

Tropical Conservation Biology

Semester 1, AY22/23

# LSM4262

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# Conservation of Humphead Wrasse (*Cheilinus undulatus*) in the tropics

Divina Vicknesh | Ong Xiang Ting, Alicia | Rachel Ong Rui Xue

## Introduction to Humphead Wrasse

Largest fish species associated with coral reefs in the world.

Largest living member of Labridae family

Important giant coral reef fish that maintains the ecosystem balance of Tropical Indo-Pacific.

- Predator: Ability to cause **trophic cascade**
- Trophic case is the ecological phenomenon triggered by removal of predators,
  - Drop in population numbers of predator
  - Increase in numbers of prey through a food chain,
  - Results in **dramatic changes in ecosystem structure**

Reef Urchin  
*Diadema* sp.



90.3% hard coral damage

Crown of thorn starfish  
*Acanthaster planci*



90% coral reef damage

Predator



- *Cheilinus undulatus* has recently been assessed for The IUCN Red List of Threatened Species in 2004.
- Listed as "Endangered"
- Listed in **Appendix II** of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (**CITES**)
- **Trade is regulated** by parties of the convention
- **Export permit** required



## Threats & Barriers to Protection

### Threats



#### Overharvesting

##### (Life Reef Food Fish Trade)

- Considered luxury food/delicacy in Hong Kong
- Highest-valued species in the trade
- Destructive fishing methods used to catch this elusive species
- High proportion from Indonesia and 68.5% <40cm in total length
- High proportion from Indonesia (profits increase up to 10 X with destructive contraband gear)

##### (Other)

- Artisanal and subsistence fisheries
- Aquarium trade

#### Habitat loss

- Destructive fishing practices
- Coastal development
- Anchor damage
- Runoff from industrial/agricultural activities
- Sediment runoff from logging operations
- Affect both adult habitats and juvenile nursery areas



#### Exacerbating factors

- Climate change
- Human population and demand growth
- Life history characteristics of species
  - slow growing,
  - delayed reproductive development



### Barriers to Protection



#### Illegal, Unreported and Unregulated (IUU) Fishing

##### (Instances of IUU)

- Assessment of 178 confiscated specimens that were entering Hong Kong from Sabah
- High proportion from Indonesia and 68.5% <40cm in total length
- But Indonesian national regulations prohibits exports of the species when <42cm total length
- significant proportion of captures and exports from Indonesia are of immature juveniles
- Extensive IUU trading between Malaysia and the Philippines
- No records of trade
- Before 2007 in Malaysia : only 1 record of export of 2 live wrasse
- Reality: large quantities exported



#### Captive breeding

- Indonesia also rears wild-caught juveniles in captivity
- Ranches fish shipped live to Hong Kong (as with wild caught fish)
- Sheer number of fish + indistinguishability between ranches and illegal wild humpheads --> difficulty in enforcement



#### Inadequacy of customs inspections

- Ship inspections by Agriculture, Fisheries, and Conservation Department in Hong Kong
- But focus on narcotics in customs and Excise departments
- Endangered species division does not have its own investigative body
- Lack of staff and manpower



#### Online trading platforms and e-commerce

- Online platforms (e.g. TMall and Taobao) and social media and chat rooms
- Facilitate illicit trade of humphead wrasse
- Make detection harder

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# Current Conservation Efforts



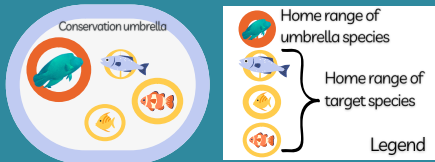
## Marine Protected Areas

### Solomon Island: Roviana Lagoon

- Community-based MPA set up in early 2000s to conserve dwindling populations as a result of commercial fishing
- Generally unsuccessful; population of humphead wrasse to have declined by 72% from 2000 to 2018
- One reason is that MPAs were too small
  - Two other studies in Palmyra Atoll and Seychelles suggested larger MPAs would be able to effectively conserve the humphead wrasse in the area
  - Explored the potential for humphead wrasse as umbrella species in MPAs

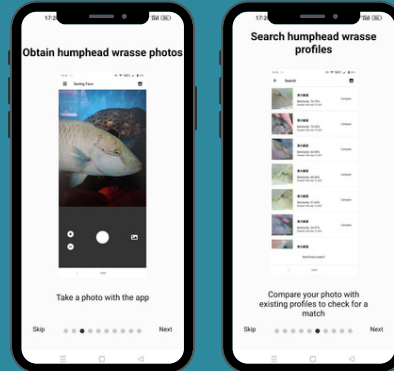
### Umbrella Species: Palmyra Atoll

- In a multi-year study of humphead wrasse, home range was compared to the size and distribution of tropical MPAs
- Determine the value of the humphead wrasse as an umbrella species for coral reef conservation
- Umbrella species are those with large home ranges that encompass many sympatric species with smaller ranges
- Powerful conservation tool: By protecting areas to maintain a viable population of the umbrella species, conserves viable populations of other target species,



## Technology: SavingFace

- Developed and launched by Hong Kong in 2021 to report illegal imports
- Uses facial recognition technology to determine if the fish sold in the market is illegal or legally imported
- Aims to empower people to be consumer watchdogs
- Signals Hong Kong's commitment to curb illegal imports



Consumers, restaurant owners and enforcement officers can then take a photo of a humphead wrasse for sale in market and compare to those in a database of legally imported humphead wrasse, aided with facial recognition technology using the fish's unique eye marks. If the user is unable to find a fish that matches, they can alert the authorities who will conduct a follow up.

- While this is a step in the right direction...
  - Technology still has limitations; not 100% accurate
  - Effective implementation would require
    - Enforcers to be committed to documenting all imported live wrasse into the database
    - Widespread usage of the app by shop owners and consumers

## Takeaways & Suggestions

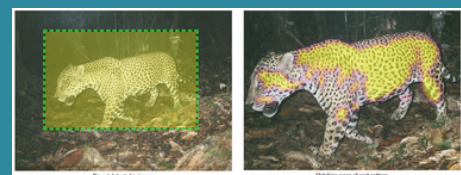
### A good choice of species for conservation can have far-reaching effects.

- Choosing umbrella species aids in conservation can have further impacts on conservation beyond itself; conservation strategies designed for umbrella species benefits co-occurring species
- e.g., calls for larger MPAs for humphead wrasse would inadvertently help in reef conservation
- Choosing species that faces a wide range of threats could have far-reaching impacts not limited to its home range
- "Ridge to reef" approach: holistic approach where the impacts of land-based practices on coastal fisheries are considered, instead of looking at them in silos

e.g., Logging in Kia region (~130km away from Roviana Lagoon, Solomon Island) leads to sediment run-off, causing continued decline in fish population. Applying "ridge to reef" for the conservation of the wrasse can call for minimisation of logging activities in Kia.

### Better enforcement can be achieved by leveraging on technology.

- Adoption of technologies similar to the SavingFace can effectively overcome constraints that enforcement efforts face such as manpower.
- Widespread adoption of SavingFace may help to circumvent the illegal fish trade on a global scale.
- Can be employed for more species
  - Wildbook uses algorithms to identify individual animals based on their defining patterns, such as spots and stripes. The technology has extended to 53 species so far.



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# Community-based Management of *ARAPAIMA GIGAS*



## KEY STAKEHOLDERS



### PROBLEM pt. I

*What is going on with earth's largest freshwater fish, Arapaima gigas?*

Reports of local extirpation in various locations in the Amazon River due to overfishing by locals and commercial fishing fleets.

Due to low fecundity and late maturation, the Arapaima population cannot recover fast enough naturally to survive the overfishing.



### COMMERCIAL FISHERMEN

As a popular aquarium fish, the Arapaima is well sought after by profit-driven commercial fishermen. They are also fished out of the river to supply aquaculture stocks.

These shipping fleets fish for Arapaima indiscriminately (i.e. they do not release juveniles back into the river) which exacerbates the slow maturation of the fish.

*May put pressure on the Brazilian government to allow greater access to the natural Arapaima stocks along the Amazon river.*



### LOCAL TRIBES (FISHERMEN)

Livelihood and way-of-life deeply tied to the Arapaima fish:

- Source of income (trade)
- Source of food
- Cultural and mythological icon
- Historical importance

Indigenous tribes fell into poverty as a result of the failed latex economy, turning to the abundant Arapaima as the next source of income. In a race to rise above the poverty line, Arapaima were overfished to the point of local extirpations.



### NGOS

Both humanitarian and conservation-based NGOs have involved themselves in a collaborative multi-partnership in the mid-Juruá region, known as the **Mid-Juruá Territory Forum** to aid the local community and protect its biodiversity.

- **ASPROC**: coordinates the management of arapaima under Arapaima Collective network
- **AMARU**: active in arapaima sustainable-management research projects
- **AMECSARA**: training local tribesmen to be advocates against misuse of natural resources
- **ASMAMJ**: battling for female participation and agency



### BRAZILIAN GOVERNMENT

Have a **civic duty** to protect the Amazonian indigenous tribes that fall under their jurisdiction.

- Implemented sustainable forest-use nature reserves
- Legitimised the 'fishing accords' of the Juruá River tribes people

Must also **balance this against the need for economic growth**; hence must consider the demands of both commercial fishermen and ecotourists/angler hobbyists.

### PROBLEM pt. II

Effects of overfishing/illegal harvesting:

- reduced arapaima population size and smaller genetic pool
- leads to low genetic diversity
  - lowered resilience to environmental changes
- loss of apex predator causes a trophic cascade



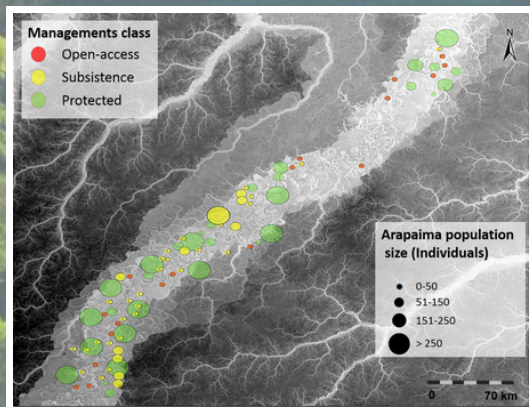


# Community-based Management of *ARAPAIMA GIGAS*



## CURRENT SOLUTION

### FISHING ACCORDS



Lake was distributed into **three categories** during the dry season:

- (1) Open-access lakes
- (2) Subsistence lakes
- (3) Protected lakes

Local communities were granted authority by government to form armed surveillance units to patrol Subsistence-use and Protected lakes.

**Success:** helped to control overexploitation, illegal and unsustainable fishing of Arapaima

**Possible problem:** corruption among the local tribesmen due to human greed, leading to black market sales under the table



### ARAPAIMA COUNTING



Characteristic of Arapaima: *obligate air-breathers that rise to the surface of the water*

- Locals were taught to use the arapaima's breaches to the surface to count the arapaima abundance
- Count used to determine recovery rates
- Data was shared with government agency IBAMA who then enacted fishing quotas

**Possible problem:** subject to human error, may be inaccurate; could be resolved by gaining more funding to invest in proper tracking equipment like RFID tags

### LOCAL EMPLOYMENT

- Income opportunities were created for the local communities
- Sustainable fishing efforts allow for the local fishermen and the converted illegal fishermen to earn honest money for a living



### ARAPAIMA RECOVERY

- Arapaima numbers recovered, highest being at protected lakes
- The stricter the regulations regarding the lake, the higher the rate of recovery

## OUTCOMES

### CONSERVATION

- Collaboration between local community, NGOs, and Government not only fosters communal pride through the use of CBM, but conservation of Arapaima population was made possible
- Protects other freshwater species within the patrolled lakes

### SUMMARY

However, circumstances are constantly changing, and **solutions must evolve** to keep up.

- Arapaima supply > demand
- Competition with captive-bred arapaima fish farms

Both diminishing profits earned by local fisherman, future improvements to this CBM strategy must aim to help the locals remain competitive and incentivised to protect this umbrella species.







# THE JAGUAR JOURNEY

JAGUARS  
HAVE LOST OVER

48%

OF THEIR  
GEOGRAPHIC RANGE  
IN THE  
PAST 2 DECADES

Jaguars are  
threatened  
by **habitat  
loss**

Agricultural Development

Infrastructure Development

## IMPORTANCE OF JAGUARS

### UMBRELLA SPECIES

Jaguar populations  
and habitat overlap  
with **high-quality  
habitat** for other  
mammals.

### KEYSTONE SPECIES

Jaguars maintain  
**structure and  
functions** of  
ecosystems.

### HIGH ECONOMIC VALUE

Jaguar habitats  
**safeguard many natural  
resources**, such as water  
sources, which millions  
depend on.

### CLIMATE CHANGE MITIGATION

Jaguars' range  
covers at least  
**4.8 million km<sup>2</sup>** of  
forests.

## CONSERVATION EFFORT:

# JAGUAR CORRIDOR INITIATIVE & 2030 CONSERVATION ROADMAP

With the jaguar's range spanning different countries and habitat types, localised reserves were ineffective at slowing down the loss of jaguar geographic range. Jaguars needed a solution that would overcome political boundaries and focus on its entire range.



In the 2010s, conservationists Zeller, Rabinowtiz, Salom-Perez, and Quigley proposed the **Jaguar Corridor Initiative (JCI)**: a **range-wide** network of **182 corridors** connecting **90 jaguar population centres** from Mexico down to Argentina.

In 2018, the **Jaguar 2030 Conservation Roadmap for the Americas** was launched: a multilateral initiative aiming to strengthen the JCI by securing **30 priority jaguar landscapes** by **2030**, through stimulating sustainable development, reducing jaguar-human conflict, and enhancing security and connectivity of core landscapes.

This massive effort requires collaboration on local, national, and transboundary levels. See the next page for more details!



# LOCAL

Several of the targeted corridor sites are located on **privately-owned land**

Example: Monoculture agricultural plantations and cattle ranches

Panthera **actively engages the local communities** in jaguar conservation efforts through **education** and provision of **economic incentives** to form **Other Effective Area-Based Conservation Measures (OECMS)**

Example: Jaguar Friendly Coffee Certification



# NATIONAL

- 1 Panthera works with local corridor councils to designate **protected areas**
- 2 **Balance** national infrastructural development (roads, dams etc) with conservation needs  
 A Work in Progress: Mainstream development of wildlife bridges/tunnels into national strategic planning documents
- 3 **Raise awareness** of the importance of jaguar conservation on a national scale
- 4 Provide **funding** for those affected by conservation areas

# TRANSBOUNDARY

In 2019, representatives of more than 20 Governments and Organizations of Regional Economic Integration **officially declared jaguars as an emblematic species of the Americas.**

The Jaguar 2030 Roadmap was thus implemented.

The use of an iconic and emblematic species can unify countries!



Importance in maintaining ecosystem health



Symbol of fight against illegal wildlife trade



Spiritual and cultural icon

**More** needs to be done!

- Greater transparency
- Progress tracking and goal evaluation mechanism
- Greater commitment between countries
- Concrete and specific deliverables



## DIVERSIFYING CONSERVATION STRATEGIES IS IMPORTANT.

Beyond protected areas, **range-wide conservation strategies** which prioritise **connectivity** and **concurrent community development** may be more effective and ethical, especially for species with transboundary ranges that overlap with human activity.



## DIFFERENT CONSERVATION ETHICS AND APPROACHES CAN MEET IN THE MIDDLE.

Conservationists may be guided by a **preservation ethic** and **Conservation Biology** approach, but may come up with strategies that reflect a **resource conservation ethic** and **New Conservation** approach, to better resonate with local communities.



# Blast Fishing In the Philippines

## The Problem:

Philippines is a country that relies heavily on fish for nutrition and export. They have a history of using dynamite fishing as an unsustainable and destructive practice, which continues to this day.



## Consequences:

1. Dead coral reefs
2. Degradation of fish habitat
3. Overexploitation of fish
4. Ecosystem collapse
5. A short term economic gain for a long term economic loss

Arrow colours key:

Green = Incentivisation or good effects  
Blue = Monitors, checks, or interactions  
Red = Disincentivisation or deleterious effects

# The solutions



## Tighter enforcement:

1. Regular patrols
2. Penalties
3. Track bomb-making materials
4. More inspection points
5. Reduce corruption

## Alternative livelihood:

1. Sustainable Tourism
2. More job opportunities



## Cultivate ocean stewardship:

1. Public awareness
2. education

# Summary

Despite current actions, the issue of blast fishing in the Philippines has not been eradicated, and it still causes negative impacts on ecosystem and sometimes hurts people. Further sustainable solutions should be implemented with the local community as the centre of focus.



# TROPHY HUNTING OF BLACK RHINOS

By Grace, Janine & Jasmine

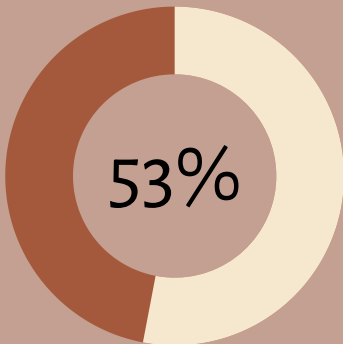
the hunting of wild animals - for sport

## The Excess Male Problem

Male rhinos are highly territorial; fighting to defend territory



Male-biased sex ratio at birth (53% for black rhino); some populations will have more males by chance

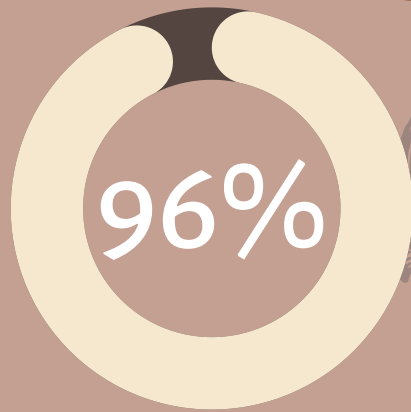


Deaths from fighting increased as black rhino densities increased



Poaching

Habitat Loss



Decline 1975-1995



## Solution: Trophy Hunting



Maximum of 5 black rhino trophy hunts per year in South Africa and Namibia respectively

Hunting occurs under strict permit conditions where old, post-reproductive bulls that may have a detrimental effect on the overall rhino population by being aggressive or territorial are selected



Rhino populations are **density-dependent**

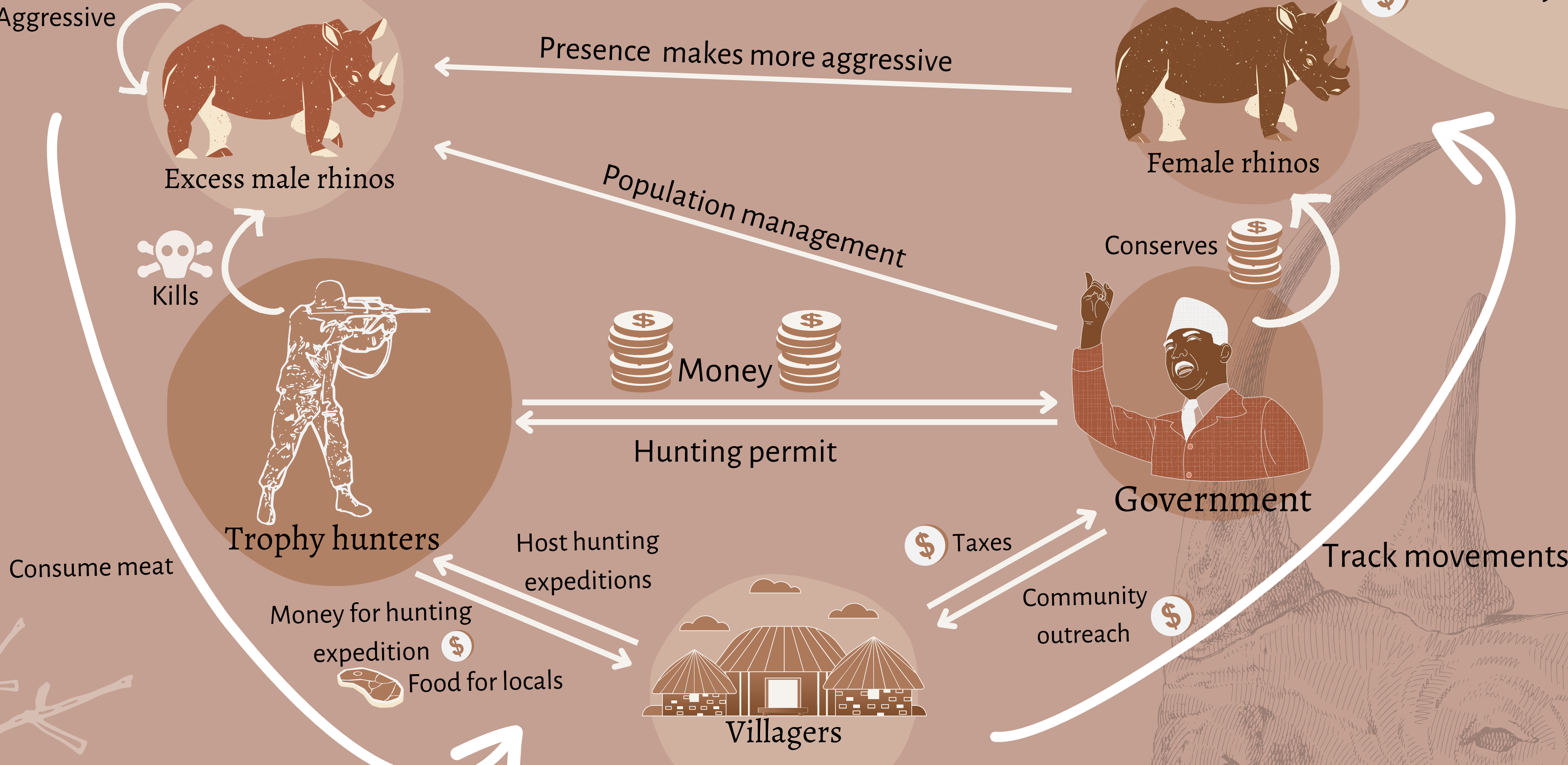
Recommendations to maintain productive densities through **removal of males**





# STAKE HOLDER INTERACTIONS

 = more money  
 = less money



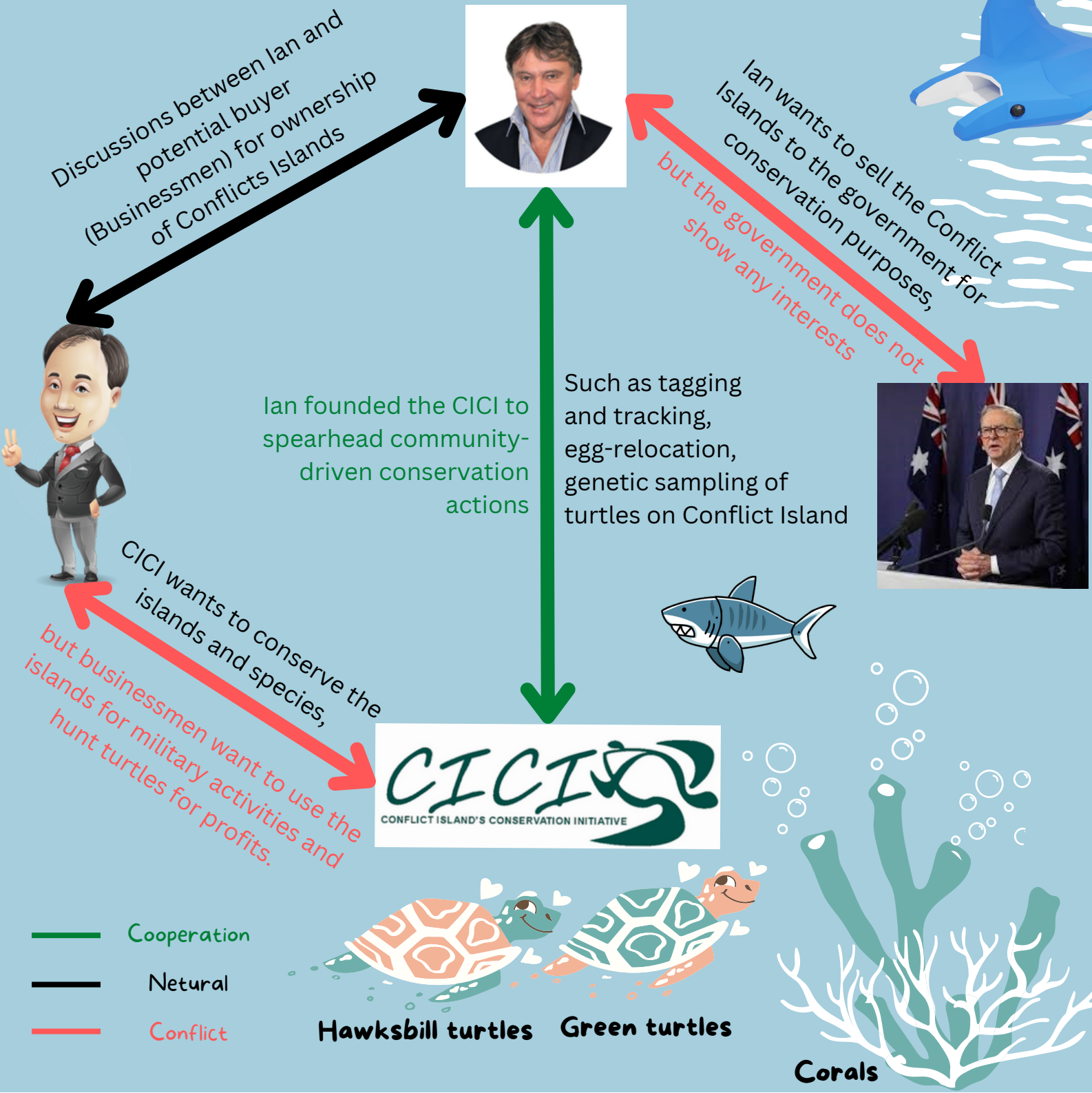


# CONFLICT ISLANDS

A complicated conflict among conservation interest, private owner and the government

## THE PROBLEM:

Ian Gowrie-Smith owns a set of private islands known as the Conflict Islands which possesses high conservation value due to ecologically valuable coral atolls, green and hawksbill turtles. However, many stakeholders have their sights on these islands for various reasons, but it is still Ian's personal dream to continue conservation efforts on the islands even after selling them despite the lack of interest from local governments and businessmen.



# THE POSSIBLE OUTCOMES:



Ian sells the private business men to further their personal agenda with no regards on turtles and corals conservation

The government takes over ownership of the islands at a subsidised price while still conserving the local biodiversity alongside CICI



Ian holds on to the ownership of Conflict Islands and continues community-based conservation under CICI

## SUMMARY

Ian Gowrie-Smith, the owner of Conflict Islands is looking to sell the islands with the goal of conservation in mind.

Several stakeholders are interested in the Conflict Islands, but currently not the Australian government. Foreign businessmen are interested but are not looking to conserve the ecological value of these islands.

Ian's choice of whom to sell these islands to will decide the fate of the islands and the species relying on them.  
Help Ian to make a choice!

## THE TEAM

**James the Busine\$\$man**



**Chen Yu  
Gowrie-Smith**



**Shi Yang Turtle**





# Rewilding in GORONGOSA

1998 **Pleistocene**

Michael Soule and Reed North introduced the Pleistocene Rewilding idea for North America

1977

**CIVIL WAR = DESTRUCTION**

1992

Collapse of ecosystem, degradation of environment, further dwindled the number of wildlife populations

2006

**Start of Rewilding**

**2010**

Positive results of Rewilding:  
**Wildlife population increased**

**Strong partnership** between a non-profit organization (GRP) and the government,



**SUCCESS!**

SCIENCE-BASED

COMMUNITY-BASED

GOVERNMENT

NGOs

**BENEFITS OF  
REWILDING**

Eliminating inequalities

Elevating poverty

Increased livelihood opportunities

Community resilience



# Applications to SOUTHEAST ASIA & CLOSER TO HOME

Multidisciplinary and progressive model:  
Science + Community-based approaches

NGOs

GOVERNMENT

SUCCESS

SCIENCE-  
BASED

COMMUNITY-  
BASED

Fragmented landscape/  
trans-boundary issues

Poaching / Snaring

High human density

Inadequate wildlife protection

CONSIDERATIONS:

LEVERAGING ON EXISTING SUPPORT FROM  
COMMUNITY/NGO/GOVERNMENT/COMMERCIAL ENTITIES

FEASIBILITY

LIMITATIONS

The animals near or far,  
small or grand -

Conservation seems like a second plan

Destruction causes Fear,  
But fear brings us Hope,  
And hope shows the Truth.

The Community,  
does not say You & I,  
but calls to Us & We.

Together with Science, showing us,  
The best ways to last.

This is the light as clear as day,  
A rocky road that had us awake.

To keep trying, and fix our mistakes.

LSM 4262

Ian Chew

Jharyathri Thiagarajah

Pamela Ng

Spencer Yau



# SAVING SOUTH SUDAN'S BIODIVERSITY

Chloe Foo | Lee Wei Qiang  
Dennis Tan | Shermaine Teo



## ECOSYSTEMS RECOVERING FROM DECADES OF WAR



### Savanna Woodland

An oasis for large wildlife found in the Congo Basin



### Montane Forest

Key biodiversity hotspot, many endemic species



### Flooded Savanna/Grasslands

Unrepresented globally, home to world's second-largest animal migration



### The Sudd

Hydrological regulator and Ramsar Wetland of International Importance

## STAKEHOLDERS

### GOVERNMENT

VS.

President Kiir: Vice President  
Sudan People's Liberation Movement (SPLM)  
Riek Machar: SPLM-in-opposition

### PARK RANGERS

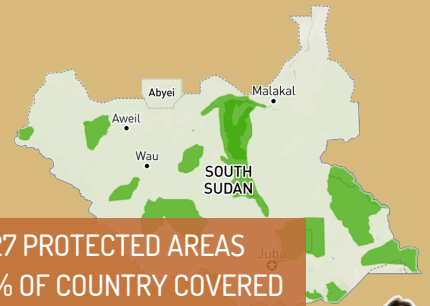


### REBEL GROUPS

### NGOs & CIVILIANS



### CORPORATIONS



27 PROTECTED AREAS  
15.5% OF COUNTRY COVERED

## LEGACY OF THE WAR



### SUSTAINING THE WAR

Poaching for bushmeat and trade to finance arms groups



### PROLIFERATION OF SMALL ARMS

Large scale hunting easier, disregard for young and pregnant females



### CIVIL UNREST

Deliberate destruction of green spaces out of discontent

## THREATS

## NATION-BUILDING NEEDS



### INFRASTRUCTURE DEVELOPMENT

**HABITAT LOSS**  
Deforestation and large-scale land use changes. Rural trunk roads impede across migration routes.



### INDUSTRIAL DEVELOPMENT

**POLLUTION**  
Overuse of agrochemicals and oil spillages from oil exploration into Sudd wetlands

**ECOSYSTEM DEGRADATION**  
Alteration of water flow regime and downstream ecosystems from construction of dams, dykes and canals

## CHALLENGES TO CONSERVATION

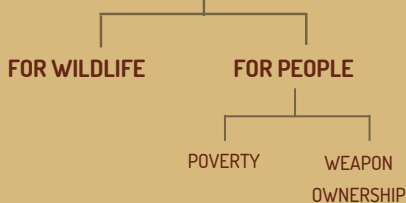
- Lack of knowledge
  - No capacity building on wildlife management
- Lack of security
  - Land mines within protected areas present hindrance for rehabilitation, research, tourism
  - Wildlife service has less ammunition than poachers and rebels
  - Decline in respect for traditional authority

## CHALLENGES TO CONSERVATION

Lack of funding

- Funds allocated to other nation-building needs
- Rangers make less than USD \$100 (S\$141) a month and often go half a year without a salary
- Allocation of 10 million SSP (S\$108,380) considered "woefully inadequate" by local authorities

## LACK OF SECURITY



## LACK OF KNOWLEDGE



## LACK OF RESOURCES



# NATIONAL BIODIVERSITY STRATEGY AND ACTION PLAN (2018-2027)

## OBJECTIVES

- Develop conservation frameworks and plans in accordance with the Aichi Biodiversity Targets

Aim: To address issues that arose from War and Nation Building

## OVERARCHING THEMES

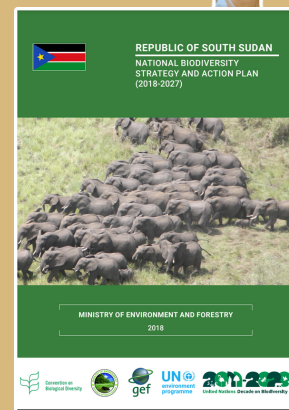
- 1 Implementation of Biodiversity Management Actions and Resource Mobilisation
- 2 Establishment of Coordination and Capacity Development
- 3 Knowledge and Information Management

## STRENGTHS ✓

- Strong focus on governance and stakeholder-coordination frameworks
- Integrates conservation goals into economic development
- Emphasis on capacity building and public participation

## WEAKNESSES ✗

- Underlying drivers of poaching not addressed
- Lack of security for conservation personnel not resolved



## PROPOSED SOLUTIONS

### DISARMAMENT

- Reduces intensity of poaching
- Improves security for communities and conservation personnel
- Extremely complex goal to achieve
  - Failed disarmament attempts in the past led to deaths of soldiers and civilians



### PEACEBUILDING

- Diplomatic solutions needed to keep peace within the country
- Measures should involve:
  - Meaningful conflict resolution
  - Long-term reconciliation processes
  - Strengthening parties' ability to work together for mutual benefit



## CONCLUDING THOUGHTS

Being the newest country in the world, South Sudan is placed in a unique position to balance its needs of nation building and biodiversity conservation while tackling its long legacy of warfare and political unrest. It is amazing that within 10 years of nation-building, South Sudan has already joined the CBD and developed strategic plans for conservation despite its internal struggles. With many of its conservation plans still in their fledgeling stages, South Sudan's conservation story is only just beginning and there is much to look forward to...

## FOOD FOR THOUGHT

1. Should conservation be abandoned in times of war?
2. How should developmental and nation-building needs be balanced with the conservation needs in new/developing countries?



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# Reconciling Conservation by Community and Corporation

A Case Study of the Mangrove Rehabilitation Efforts



## Mangroves

- Store **blue carbon**
- **Ecosystem services**
- **Indonesia**: greatest mangrove coverage & diversity
  - **BUT** - threatened by exploitative activities.



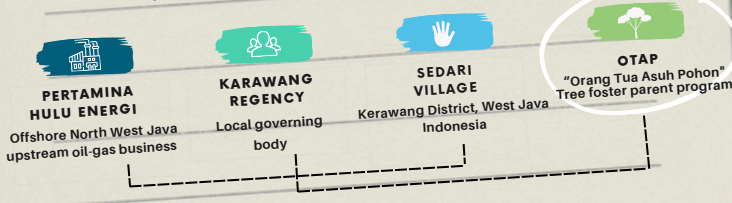
Mangrove restoration should be tailored according to the managing local community to make it more effective! In Sedari, it was a **multi-collaborative effort**:

Sedari in Karawang, Indonesia was one of the coastal villages that suffers from **sediment abrasion**

Shrimp and fish ponds called "tambak" degraded what once were mangrove plantations - making coastal flooding worse



## Actors and Actions



Green investment process:

- Employees & their families invest in OTAP
- Company invest equal amount
- Fund used to purchase seedlings and other related activities



## OTAP Stages

★ Factors contributing to program success

### Phase 1



- Sedari Village - 2012
- 14.3% mangroves survived
- Less community involvement
- Immature planting strategy

- Nov 2013
- 100% survival (replant dead)
- No monitor & evaluation
- Lack attention to pest problem



### Phase 2

### Phase 3



- Mar 2014
- 100% survival (replant dead)
- Capacity building
- Monitor & evaluation ★
- Pest control
- Collaboration amongst private sector, community & government ★

- Sedari Village - Jun 2014
- Same as phase 3
- Outreach programs
  - Education
  - Eco-tourism



### Phase 4





# Community benefits

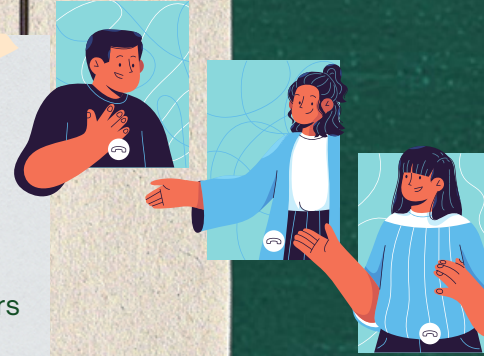


## Environmentally

- Reduce abrasion severity
- Beautify community

## Economically

- Additional income
  - Selling seed
- Alternative livelihood
  - Eco-tourism related work
    - Rent boat, sell food to visitors
- Fisheries
  - Recovered mangrove forest help to shorten harvest wait period



- Oil spill in Karawang
- July 2019
- Caused by oil well leak
- **Culprit:** Pertamina, the initiator of OTAP



The same area experienced an oil pipeline explosion and a pipeline leak in 2018 and 2021.

## CONCLUSION

### FUTURE

- a. Transparent program
- b. Active communication amongst parties
- c. Government offer alternative livelihood to fish farmers
- d. Private sector develop stronger surveillance program

### KEYS TO SUCCESS

- Capacity building
  - Effective planting strategy
- Collaboration amongst all three parties.

### Group I:

Louise Angeli Asnan  
Yuqi Song

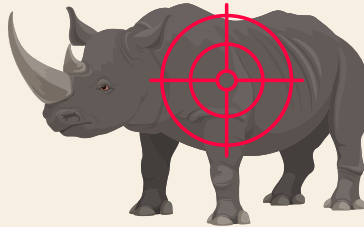
Zelena Zeng  
Zoey Duan Wanzhen

LSM4262  
AY 22/23

# A HORNY ISSUE:

## The Rhinoceros Horn Trade

White & Black Rhinoceros (rhinos) are keystone species vital to ecosystems through geo-forming, circulating nutrients, hosting ectoparasites and maintaining wild grass.



<50

WHITE RHINOS BY 1910s

Hunted for:

- Sport
- Meat & Skin
- Traditional Chinese Medicine

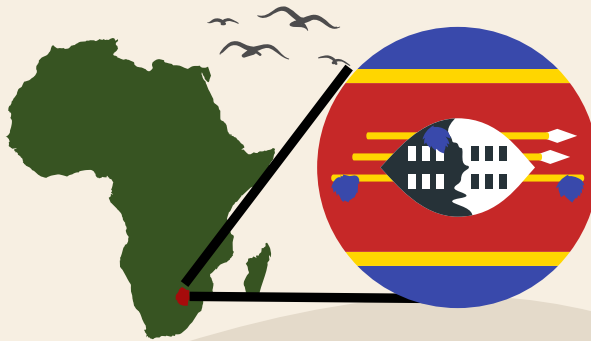


Across the world, countries have entered an international agreement: Convention of International Trade in Endangered Species of Wild Fauna and Flora. Where no commercial trade of Rhino horns are allowed, but Rhinoceros can be traded for certain populations.

IN  
ESWATINI,



1 IN 3 LIVE BELOW  
THE POVERTY LINE



Eastern flank of South Africa



330 kg Stockpiled  
rhino horn

Given low poaching levels, Eswatini appeals for the sale of stockpiled rhino horns and sustainably harvested shavings for increased standard of living for its' people.

In response to Eswatini,

ANIMALS

### Countries reject proposal to open up rhino horn trade

Countries voted against eSwatini and Namibia's proposals to loosen restrictions on the trade in live rhinos and rhino parts.

BY RACHEL FOBAR |  
PUBLISHED 26 AUG 2019, 08:11 BST

References: please visit [tinyurl.com/lsm4262references](https://tinyurl.com/lsm4262references)



# LEGALIZATION:

## Approval

Supported by the Eswatini government and Private Rhino Owners Association (PROA)

### Pros:

- Revenue can be used to fund anti-poaching efforts
- More money for conservation
- Park development and resource
- Remunerate park rangers
- Horn harvesting can be done sustainably

### Cons:

- Loophole for illegally poached horns to enter the market
- Undermine years of hard work to reduce demand for horns
  - Removes stigma of rhino horn
  - Leads to increase in demand and can drive unsustainable harvesting

## The Way Forward

- Strict criteria for harvesting rhino horns
- Continuous monitoring of rhino population
- Increase transparency through compulsory reporting and subject to scrutiny by international parties (UNODC, CITES)
- Central Selling Organisation (CSO)

## Banned

### Pros:

- Does not fulfil demand
- Strict monitoring and heavy punishments
- Maintain conservation efforts

### Cons:

- 330 kg stockpile of horns underutilised
- No revenue for the parks
- Ineffective - people are still illegally doing it

## The Way Forward

- More international collaboration
- “Richer” countries should support conservation efforts in the parks
- Combat and eradicate syndicate’s operation
- Stockpile of horns can be loaned for research
- Monitor population and revise conservation plans
- Provide alternative economic opportunities
- Reduces economic need to poach

### LEARNING POINTS

It's complicated! This issue sits at the intersection of economics, conservation, politics and behavioural science. No matter whether you are pro or anti trade, poverty is the root problem must be ameliorated to remove the financial incentives that poaching bring. Engagement and empowerment is key.

### THE TEAM:





# ON THE RUNWAY:

## CATWALKING TO SAVE THE MALAYAN TIGER

Angelica Ang, Agnes Chan, Lilly Deluca & Ryan Foster

### THE MALAYAN TIGER *Panthera tigris jacksoni*

The Malayan Tiger (*Panthera tigris jacksoni*) is native to the southern and central regions of the Malay Peninsula, which consists of Southern Thailand and Peninsula Malaysia (Kawanishi, 2014; "Malayan Tiger", 2019). It is genetically different from the Indochinese Tiger, or the *Panthera tigris corbetti*, and was established as a subspecies in 2004 (Luo et al., 2004).

The range of the Malayan Tiger spans across three landscapes: the **Main Range**, **Greater Taman Negara** and the **Southern Forest**, which each has a priority area for tiger conservation (Figure 1, from MYCAT, n.d.).

*Panthera tigris jacksoni* has been listed as **critically endangered** on the IUCN Red List, with ~80-120 individuals left in the wild, and the record of a continuously declining population (Kawanishi, 2014).

The species bears great **cultural** significance for Malaysia as its representative national animal (Dipiazza, 2006). It is also of great **ecological** importance, safeguarding Malaysia's farmlands by keeping their burgeoning wild boar population at bay (Ickes et al., 2005).

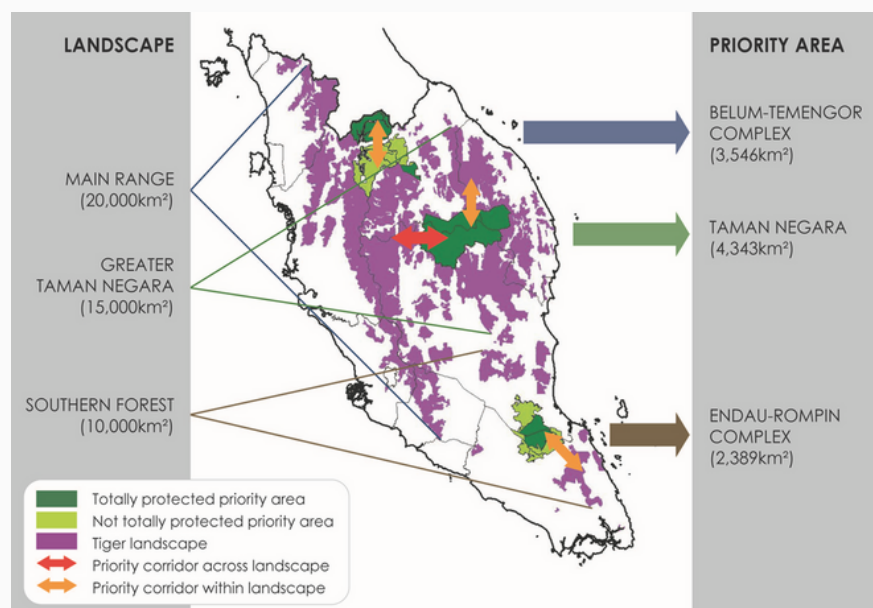


Figure 1: Landscapes and Priority Areas Inhabited by the Malayan Tiger (MYCAT, n.d.)

The **Malaysian Conservation Alliance for Tigers (MYCAT)** is a collaboration between various **NGOs** and the **Malaysian government**, seeking to protect the Malayan Tiger through initiatives such as **reforestation**, **community outreach** and a **wildlife crime hotline** ("Who We Are", 2019).

### MAIN THREATS



#### Poaching and illegal wildlife trade

Poaching is the number one threat to the Malayan Tiger. The illegal wildlife trade drives demand for poaching.



#### Deforestation and habitat degradation

The home of the Malayan Tiger is being lost due to logging for development, and palm and durian plantations.



#### Declining prey base

The Malayan Tiger's prey is also hunted by humans, resulting in a decline in food.



#### Human-tiger conflict

Human and tigers compete for resources and space, resulting in death of livestock and potential danger for the locals, which motivate removal of the Malayan Tiger.

("Threats", 2019)





## CITIZEN ACTION, IN ACTION!

In 2010, in response to the direness of the Malayan tiger situation, MYCAT launched its CATWalk initiative - a citizen action, anti-poaching, anti-deforestation surveillance walk in the Sungai Yu Ecological Corridor (Figure 2). The corridor connects two of the key ranges of the Malayan tiger. Ensuring the safe passage of tigers through this tract is critical for maintaining genetic diversity and long-term survivability.

CATWalkers spend three days patrolling the corridor accompanied by a CATWalk staff member and a community ranger from the Batek tribe. The goal of CATWalk is simple - to deter poachers by making a presence. CATWalkers "become the eyes and ears of the forest as [they] walk."

So far, CATWalk has succeeded in increasing wildlife in Sungai Yu Ecological Corridor, decreasing the number of snare traps in and around the corridor, and delivering empowerment, income and a renewed sense of ownership to the local community.



Figure 2: Sungai Yu Ecological Corridor - home of the CATWalk (MYCAT, n.d.)

## FUTURE PLANS

MYCAT's ambitions for the future are two-fold: to continue its current, direct response to dwindling Malayan Tiger numbers by placing its 'eyes and ears' on the ground (via CATWalk), and to amp up its indirect, long-term approach, through research and education.

With the success of CATWalk, it is hoped that this citizen-action model can be deployed not only for the conservation of the Malayan Tiger, but for many other species across the tropics that suffer from the same threats. The 'Leopard Quest' convened by the Singapore Wildcat Action Group (SWAG) is but a small-scale example of this.

Though, MYCAT's greatest ambition lies in *education*. In particular, MYCAT hopes to educate the next generation through roving school exhibitions. It is imperative that a bond with nature is established at a young age as a preventative method of conservation. With a combination of all of the above, and an increased awareness of the threat's tigers face, the overall goal of MYCAT is to save the Malayan Tiger from the brink of extinction - an ambition we must all embrace.

*"We become  
the eyes and  
the ears of  
the forest as  
we walk..."*



Scan the QR code to join an upcoming CATWalk!



# Conservation effectiveness of protected areas

--a case study of Alto Mayo Protected Forest, Peru



&



- The "E" in the care principles of PA design
- conservation efficiency
- Human well-being vs. PA

VS



VS

→ “The General conflict in PA”

*Whether terrestrial protected areas are effective in achieving their environmental and socio-economic objectives ?*

## “Facts of Peruvian Amazon Forest”

**Society:** Raising environmental crime and entrepreneurial criminal activities, impacts on indigenous tribes in the forests, political instability and crisis cause lack of regulation to the problems.

**Environment:** Deforestation leads to biodiversity, habitat destruction and carbon emission. Agriculture also causes soil erosion, river siltation and water contamination.



**Economics:** Logging and unsustainable farming lead to economic growth but the practices are unsustainable, cheap labor involve of indigeous communities.



# The Solutions



# 1

## Environmental

Through the trade of carbon credits, buyers neutralize a portion of their carbon footprint, and forests survive to absorb climate-warming carbon.

# 2

## Social and Economical

- Balanced Stakeholders



### International Governments:

REDD+ pays developing country governments not to cut down forests.



### Private Sectors:

Enabled the local coffee industry to increase their production, quality of coffee and income.



### Social Organizations:

Enable local coffee cooperation to make immediate financial payments, thus building their reputation and trust..



### Local Communities:

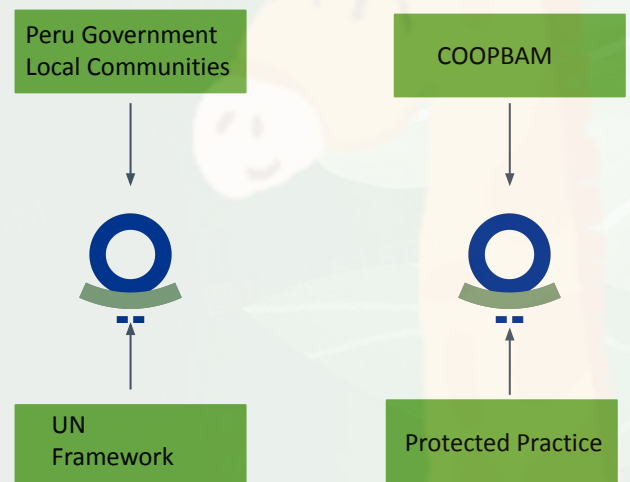
They agreed in exchange for technical and financial support.



photography by PETER CHIRA

## Social and Economical

- The need for an intermediary: CI



## Social and Economical

- **Educations:** CI and the Peruvian National Park organized workshops for young people.
- **Accounting:** There are independent audits after implementation to evaluate its success.





































# Summary

Although there was a fierce debate about unsustainable practices and actual local stakeholders in the Alto Mayo forest in Peru. This project by Conservation International, has reconciled government officials, the private sector, civil society and local farmer partnerships through initiatives such as carbon credit and financial support. By 2020, deforestation in the Alto Mayo Reserve has fallen by 59%, generating over 8.4 million metric tonnes of emissions reductions, helping to protect the biodiversity while providing nearly 500 sustainable jobs. Generating benefits for local people, biodiversity conservation and community carbon emissions, making it is one of the few REDD+ projects in the world that continues to be successful.



This compilation of case studies embodies the work of 11 groups of 42 exceptional individuals over these past 13 weeks.

In here, you will find the **lessons** we've learnt as a class, the **hopes** we hold for our world, and the **dreams** we dare to dream for our shared future.

 AHBAR ALAM	 CHEW SENG YIAN IAN	 DIVINA VICKNESH	 JAMES NG TZE CHIAN
 ALIDIA BINTE ADAM LEW	 CHLOE FOO YUNN SHAH	 DUAN WANZHEN	 JASMINE ONG JIE MIN
 ANGELICA ANG TING YI	 DELUCA LILLY ROSE	 FOSTER RYAN	 JHARYATHRI THIAGARAJAH
 CHAN MAN SUM AGNES	 DENNIS TAN WEI JIE	 HAN WEIYI	 JIN ZIQI
 LEE WEI QIANG	 LIN LI JERRY	 OW JUN NING CLAIRE	 SEAN NG JING WEN
 LI CHENYU	 LOUISE ANGELI ASNAN	 PAMELA NG HUAI KEOW	 SHANICE NG WEI JING
 LI SIJIA	 MUHAMMAD HILMI B SAIFULBAHRI	 RACHEL ONG RUI XUE	 SHERMAINE TEO HUIMIN
 LIM HUI MAY VICTORIA	 ONG XIANG TING, ALICIA	 SEAN NEO ZHI RUI	 SHERYL CHAN SI ERN
 SOH JANINE	 TAN SHI YANG	 YEO JIE YI DANA	
 SONG YUQI YUKI	 TASHA PHUA XINCI	 ZENG JINGZHI ZELENA	
 SPENCER YAU JIA MING	 TEH ZI EN, GRACE	 Yeo Hui Jing Hannah	
 TAN HUI MIN STEFFI	 WU MINLI	 Chan Zhi Wen, Ian	

The animals near or far,  
small or grand—  
Conservation seems like a second plan  
Destruction causes Fear,  
But fear brings us Hope,  
And hope shows the Truth.  
The Community,  
Does not say You & I,  
But calls to Us & We.

Together with Science, showing us,  
The best ways to last.

This is the light as clear as day,  
A rocky road that had us awake.

To keep trying, and fix our mistakes.

- Pamela Ng  
(with Ian, Jhar and Spencer)

Be the best tree you can be!