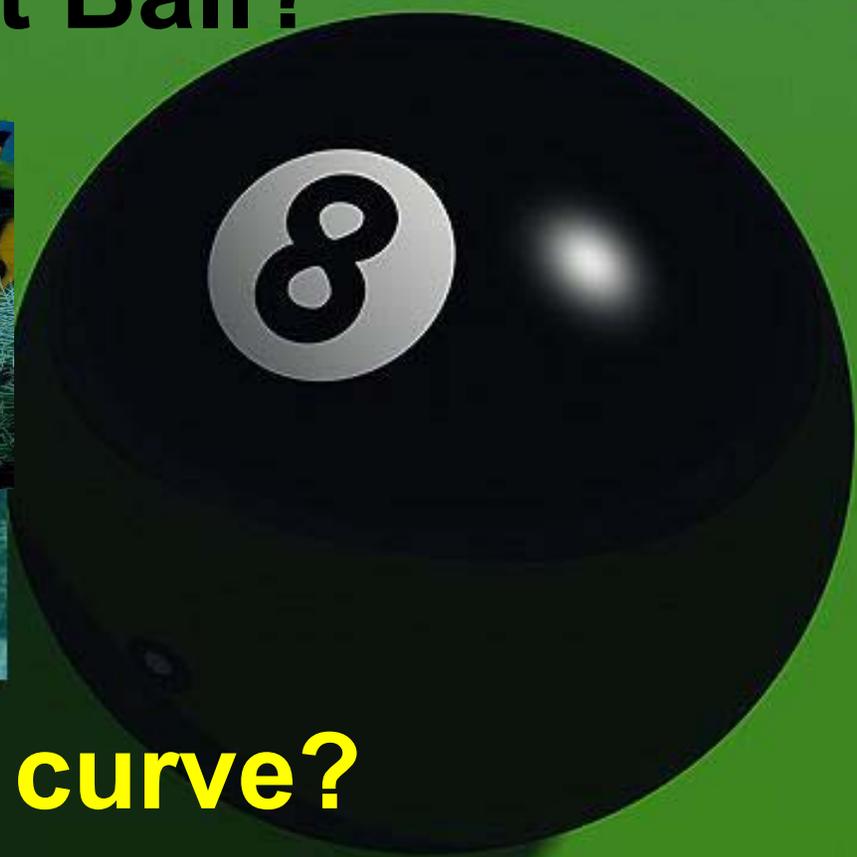


# Behind the Eight Ball?



# Or Ahead of **the curve?**

An underwater photograph of a vibrant coral reef. The scene is dominated by various types of coral, including large, rounded, brain-like structures on the left and more intricate, branching and table corals in the center and right. The water is clear and blue, with sunlight filtering through from the surface, creating a dappled light effect on the reef. The overall atmosphere is serene and natural.

**● A case for  
coordinated, adaptive  
science in supporting  
management  
and policy**

**Andy Hooten**  
Consultant to the World Bank  
AJH, Environmental Services  
June 19, 2003

# Outline



**some stereotypic generalizations & ideas to offer fuel for debate...**



**Some helpful quotes**



**The Tyranny of the Urgent**



**A model for adaptive investigations and better communication**



**A project aimed at coordinating & targeting investigations that can be applied to management & policy**



**Coral Reef Science has historically been resource constrained. This factor has fostered intense competition within the community.**

*“The coral reef scientific community eats their young”*

*Phillip Dustan, College of Charleston*



**Coral Reef Science has also been very turf-oriented, both spatially and intellectually.**



**In reaction-based scenarios, science is often asked to provide answers within time frames that are "unfair" or unrealistic**

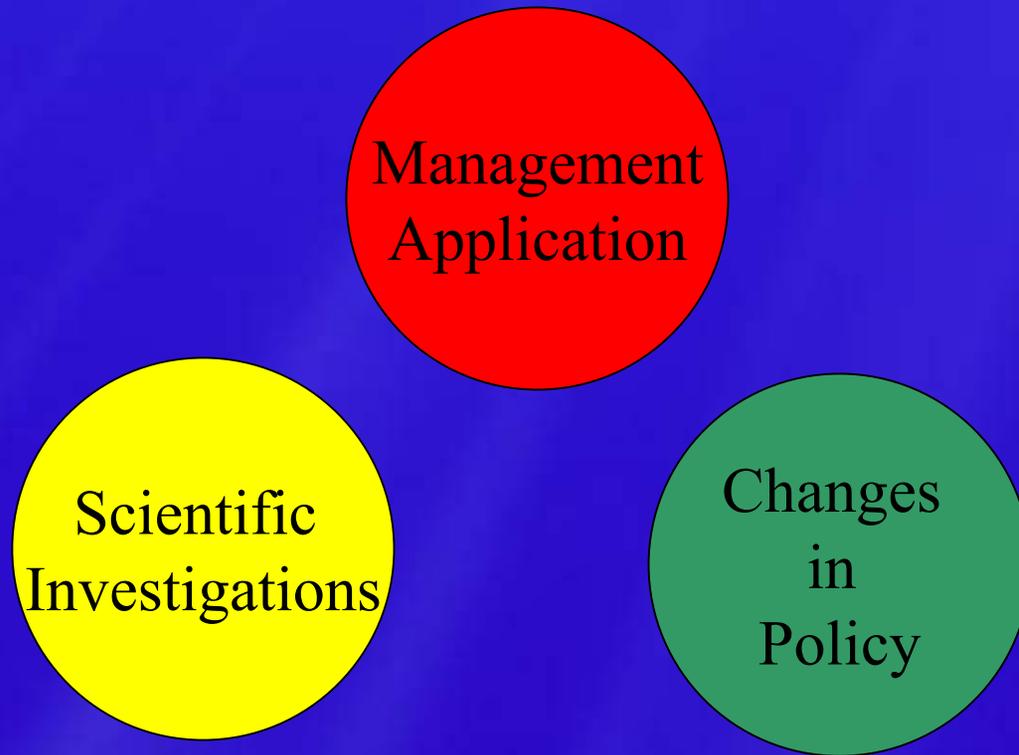
**i.e. expectations of conclusive results that do not coincide with easily observable ecosystem dynamics, or with limited baseline data**



**Scientists are motivated by interesting questions - *there is scope for win-win!***



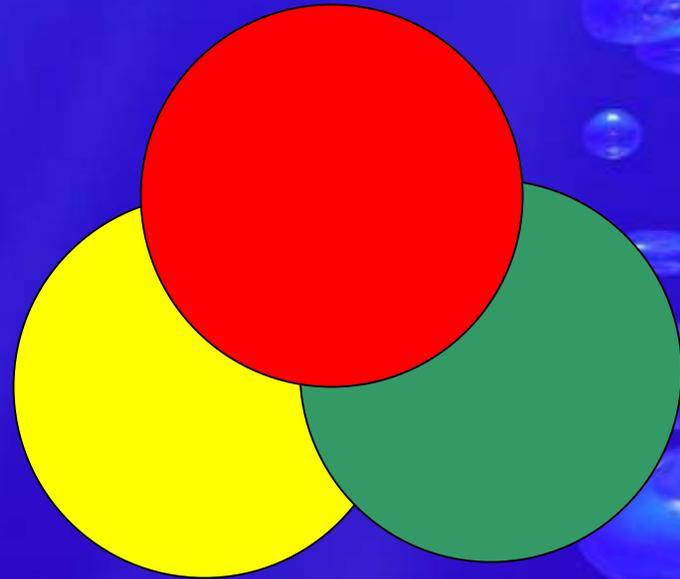
**There are real differences in the way that scientists, managers and other disciplines address problems.**



**The day-to-day roles of the professionals in these spheres are often distinct & separate...**

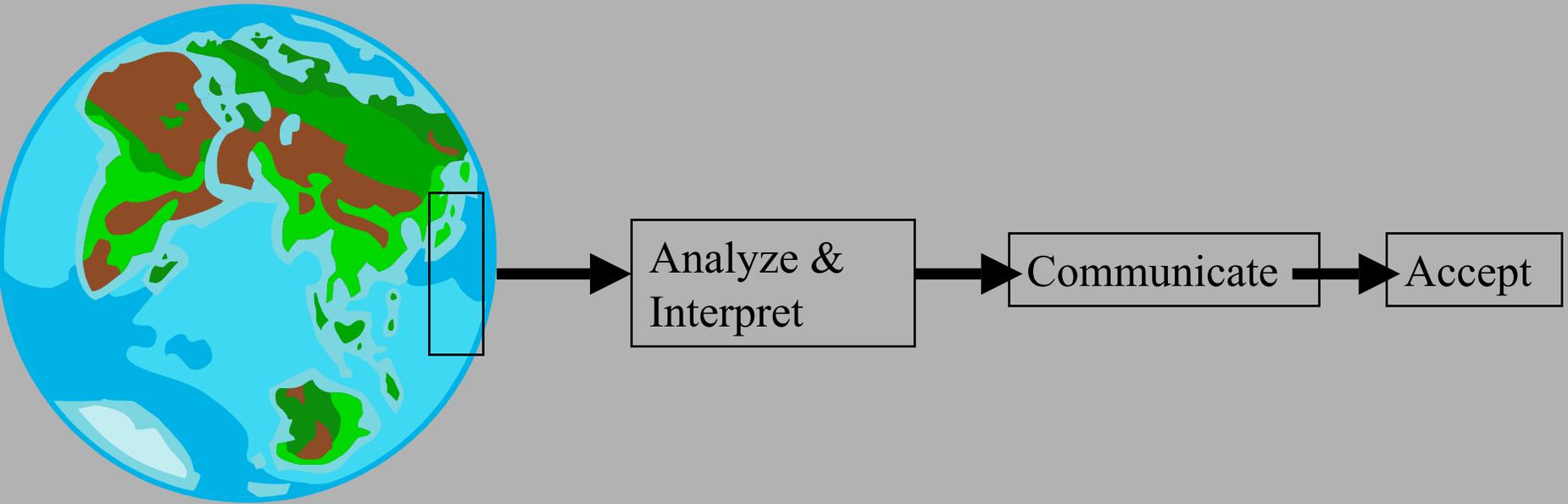
# Supporting Management

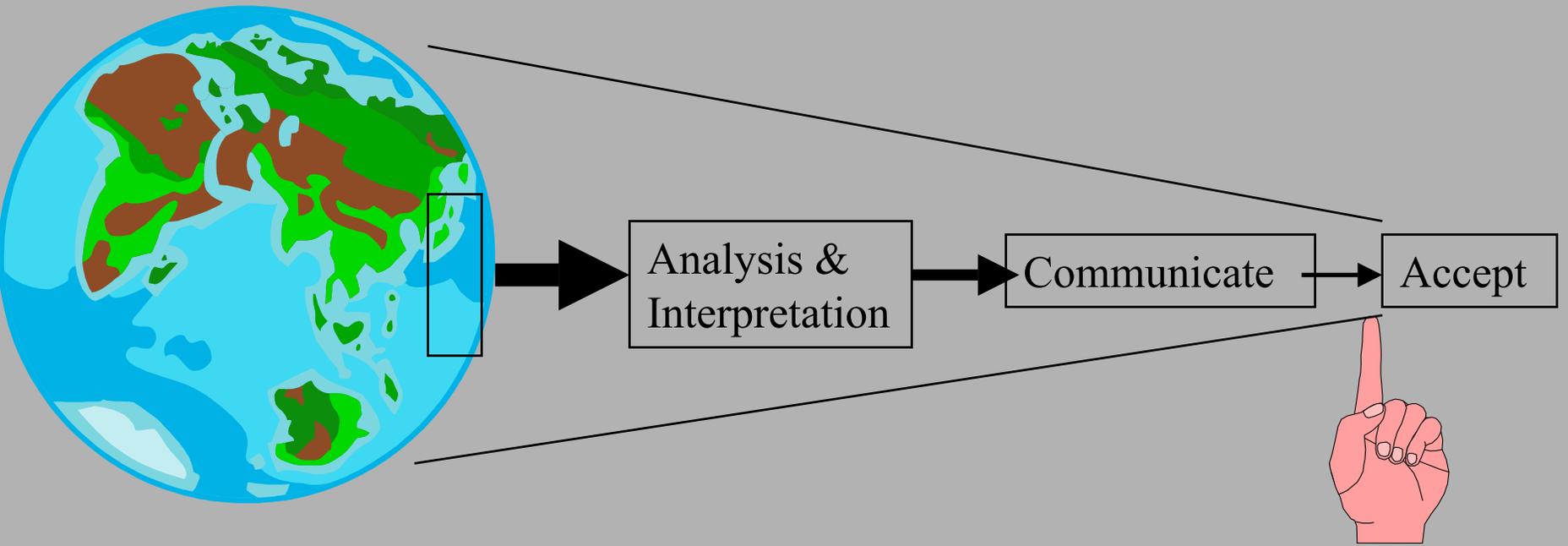
A good management decision lies at the intersection of what is feasible



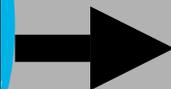
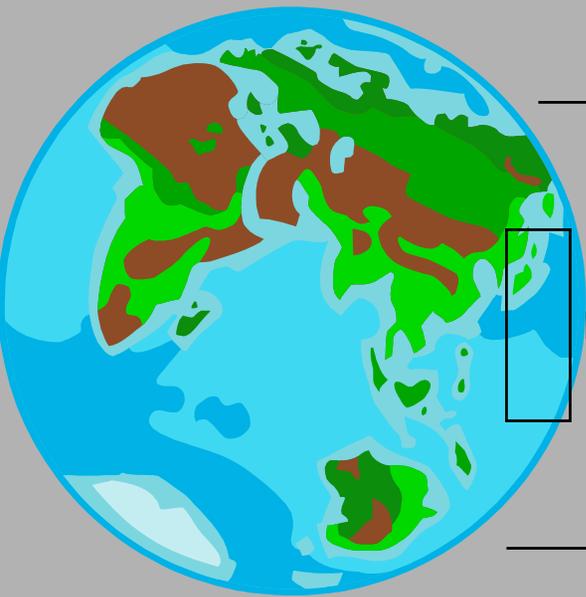
*Source: John McManus, NCORE*

# Common to both science and management

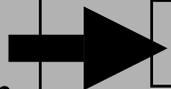




This is where trust & credibility  
are essential



Analysis &  
Interpretation



Communicate



Accept

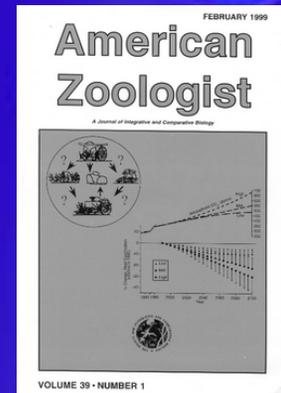


The challenge is to cultivate mutual trust  
--both within and between communities  
of practice



**“Current reef degradation suggests that these mechanisms are being taxed beyond their limits; understanding of the problem is hampered by serious inadequacies in our understanding of physiological stress responses, the range and implications of reproductive strategies, and the mechanisms of calcification and algal symbiosis.”**

*R.W. Buddemeier and Stephen V. Smith, 1999.  
Coral adaptation and acclimatization: A most ingenious paradox. Amer. Zool.39:1-9.*



**“We conclude that management of natural resources based on *sound knowledge of process and mechanisms* will be far more robust than the traditional approach that has centered on monitoring patterns of abundance.”**

*T.P. Hughes, A.H. Baird, E.A. Dinsdale, N.A. Moltschaniwskyj, M.S. Pratchett, J.E. Tanner and B.L. Willis. 1999. Patterns of recruitment and abundance of corals along the Great Barrier Reef*  
*Letter to Nature, Vol. 397. 7 January 1999.*

**“As a science, reef management is in its infancy...Because a coral reef is a living system, we’d be wiser to base management on dynamics rather than state, because dynamics determines tomorrow’s state...The Science that we must build to guide reef management will have many dimensions, and...the ecological dimension will not be trivial.”**

*Peter F. Sale. Recruitment in Space and Time, Editorial in Nature, January 1999 in response to Hughes et al Letter -Patterns of recruitment and abundance of corals along the Great Barrier Reef*

**“Do you have an answer?”**

*Aileen Velazco-Dominguez. You heard it hear  
live...today*



**“Monitoring alone will not give  
you the answer.”**

*Terry Done. You heard it here live...  
Yesterday*

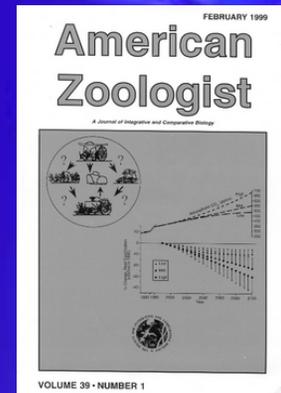
**But wait!**

**Traditional, or Local Ecological Knowledge**

**“Interactions and conditional dependencies  
we need to get our heads around...”**

**‘The answers from these questions will not come from “capacity building”, but from well-focused research’.**

*A. Barrie Pittock. 1999. Coral Reefs: Adaptation to What? Amer. Zool.39:10-29.*



**URGENT**

**NOT URGENT**

a bleaching event...

**IMPORTANT**

The boss wants it  
by C.O.B.!

**I**

Strategic Planning



...understanding a bleaching  
event

**NOT  
IMPORTANT**

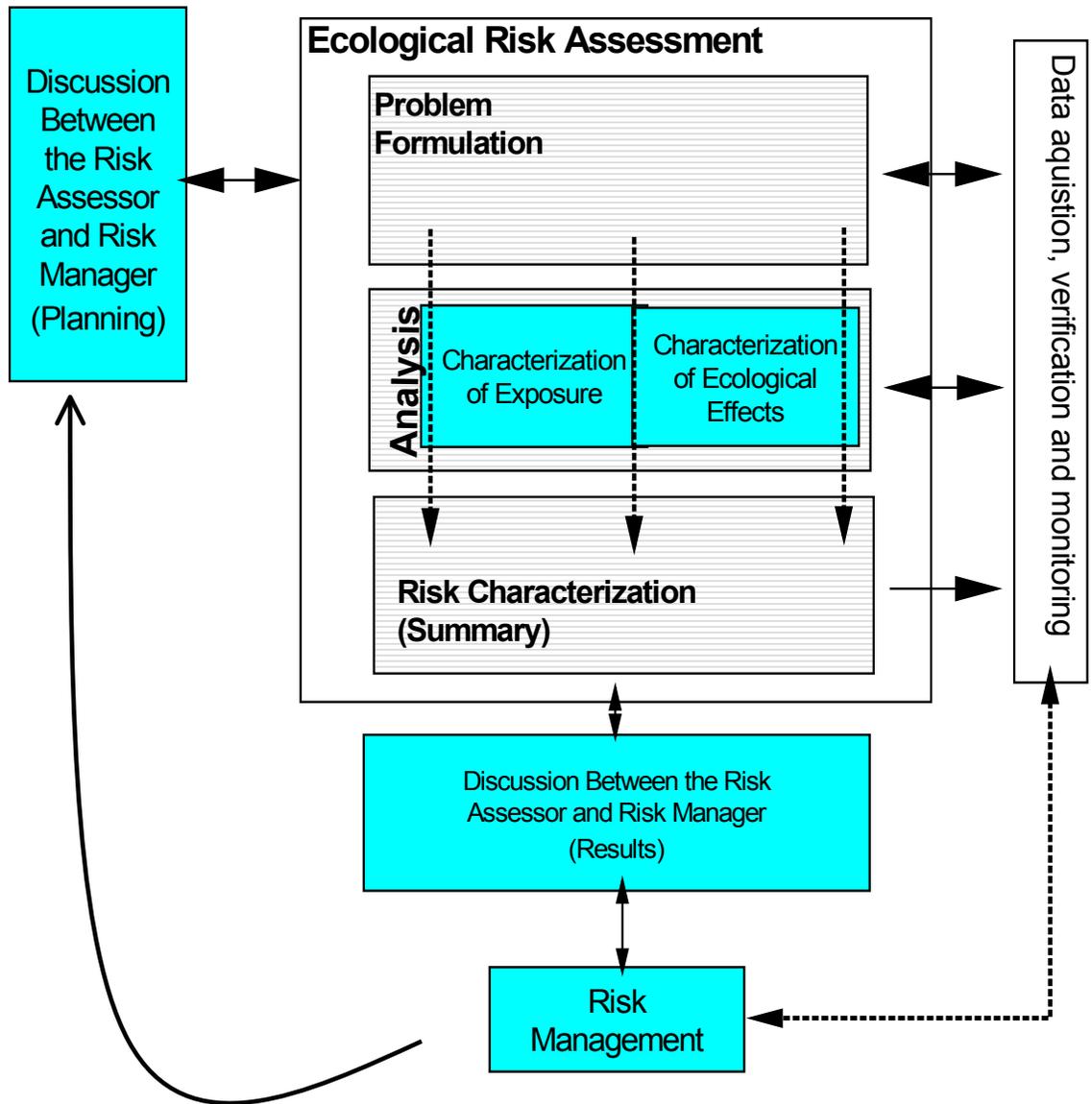
Office meetings, last-minute  
media event...

**III**

**IV**

....Checking Email?

***The Tyranny of the Urgent at the expense of the Important***



For each objective...

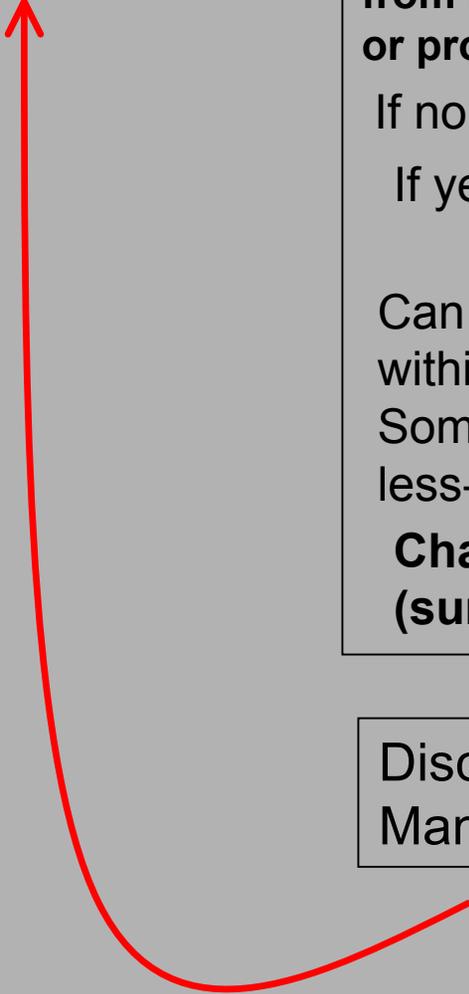
Discussion concerning Management Objectives

What is known?  
...unknown?  
**Can unknowns be ascertained from literature reviews, databases, or provided in some way?**  
If no, then...   
If yes, (or after "no" ) then...   
Can action be recommended within a "short" time frame?  
Some early guidance, even with less-than ideal information...  
**Characterization (summary of the issue)**

Data acquisition, verification & monitoring

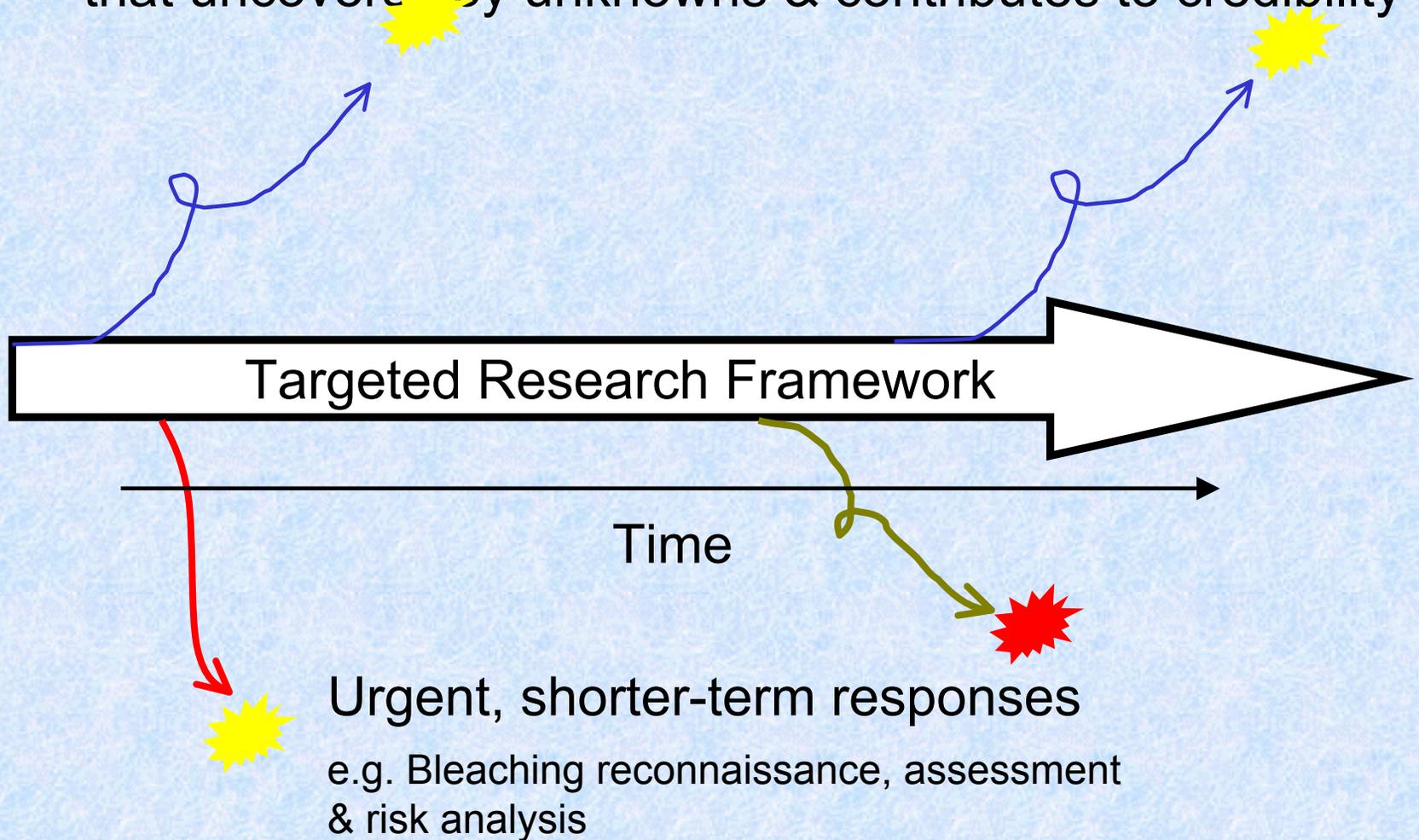
Discussions between Management & investigators

An Action



# Commitment To A Process

But an investment in a longer-term strategy that uncovers key unknowns & contributes to credibility



An underwater photograph of a coral reef. The water is clear and blue, with sunlight filtering through from above, creating a dappled light effect on the coral. The coral structures are diverse, including branching and table corals. The overall scene is vibrant and healthy.

**“Effects of Localized  
Anthropogenic Stress and  
Compounding Impacts of Climate  
Change on the Sustainability of  
Coral Reef Ecosystems  
and the Implications for  
Management”**

An underwater photograph of a coral reef. The water is clear and blue, with sunlight filtering through from above, creating a dappled light effect on the coral. The coral is diverse, with various shapes and colors, including some that appear white and bleached. The overall scene is vibrant and detailed.

**“GEF-World Bank Targeted  
Research and Capacity Building”**

**OR (simply)...  
“The TR”**

***<http://www.gefcoral.org>***

# TR...

Begun in 1998 in reaction to the ENSO

International scoping for two years to ask what the most pressing themes were for science to benefit management

- Bleaching and local ecological response
- Disease
- Application of remote sensing
- Large-scale ecology & Connectivity
- Restoration & Remediation
- Modeling & Decision Support

**TR...**

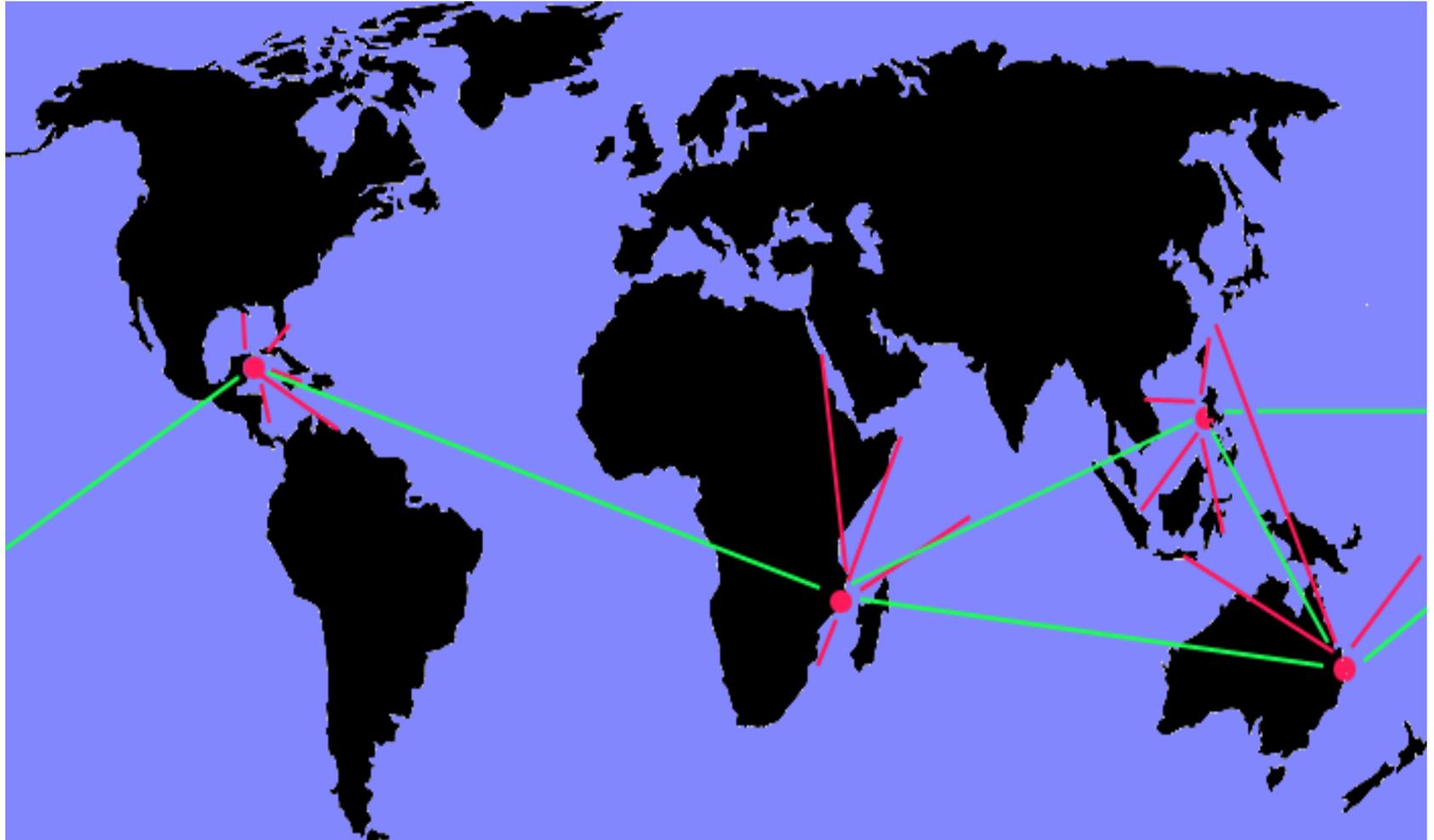
**within each theme identify priority unknowns  
and define specific hypotheses  
that have applied benefit**

**Focus on rigor and collaboration with  
other working group themes**

**Extend capacity within developing countries  
through centers of excellence and  
targeted exchanges**

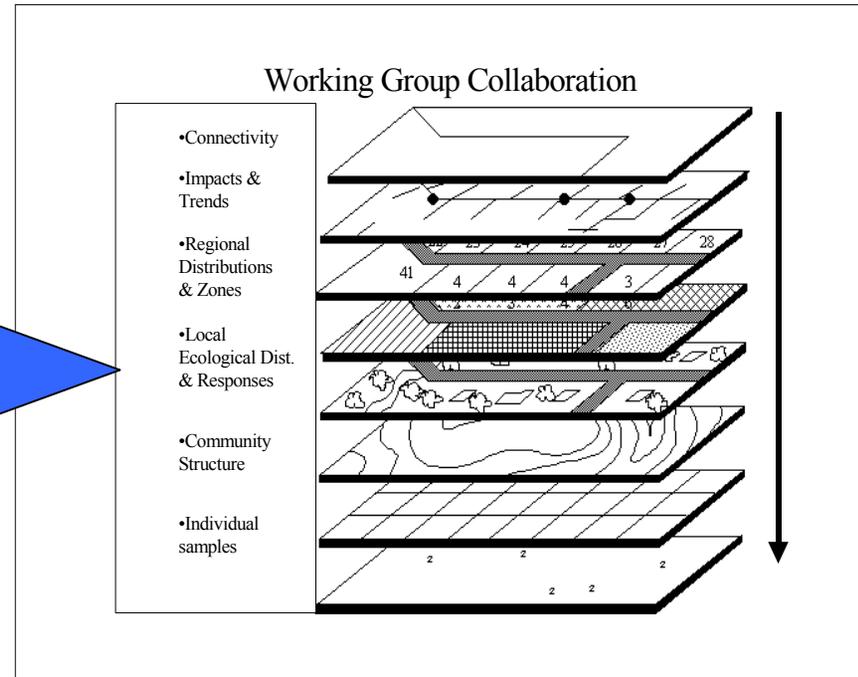
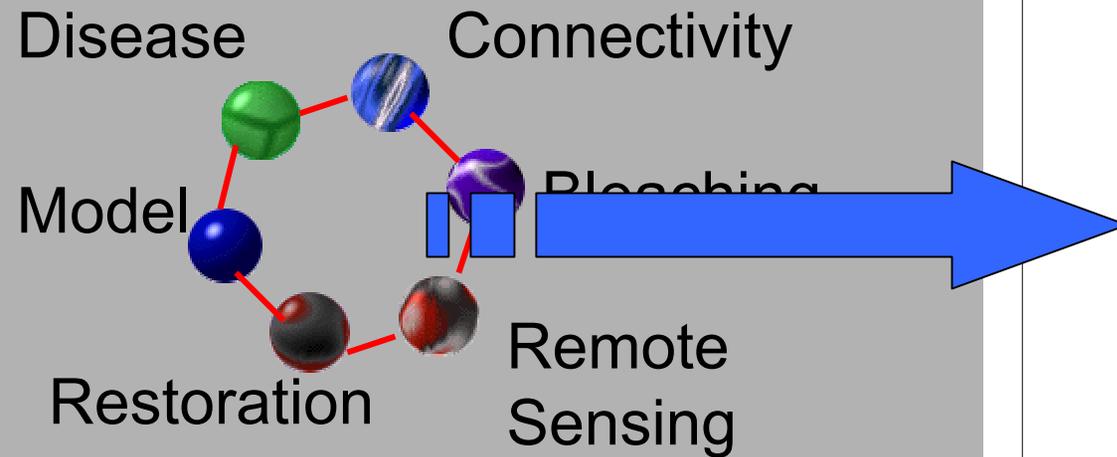
# Four Nodes

with Satellite sites over time

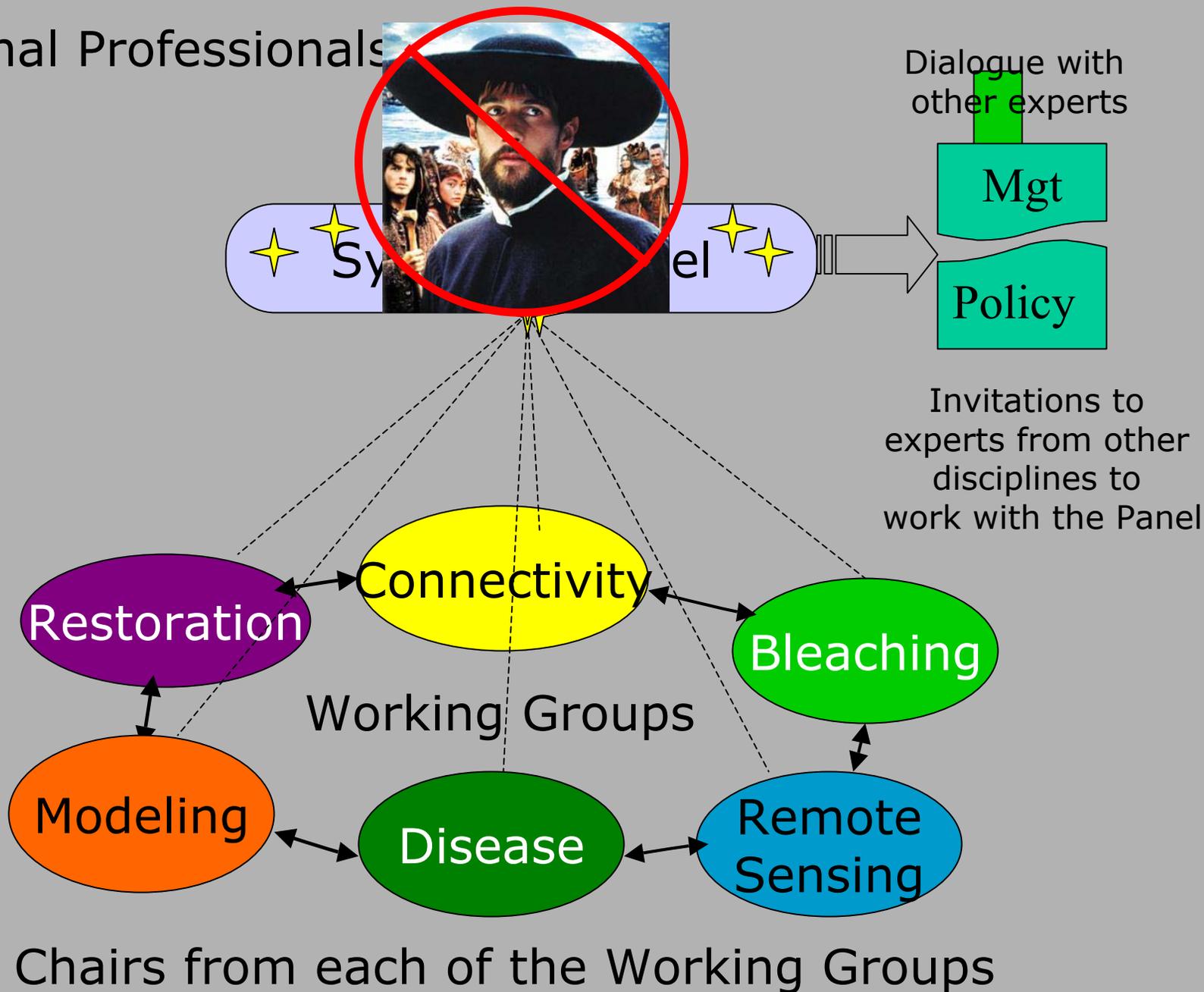


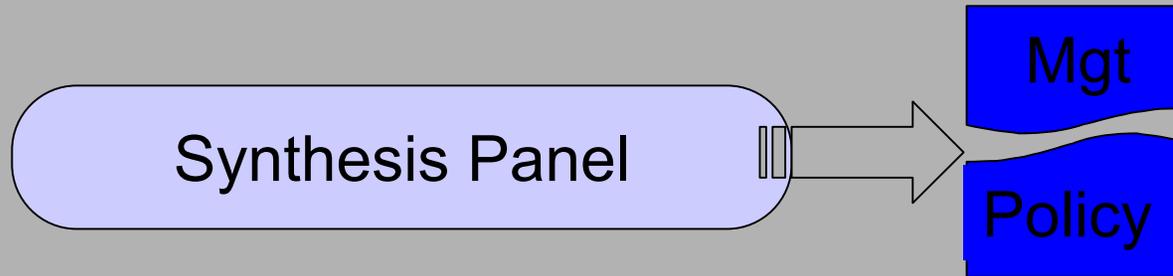
*Source: Ove Hoegh-Guldberg*

# Synergy between working groups in the field: integrated & related findings have greater power

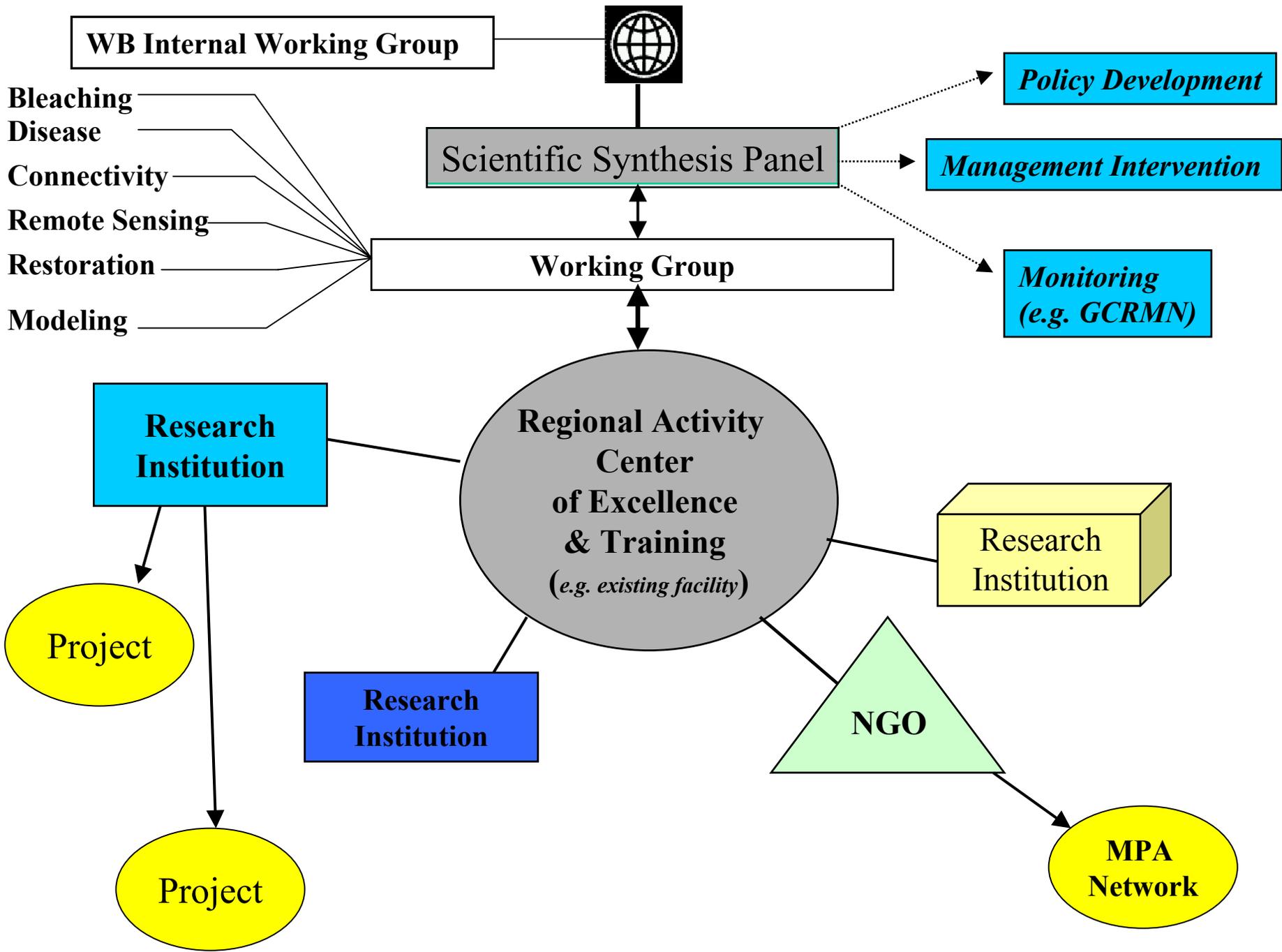


# Additional Professionals





- Help steer the working groups based on synthesis of results, Integrate findings with other independent research
- Help prioritize where applied research gaps need to be addressed over the life of the Targeted Research framework (10-15 yr)
- To serve as a coordinated voice in communicating coral reef state and dynamics
- Invite and engage experts from other disciplines to advance integration of research findings into management application and policy development



## Things to think about in getting ahead of the Curve...

- The sequencing or staging of stakeholder engagement (e.g. not being overwhelmed with inputs at the beginning)
- prioritize those unknowns with applied value and make them an investigative focus
- Prepare for the Nexus: where the innovations occur
- where possible generate early results (to establish trust and maintain credibility)
- Clear partitioning of short versus long term responses against those longer term investments-- to stage our ability to respond more effectively when the future events arise.