinsdale[1], Robert A. Edwards[1], Steve Giles[4], Mark Hatay[1], Nao Hisakawa[1], Ben Knowles[1], Yan Wei Lim[1], Heather Maughan[5], Olga Pantos[6], Ty N. F. Roach[1], Savannah E. Sanchez[1], Cynthia B. Silveira[1], Stuart Sandin[7], Jennifer E. Smith[7] and Forest Rohwer[1]





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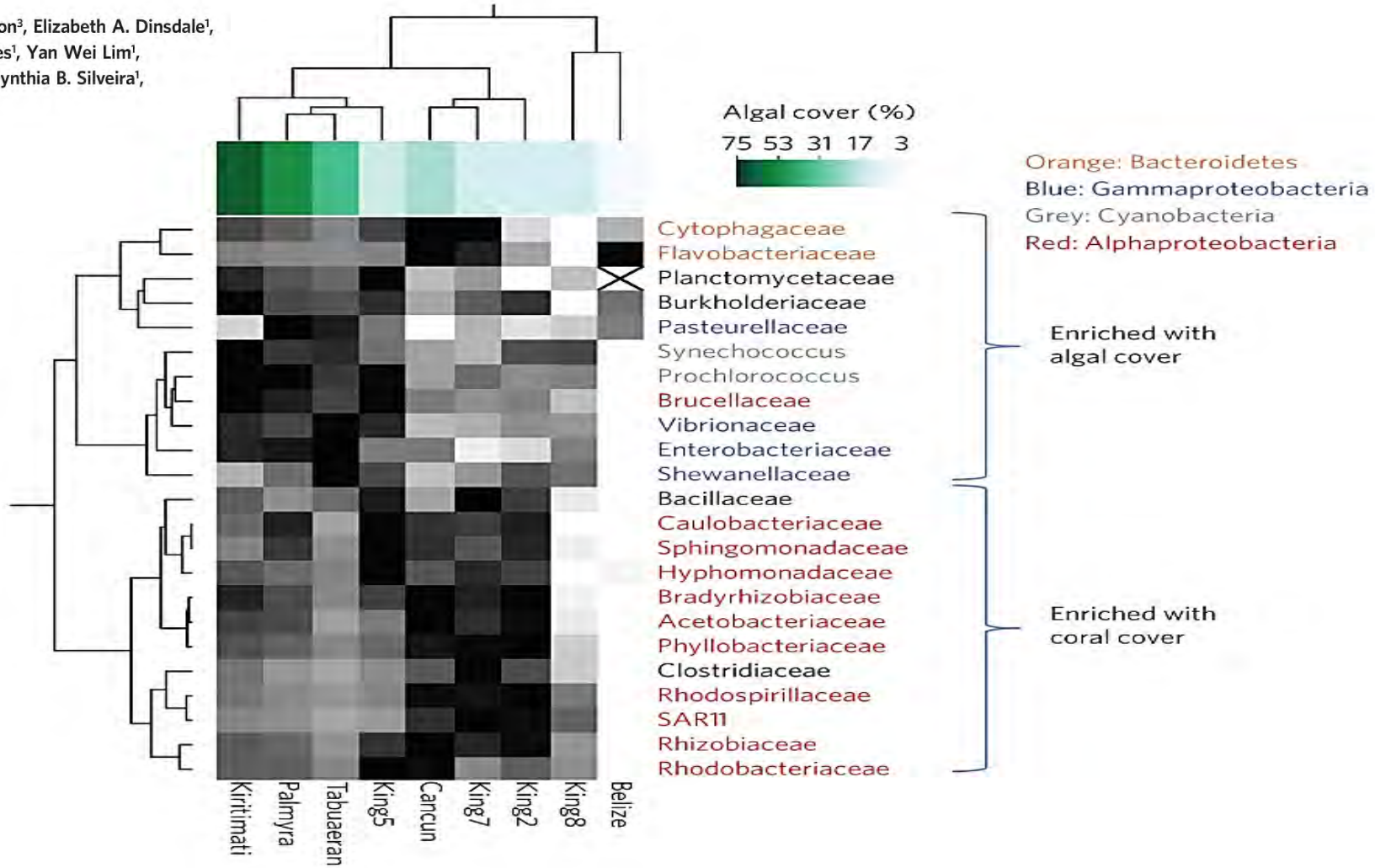
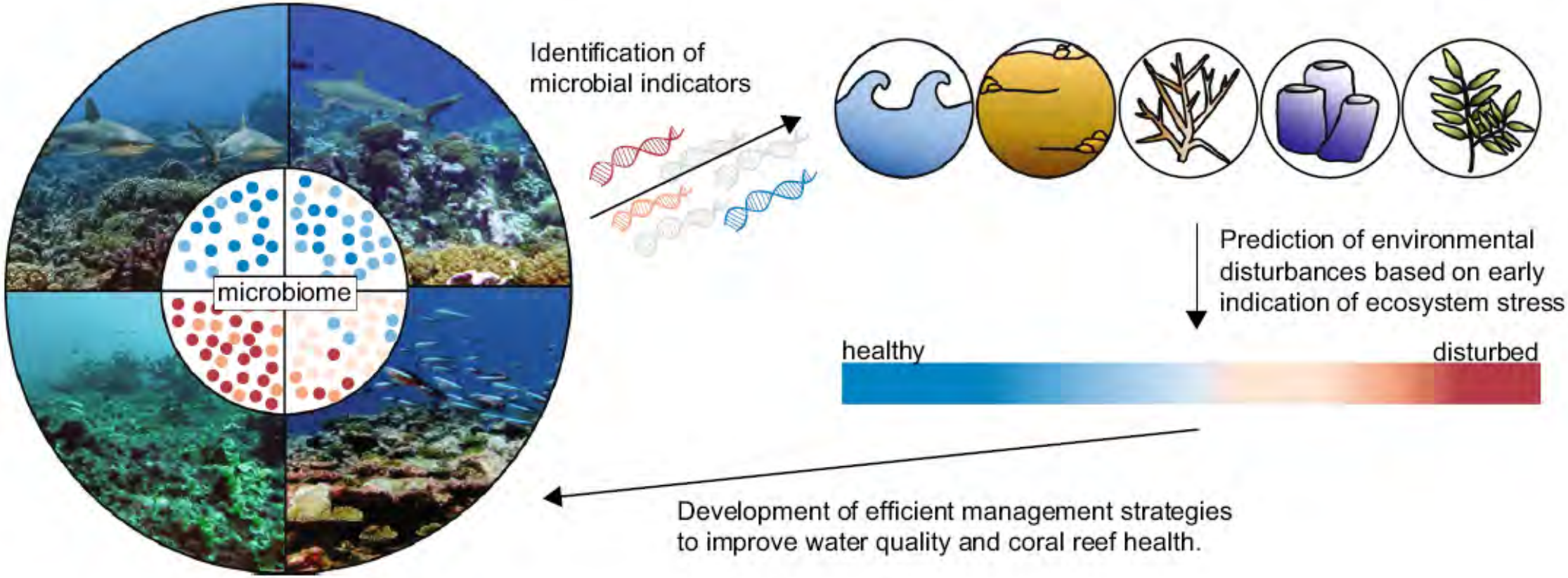


Reef Health indicators and early warning indicators are important



(Source: McDevitt-Irwin *et al,* 2017)

Key metrics provide vital insights about reef processes and health

Benthic, fish, and microbial metrics keep measurements simple

Source: Kaufman *et al.*, 2011

Coral Health Index methods are reliable and reproducible

Accepted methods for benthic, fish, and microbial data

The methods for collecting data to calculate CHI are standard and reliable. Data are collected by scientifically trained people and can be performed quickly and consistently. There are many different ways to lay a transect or analyze photos and videos, but the methods chosen for CHI are based on being easy to perform and replicate. In order to compare the world's reefs, the methods must apply equally to the variety of reefs encountered. (Complete methodologies can be found at www.science2action.org.)

Benthos

Photographic surveys are the most reliable and replicable means of describing the reef benthos. While photos provide data necessary for estimating CHI, they also can be archived for future reference and more detailed analyses. In a survey site, a transect line is placed and quadrats are selected randomly along the line. A photo is taken of each quadrat using a digital camera. The benthic type under randomly selected points is assessed. At least five benthic categories should be identified: hard coral, crustose coralline algae (CCA), turf algae, macroalgae, and undescribed. Results are averaged across photos to provide a site-specific estimate of benthic composition. The summed proportional cover of hard coral and CCA provides the CHI estimate of the benthos (maximum = 1.0)

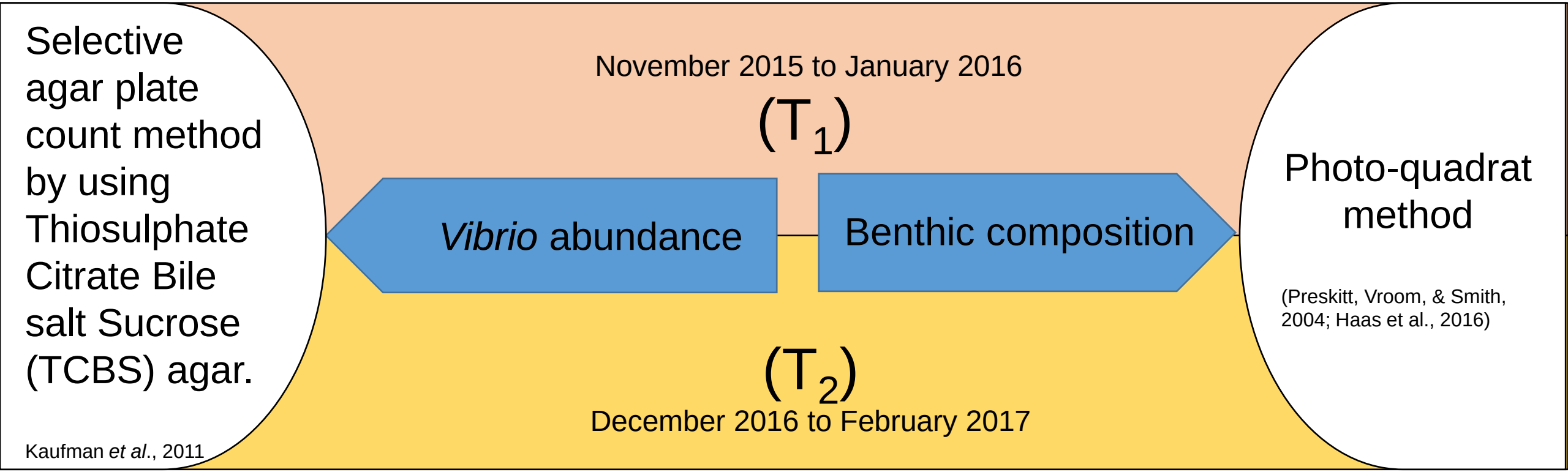
Fishes

Underwater visual censuses are an invaluable means of determining the composition of the fish assemblage on coral reefs. Belt transect methodologies provide one of the most robust and replicable approaches for these censuses. A pair of divers swims along adjacent belt transects, recording the species and size of all fishes within the area. Divers will census three such belt transects at each site. Using relationships between length and weight, the mass of each fish can be estimated. Summing these masses across all fishes surveyed provides an estimate of total biomass of the fish assemblage, reported in grams per square meter. Total fish biomass is reported as a fraction of 500 grams per square meter (maximum = 1.0) to provide the CHI estimate of fishes.

Microbes

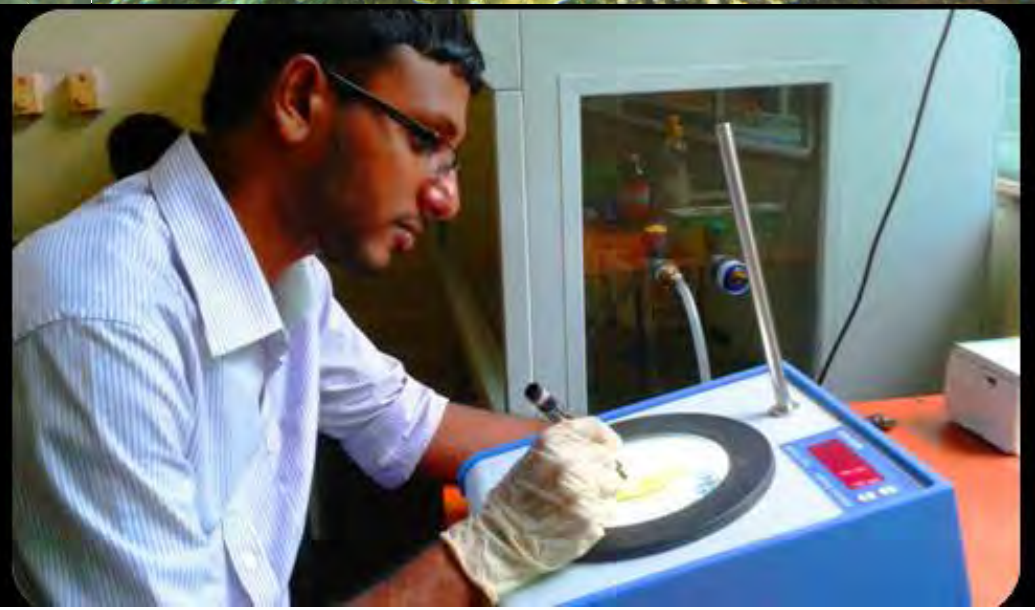
Thousands of microbe types can be found in the reef environment, but *Vibrio* are ubiquitous, and a numerically and functionally important group. CHI uses simple approaches to estimate the concentration of culturable *Vibrio*. Samples of seawater are collected above the reef benthos. Small subsamples of the seawater are spread onto plates and allowed to culture. After 24 hours, the number of colony-forming units is counted on each plate. The average number of colonies per plate is the site-specific estimate of *Vibrio* concentration (reported in number per microliter). Two final mathematical steps are needed: (1) divide the average number of colonies per microliter by 100 and add 1, and (2) take the inverse of this number. This number is the CHI estimate of the microbes. Note that a lower concentration of *Vibrio* gives a higher CHI score (maximum = 1.0).

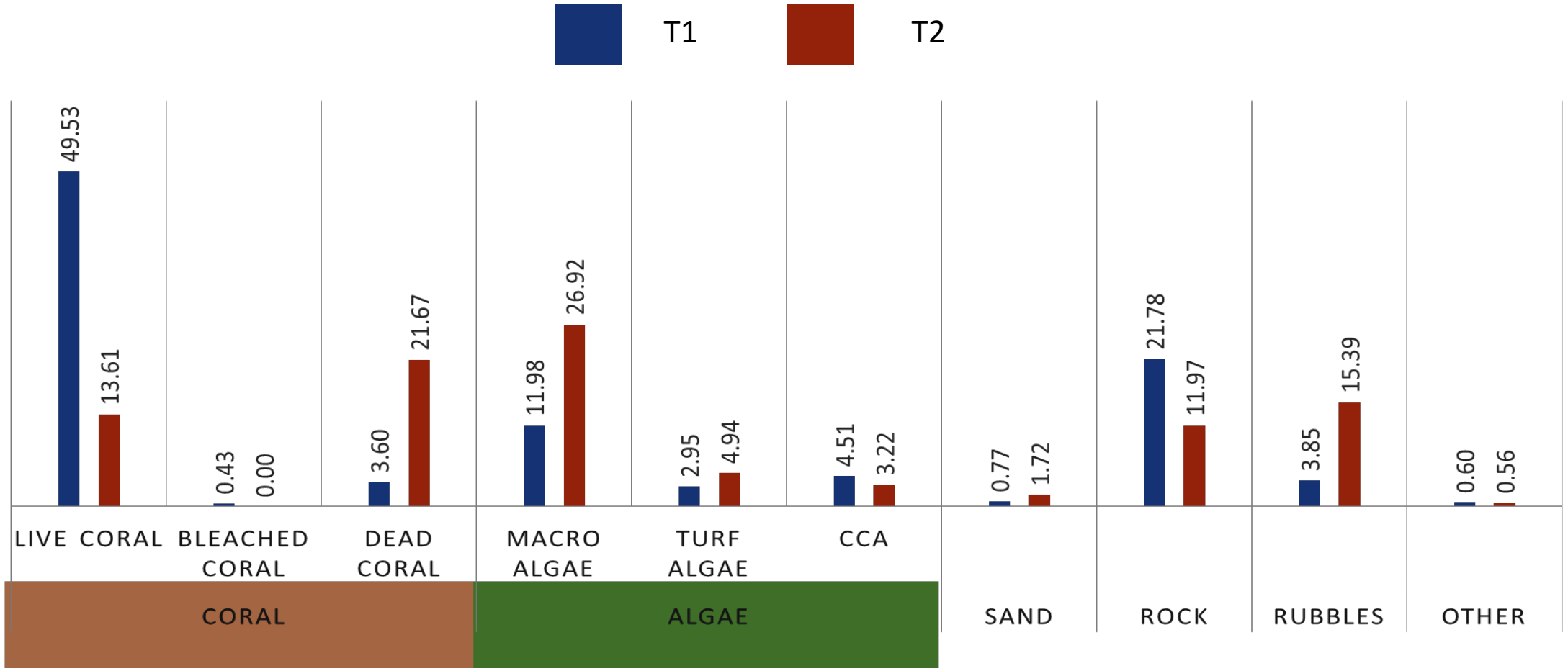
Present study was conducted at Polhena reef, Southern Sri Lanka during the thermal bleaching event 2016.



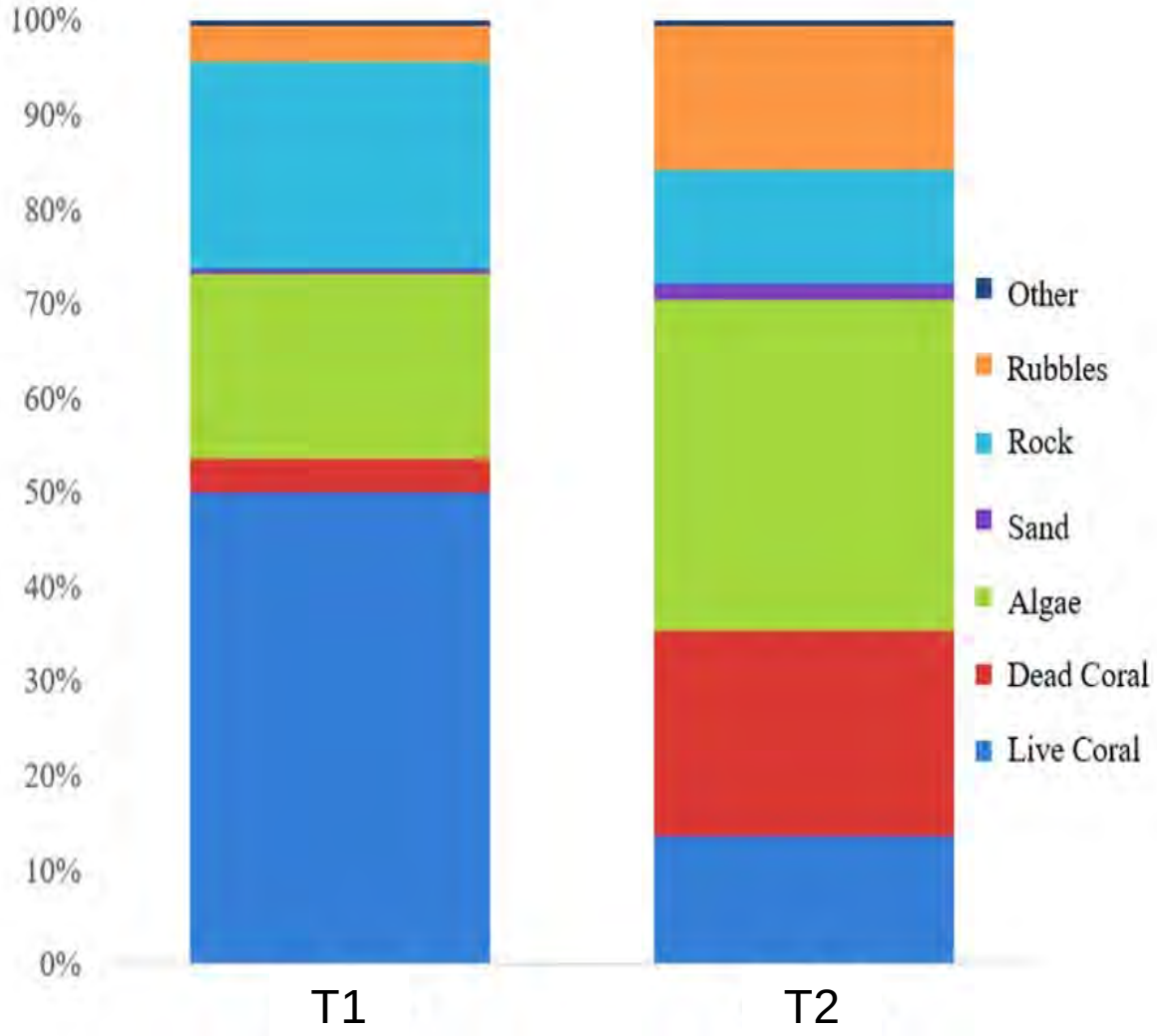
to observe the dynamics of *Vibrio* abundance to relate changes in benthic composition

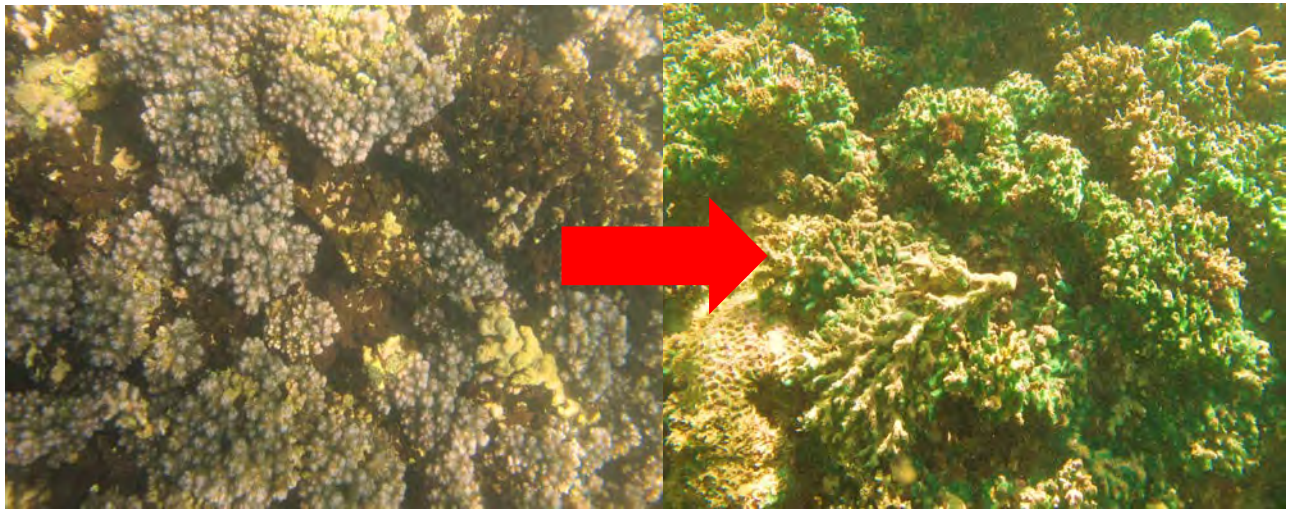
Global thinking | Local Action | Way Ahead





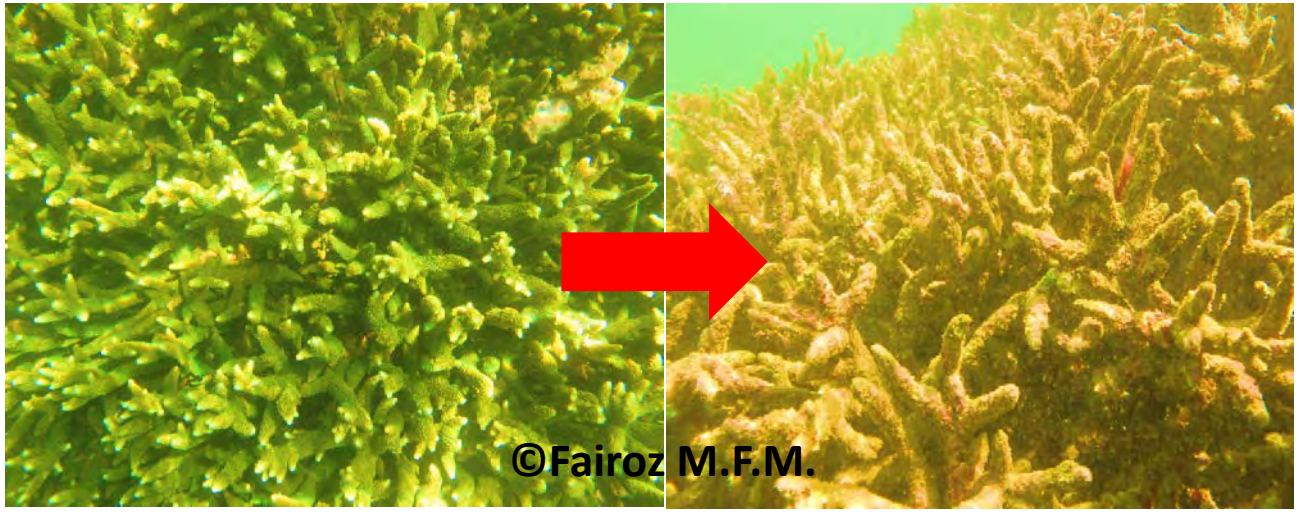
Benthic composition change from January 2016 to December 2016





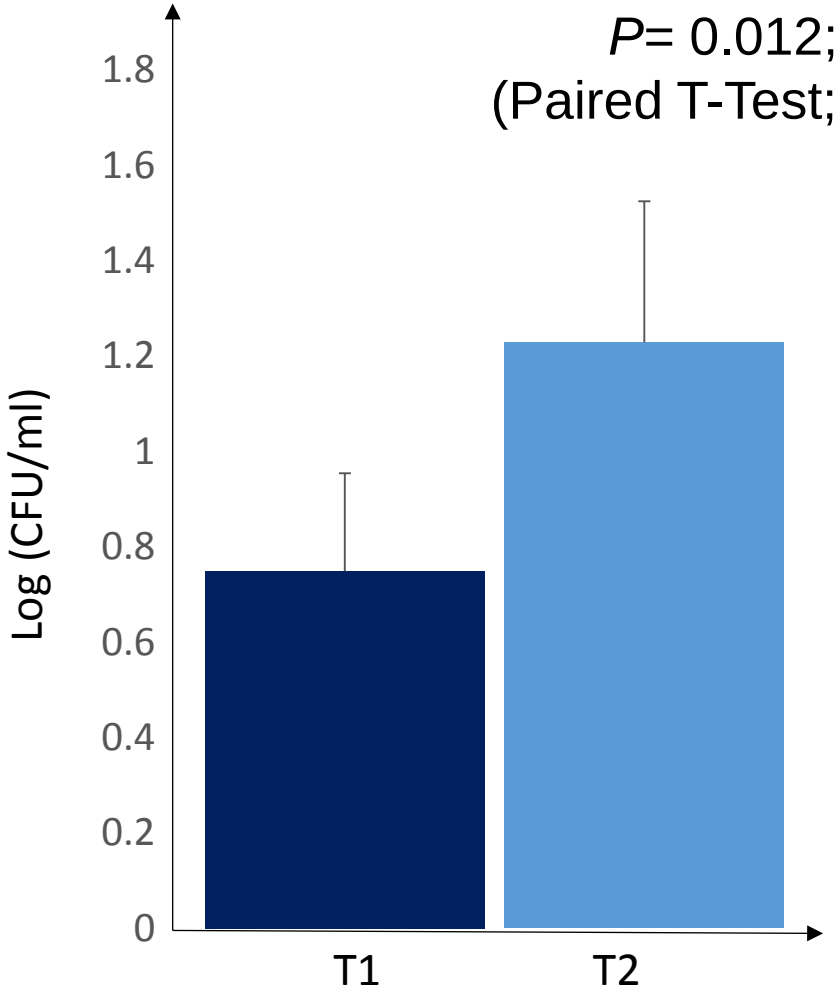
2016 January

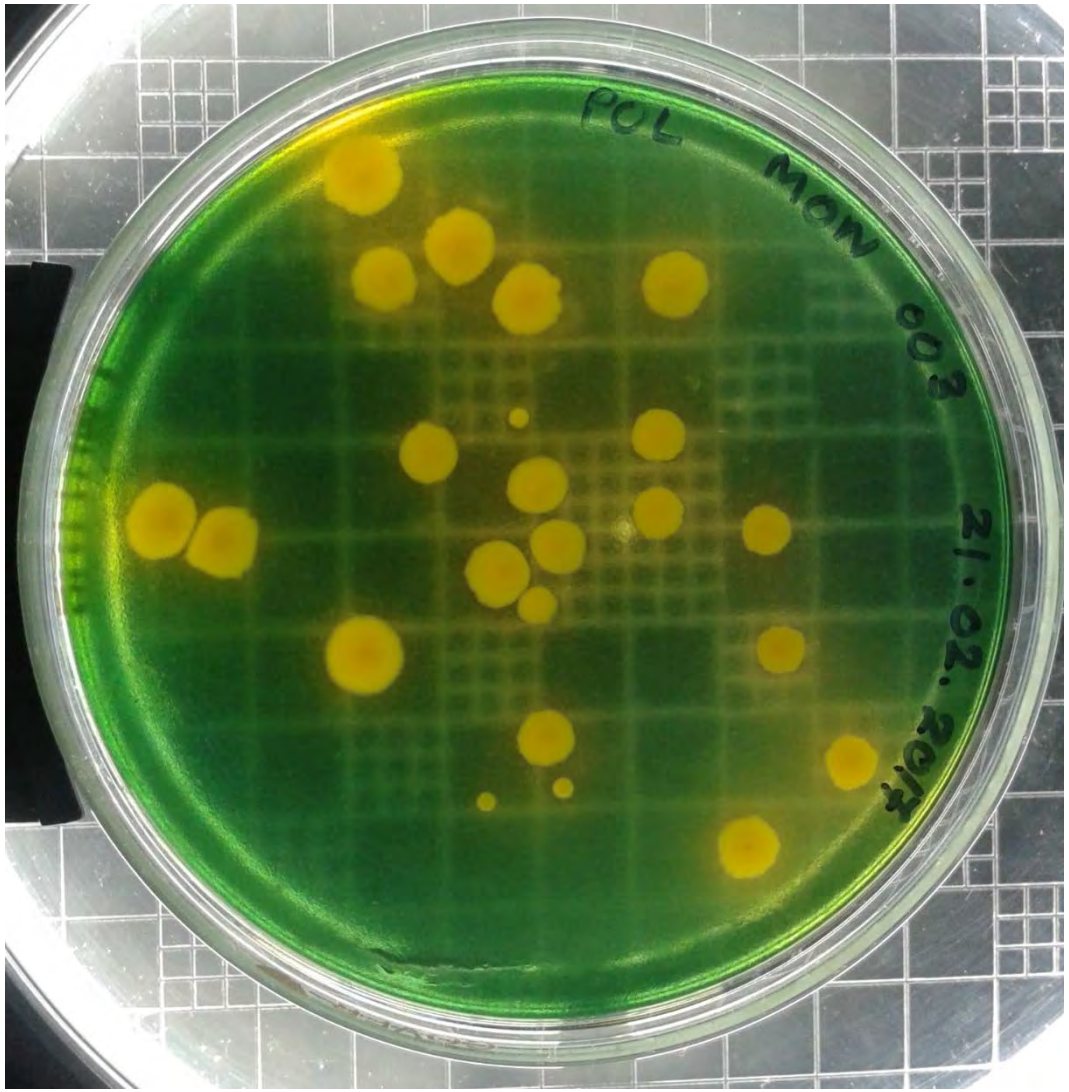
2016 December



Mean *Vibrio* abundance at T2 was significantly higher than that of in T1

P= 0.012; *P*< 0.05
(Paired T-Test; MINITAB 14)





Coral Health Index (CHI) value was obtained via *Vibrio* score method to assess reef health.

$$\text{MS } Vibrio = \frac{1}{[(Number\ of\ colony\ forming\ units\ per\ 1\mu l\ of\ sample\ water \div 100) + 1]}$$

However, CHI indicated Polhena reef was microbiologically healthy where index value recorded in both time periods as 0.99

Local level significant of current findings (first of its kind of evidences)

Future research ?

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Our Team

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