

# Management of the Marine Biodiversity and Resources of the Socotra Archipelago, Yemen



**High Marine Biogeographic Significance with a mixture of species from the Arabian, Red Sea, African and the Indo-Pacific regions.**

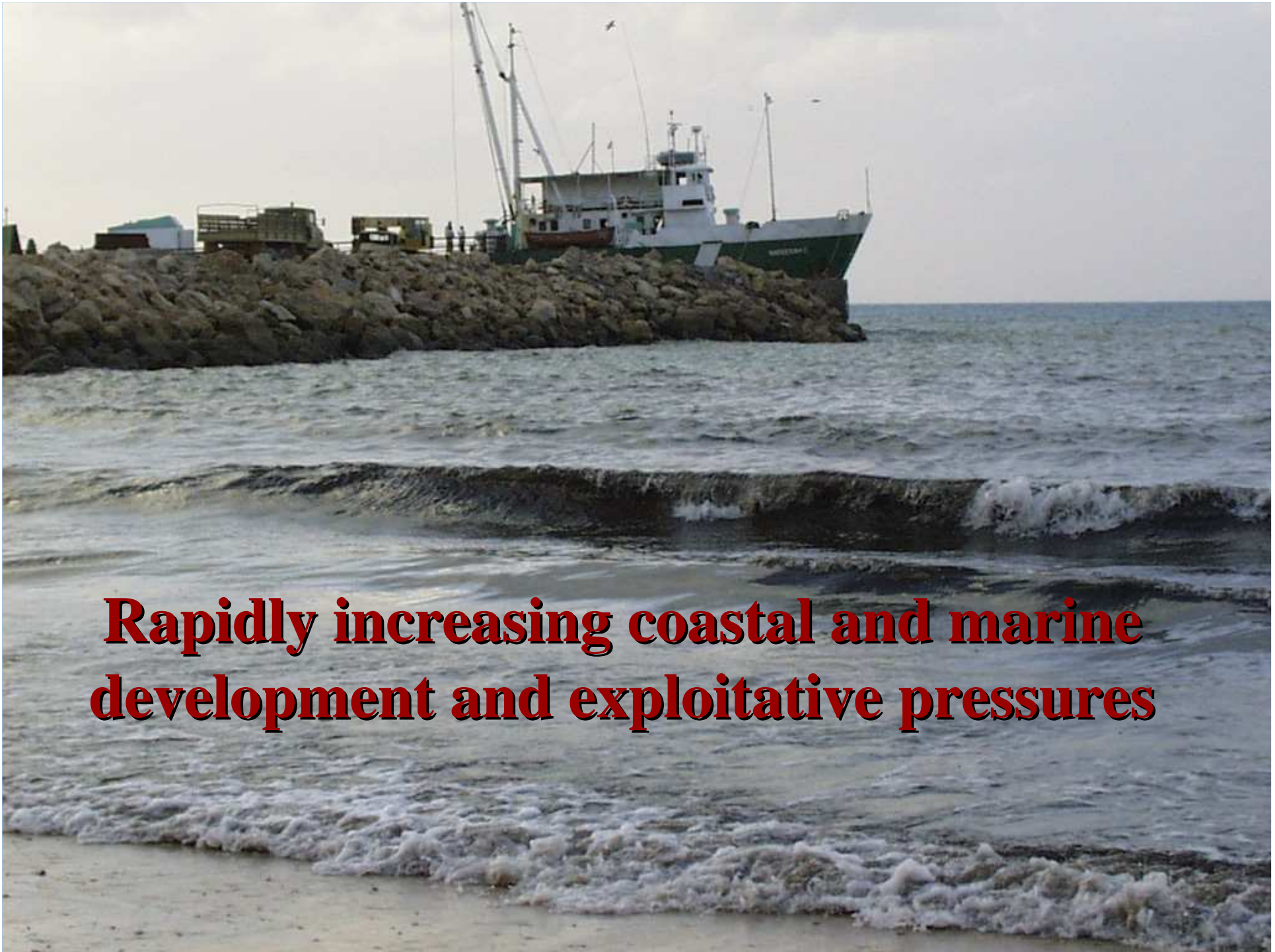
Yemen



Socotra  
Archipelago

**Important fisheries due to annual upwelling.**

INDIAN OCEAN



**Rapidly increasing coastal and marine development and exploitative pressures**



## **Project Objective:**

**The conservation & sustainable use of the terrestrial and marine resources to meet the challenge of increasing development and exploitative pressures.**

# **The Marine component:**

- **Institutional & capacity building**
- **Documentation of traditional fisheries practices**
- **Marine habitat & biodiversity inventory**
- **Specific marine resource assessment**
- **Threat analyses**
- **Actions**

A man in a light green shirt stands at the front of a room, holding a framed chart with a blue and yellow line graph. He is addressing a group of people seated around a table. The room has light green walls and a whiteboard in the background. The text 'Institutional & capacity building' is overlaid in red on the whiteboard area.

## **Institutional & capacity building**

**The local authorities are regularly informed of project activities & findings. Technical workshops & various training are provided to local stakeholders.**



# **Intertidal ecology training course conducted by the Senckenberg-Hariri consultants.**

## **Other training courses:**

- **Scuba diving**
- **Basic marine biology & taxonomy**
- **Marine survey techniques**
- **Fisheries surveys & monitoring**
- **Marine resource management**
- **Fisheries processing & marketing**
- **Fishermen cooperatives management**





# **Documentation of traditional fisheries practices**

**e.g. No catching of berried and small lobsters, no fishing by net during full moon, no fishing by baited steel traps, no bottom nets in rocky areas.....**



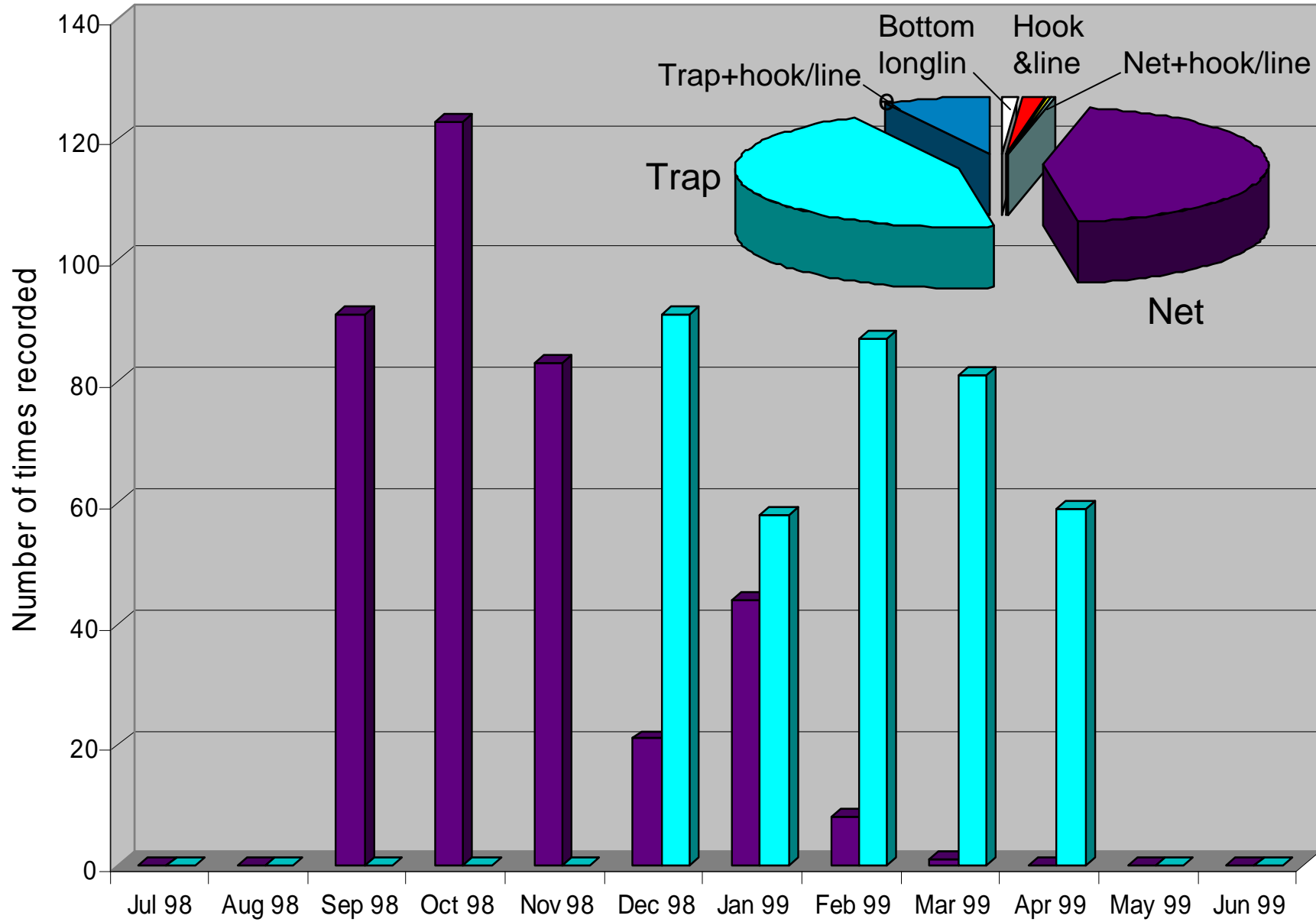


A man with short dark hair, wearing a grey long-sleeved shirt and a black and white checkered apron, is sitting on the ground. He is holding a white notebook and a pen, writing in it. He is surrounded by a large pile of fish, mostly light-colored with some darker spots. The background shows other people and more fish, suggesting a busy fishing area. The text is overlaid on the left side of the image.

**Daily recording of fishing activities & fish catch by 17 extension officers around the islands**

**One year of fishing effort & catch data from 3 areas input into database for analyses**

### Frequency of Use of Nets & Traps at Dehamdh

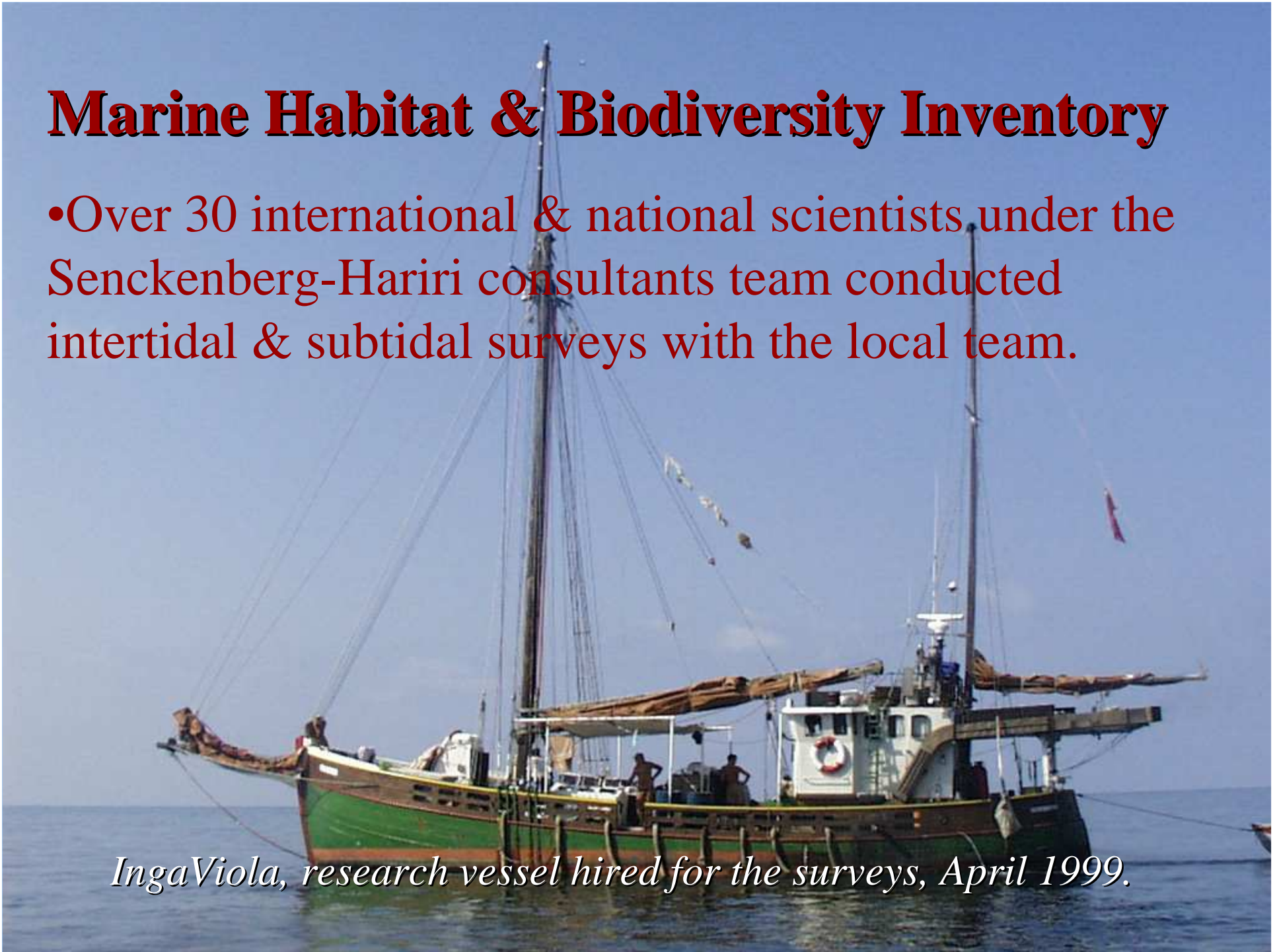





# **Marine Habitat & Biodiversity Inventory**

- Over 30 international & national scientists under the Senckenberg-Hariri consultants team conducted intertidal & subtidal surveys with the local team.

*IngaViola, research vessel hired for the surveys, April 1999.*



A large, layered rock stack in the ocean under a cloudy sky. The rock stack is composed of many horizontal layers of light-colored rock, possibly limestone or sandstone, with some darker patches. It has a jagged, irregular top. The ocean is a deep blue with some whitecaps. The sky is a pale blue with scattered white clouds.

**Over 500 intertidal & subtidal sites were surveyed, including the islands of Samha, Darsah & Abdul Kuri & two outlying rock stacks.**



## **Survey topics :**

- **ground truthing of biotope classifications from satellite images,**
- **coral diversity,**
- **reef fish inventory,**
- **other invertebrates,**
- **seabirds, &**
- **marine turtles.**





# Specific Resource Assessment

- Sharks
- Lobsters
- Reef fishes





# Shark fisheries

- Net & longline
- Shark fins dried for export
- Shark meat salted for sale to the mainland

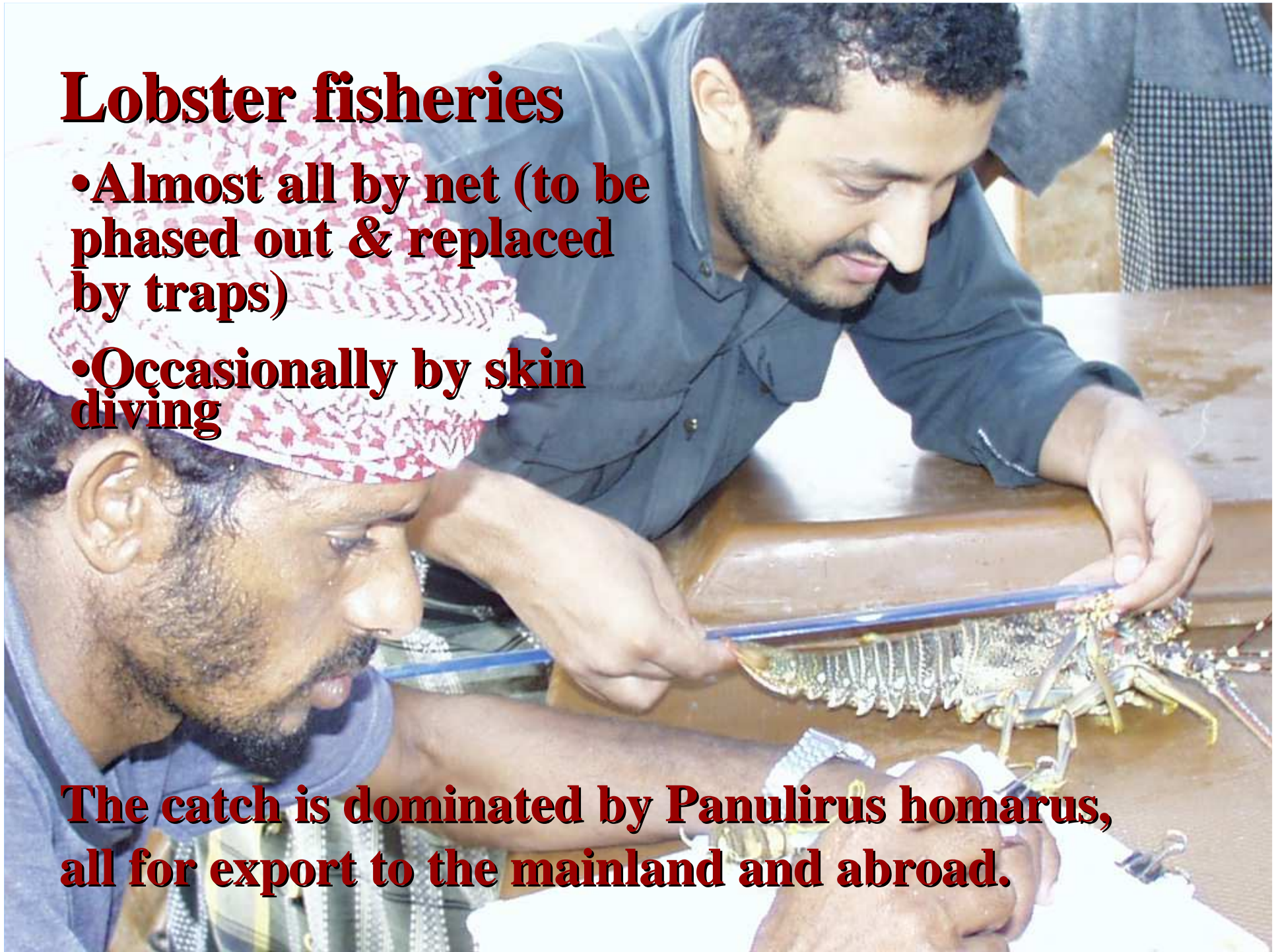




## **Lobster fisheries**

- **Almost all by net (to be phased out & replaced by traps)**
- **Occasionally by skin diving**

**The catch is dominated by *Panulirus homarus*, all for export to the mainland and abroad.**





# Reef fisheries

- By hook & line
- Mostly for home consumption, but also sold to visiting buyers for export.



# Threat Analyses

- **Over-exploitation**
- **Illegal & uncontrolled industrial fishing**
- **Habitat destruction**
- **Natural disturbances**
- **Social impacts**



# Over-exploitation



# **Shark fishery**

## ***Symptoms of overfishing:***

- **Decline in numbers all around the island**
- **Decline in sizes**
- **Decline in diversity?**

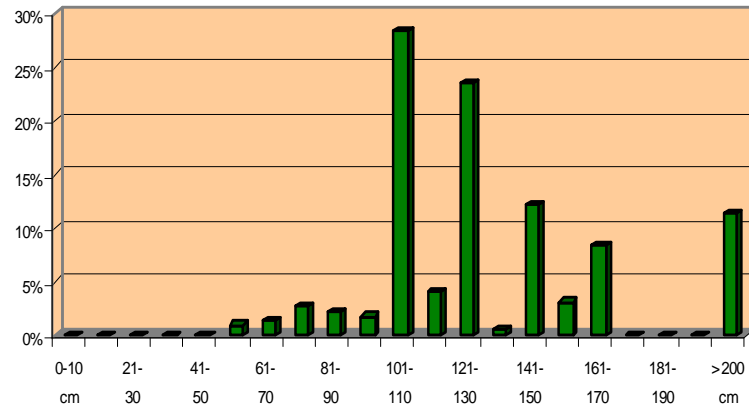
## ***Root causes:***

- **Heavy export demand for shark fins to supply E.Asia markets**
- **Regional overfishing by legal & illegal industrial fishing vessels**

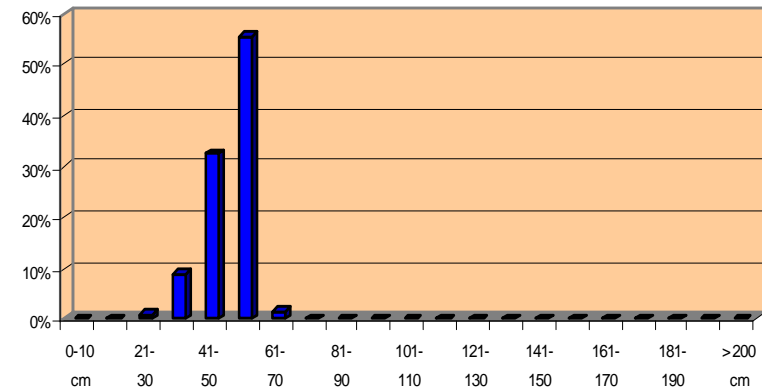


# Size distribution of the four most commonly caught sharks from Mahfrehin area (southern Socotra I.)

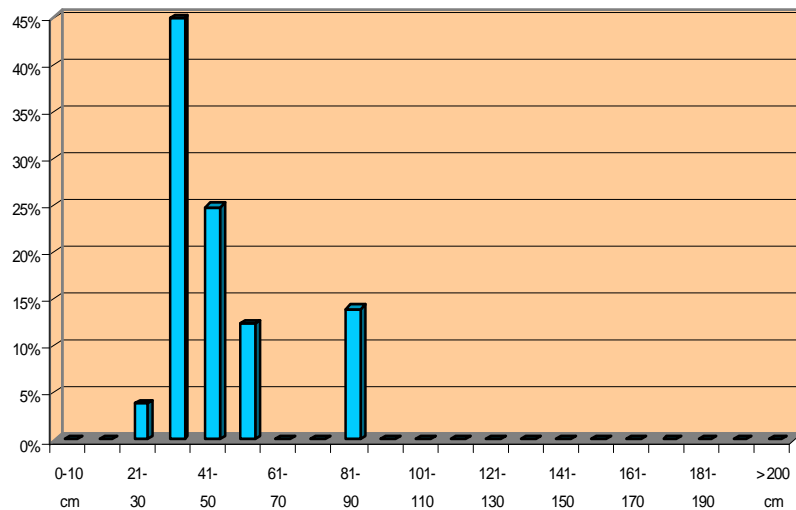
Rhinobatos spp.



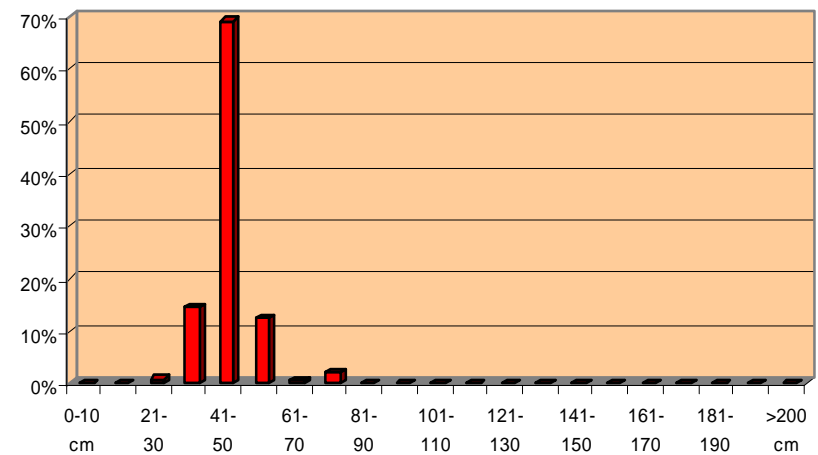
Loxodon macrorhinus, Carcharhinus macloti



Sphyrna lewini



Carcharhinus sorrah



# Lobster fishery

## *Symptoms of overfishing:*

- Decline in numbers on the northern coast and part of the southern coast of Socotra Island
- Small sizes in heavily fished areas (e.g. E. Noged)
- Loss of traditional conservation ethics in some areas, indicated by high percentage of berried & small lobsters.

## *Root cause:*

- Collapse in the lobster fishery of the mainland coast
- Sharp increase in prices & buyer pressure



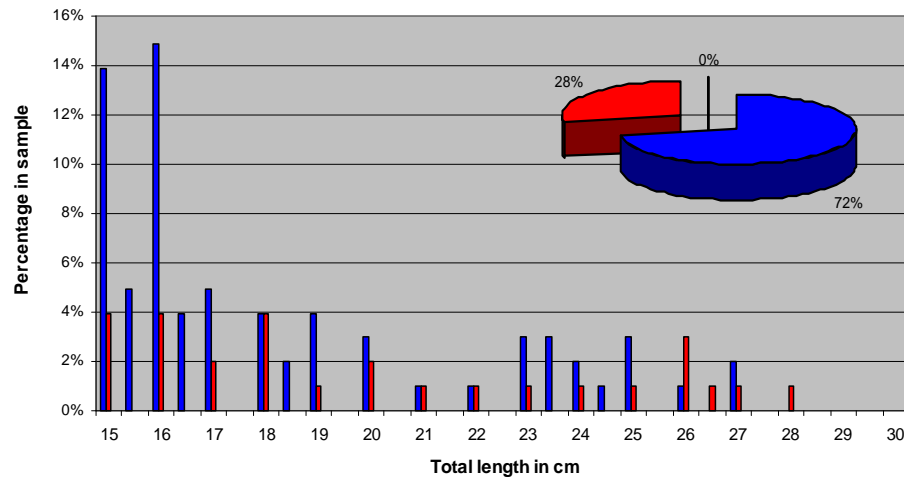
A close-up photograph of a person's hands holding a large lobster. The lobster is positioned horizontally, with its head to the right and tail to the left. The most prominent feature is the bright orange, glowing roe (berried) on the lobster's back. The lobster's legs are a mix of green and white, and its antennae are long and thin. The background is slightly blurred, showing what appears to be a wooden surface and a person's arm.

**Lobster price has almost doubled in the last year, tempting fishermen to extend their fishing seasons & ignore official regulations.**

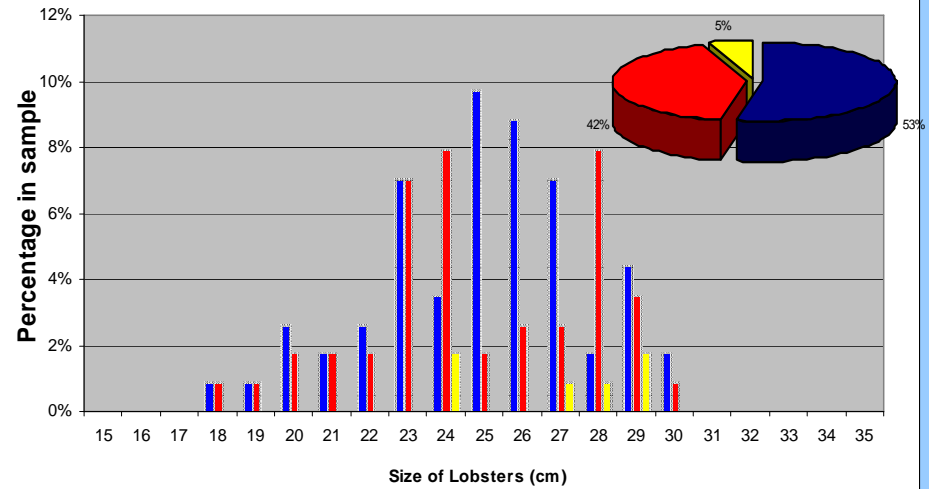
**Berried females & small lobsters are often caught & sold, despite traditional ban.**

# Size Distribution of *Panulirus homarus* sampled from lobster buyers at 4 locations.

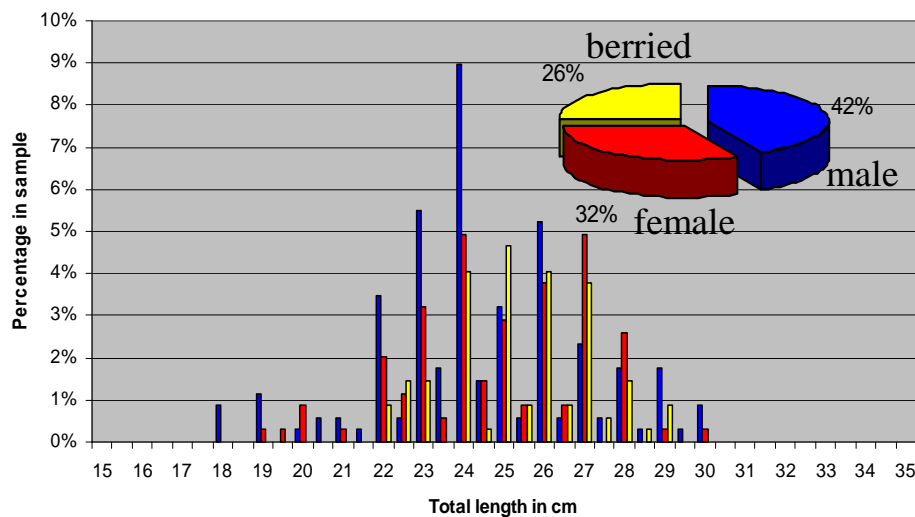
Zaheq (SE Socotra), 14 March 99



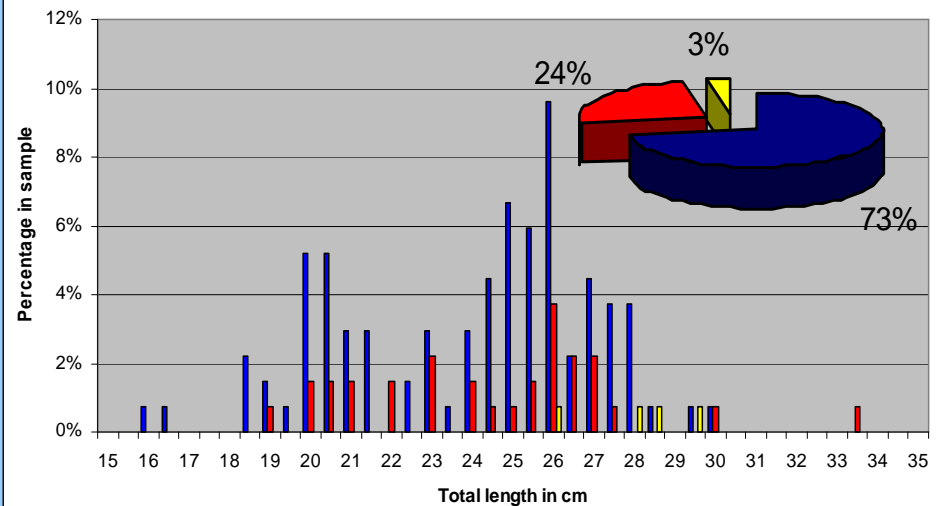
Irisal (eastern Socotra), 4 April 99



Neet (SW Socotra), 18 Nov 1999



Steroh (southern Socotra), 3 Dec 1999.





# Reef fisheries

## *Symptoms of overfishing:*

- **There is no noticeable overfishing yet, but the growing commercial reef fishery for export will place much heavier pressure on reef resources than the present traditional subsistence fishery.**

## *Root causes:*

- **Rapid improvement in storage & transport facilities, leading to the increase in buyers from outside the islands.**

**The newly installed ice plant & cold stores financed by foreign investors will enable fishermen to sell fresh fish to buyers year round.**

**None of the existing fisheries investment operations has undergone EIA or assessment on the sustainability of target fish stocks.**





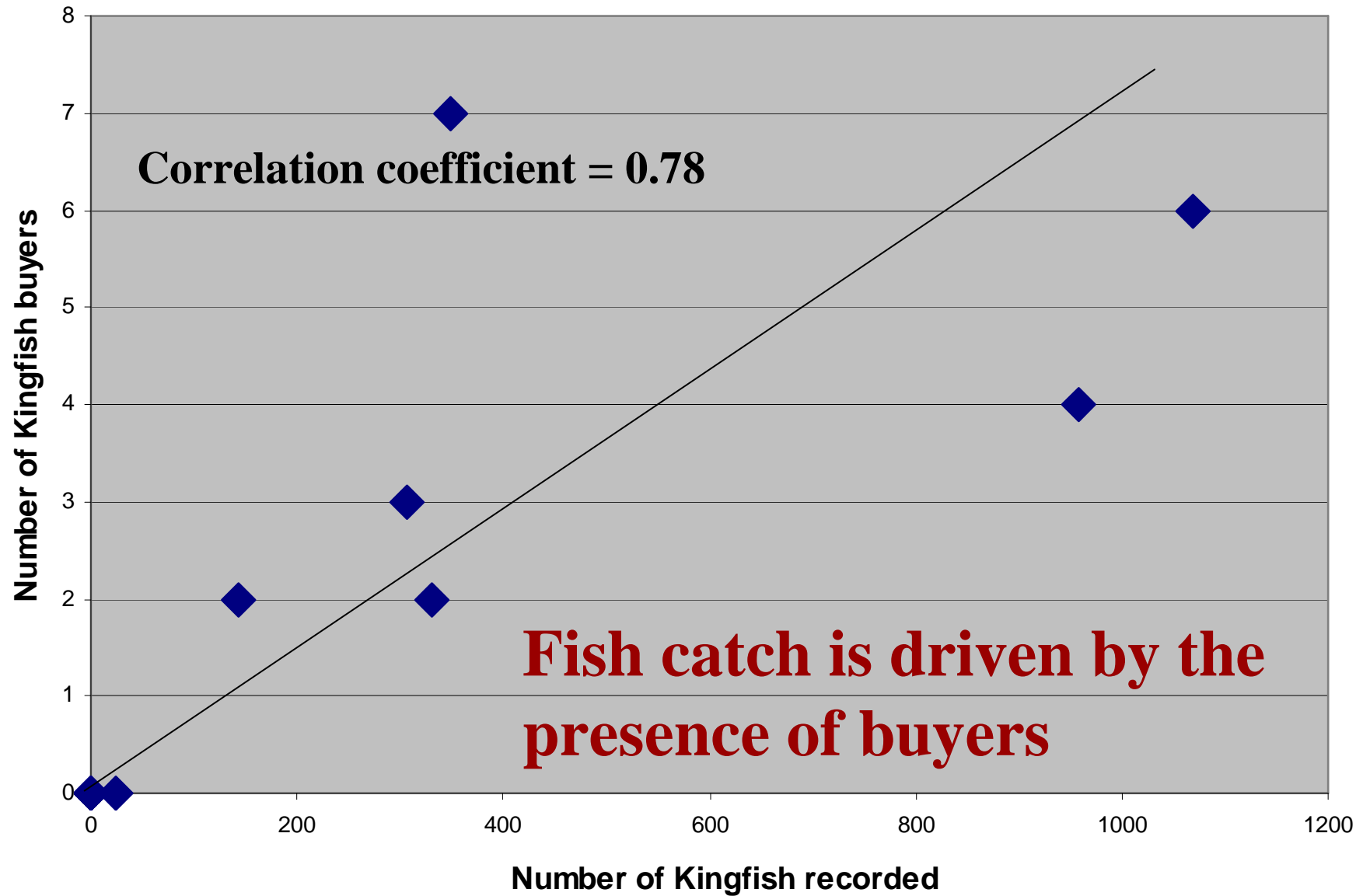
# Rapidly increasing pressures on reef fisheries

- Limited resource base
- Escalating export demands
- Lack of monitoring & control
- Lack of information on stocks



*A reef fish buyer from the Emirates equipped with freezers.*

## Buyer pressure & catch of Kingfish in Mahfrehin area (southern Socotra) from July 98- June 99







## **Illegal & uncontrolled industrial fishing**

- **Poaching**
- **Excessive licensing**
- **Lack of surveillance & enforcement capacities**





# Habitat destruction & degradation

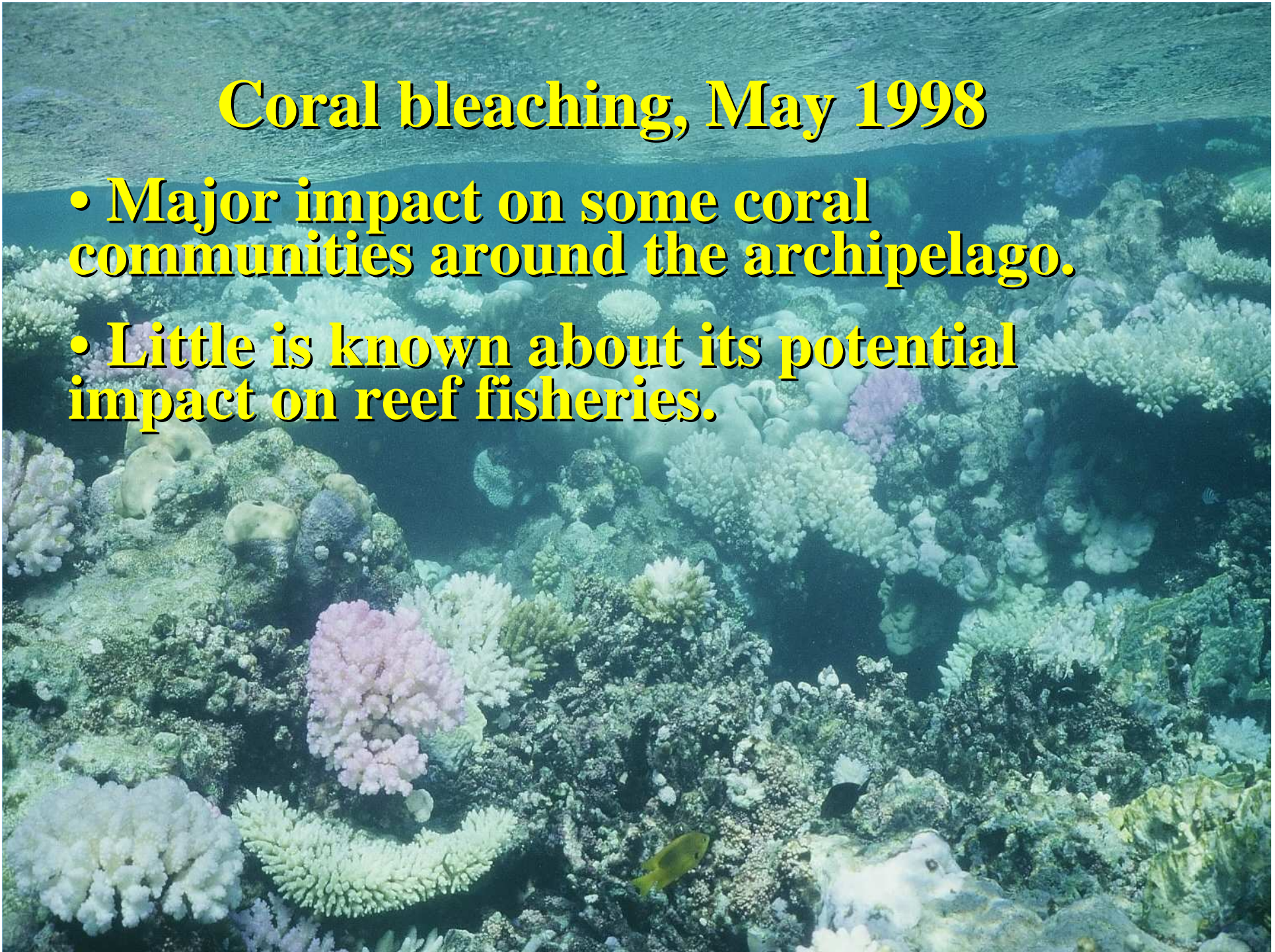
- Unplanned port construction & expansion
- Coastal development without EIAs
- Coral mining for export
- Trawling





## **Coral bleaching, May 1998**

- Major impact on some coral communities around the archipelago.**
- Little is known about its potential impact on reef fisheries.**





# **Social impacts**

A group of approximately 30 people, including men, women, and children, are sitting in a large circle on a sandy beach. They are dressed in casual, everyday clothing. In the background, the ocean is visible with several small boats and a larger wooden boat. The sky is clear and blue.

- **Changes in traditional conservation values**
- **Disputes over customary marine user rights**
- **Influx of outside fishermen**

## **Mitigation Measures (Actions)**

- **Strengthened fisheries management & control**
  - **Conservation & Development Zoning Plan**
    - **Environmental education & awareness**
      - **Community empowerment**
  - **Partnerships among stakeholders**
    - **Political support**



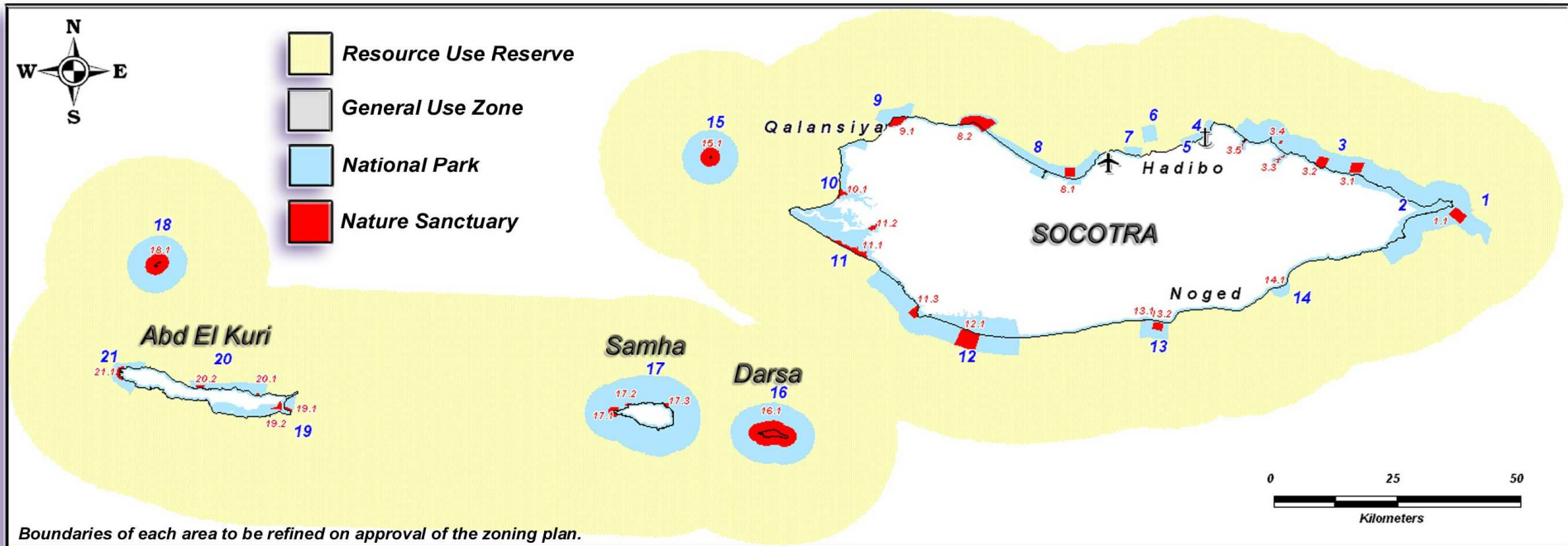
A man in a camouflage uniform and cap stands in a storage area filled with large yellow bags. He is holding a white object, possibly a cup or a small container. The background shows a corrugated metal wall and more bags.

## Strengthened fisheries management & control

- Enforcement capacity of the Department of Fisheries
- Project extension officers serve as coast watchers
- Fishermen societies record fish landings & report violators
- Management oriented research



## Zoning Plan for Socotra Archipelago for the Conservation and Sustainable Use of Biodiversity and Natural Resources











The Zoning Plan is aimed towards maximizing **conservation effectiveness**, by emphasizing **community based management** & integrating **development needs** at the **planning** stage, thus minimizing user conflicts in the future.



**SUMMARY ACTIVITY GUIDE  
FOR THE MARINE ZONING  
PLAN**

*Management guidelines will be developed specifically for each area on approval of the zoning plan.*

		Resource Use Reserve	General Use Zone	National Park	Nature Sanctuary
Sea Port		✓	✓	✗	✗
Ballast disposal		✗	✗	✗	✗
Trawling		✗	✗	✗	✗
Shark fishing by net		✓	✓	✗	✗
Hook and line		✓	✓	✓	✗
Turtle exploitation		✗	✗	✗	✗
Managed ecotourism		✓	✓	✓	✓
Research and Education		✓	✓	✓	✓


•Detailed activity guidelines developed by the local team & reviewed by scientists.

•Public consultations undertaken at national, local & village levels.

•ZP submitted for government approval.

•Detailed site specific management plans to be prepared.


*Table prepared by Rebecca Klaus.*



**The network  
of marine  
nature  
sanctuaries  
will serve as  
'living  
banks'.**

**managed well, the sanctuaries will  
plenish the used resources in the  
surrounding fishing grounds.**





**Environmental  
education &  
awareness**

**Joint visits to local schools & villages by the  
marine team & education/awareness team to  
promote environmental awareness.**




# **Community empowerment**

**Empowering the local communities to safeguard their own resources could be the most cost effective & long-term solution to undesirable exploitative pressures.**







**Partnerships among stakeholders and Government authorities and international agencies informed with sound scientific knowledge, will contribute to the success of conservation & sustainable management efforts.**



What future for Socotra?

ما هو مستقبل سقطرى؟

