Mangrove Forest Landscape Restoration In the North of Vietnam

Community-based mangrove reforestation and disaster risk reduction Implemented by Viet Nam Red Cross 1994-2015

"Forest Landscape Restoration: Making it Happen" Conference | Manila | Feb 25th to 27th, 2019

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ECOLOGICAL FUNCTIONS

(Millennium Ecosystem Assessment , 2005)

Provisioning

Regulating

Cultural

Supporting

Regulating

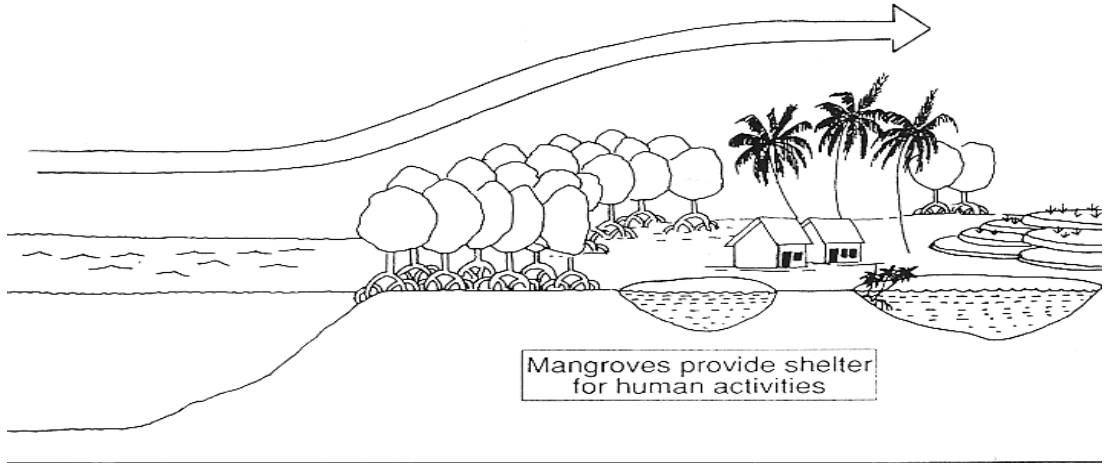
Coastal protection Function

Coastal Protection against coastal erosion, waves, currents, storms, flood and natural calamities

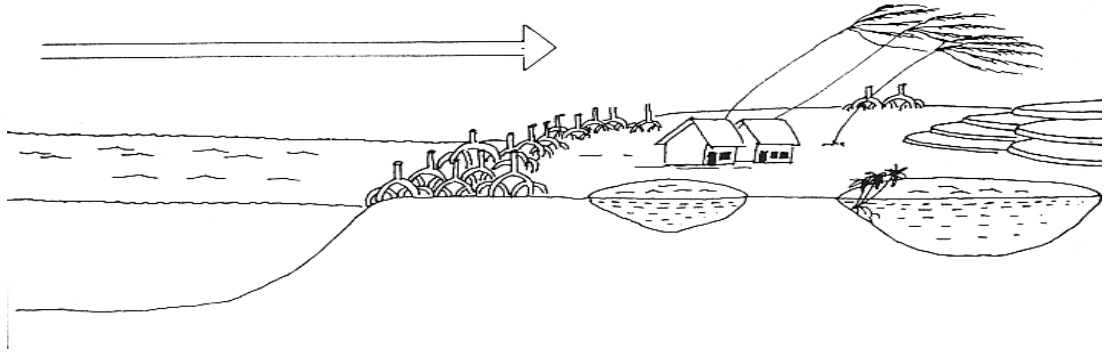
Mangroves prevent soil erosion and trap sediment

“Engineers” building and maintaining physical structure of the habitat

Restorated forest protect coastal

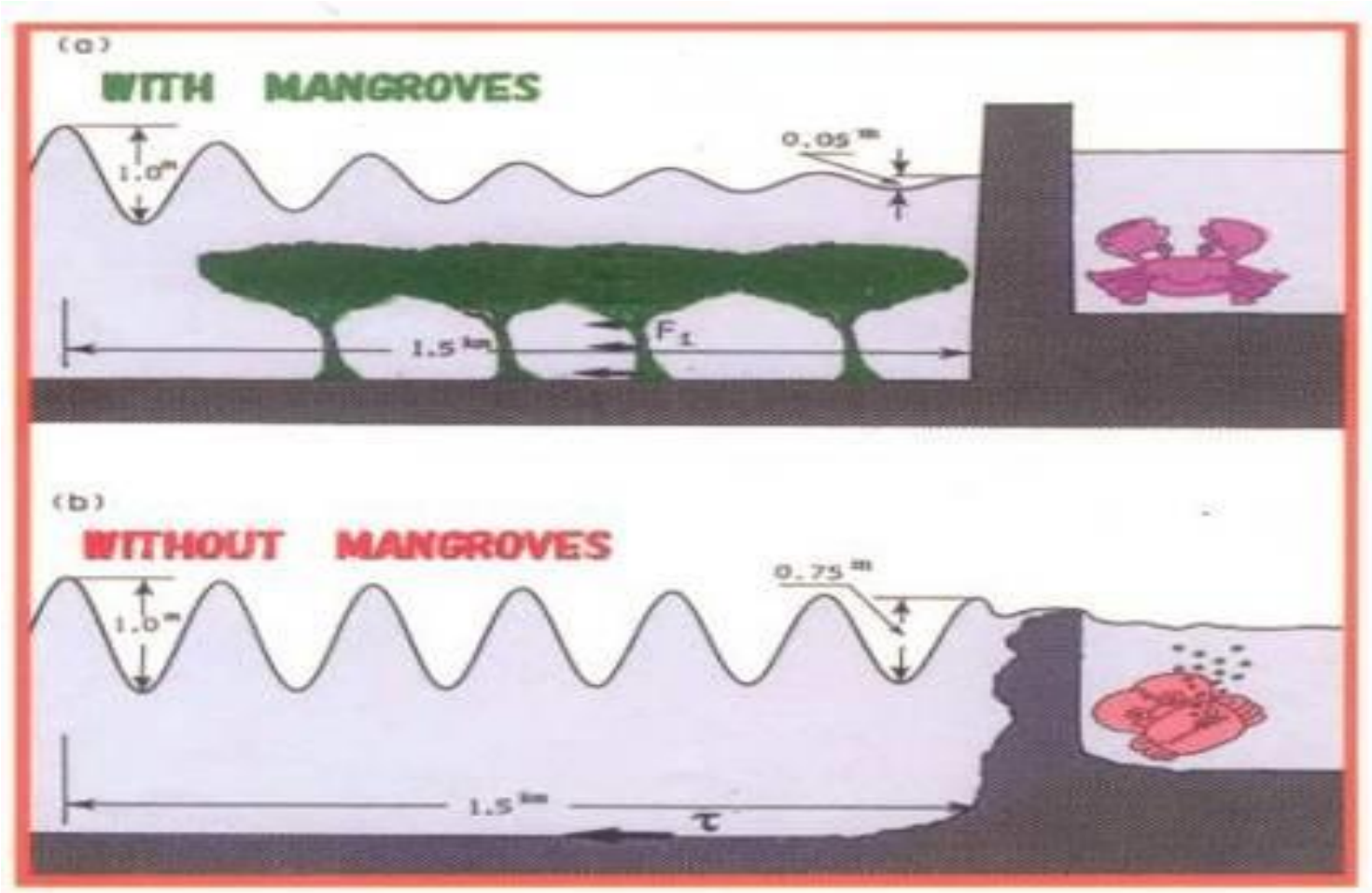


Mangroves have functions protection the coastline, coastal communities of wind, storm and stunami… (Davies & Claridge 1993)



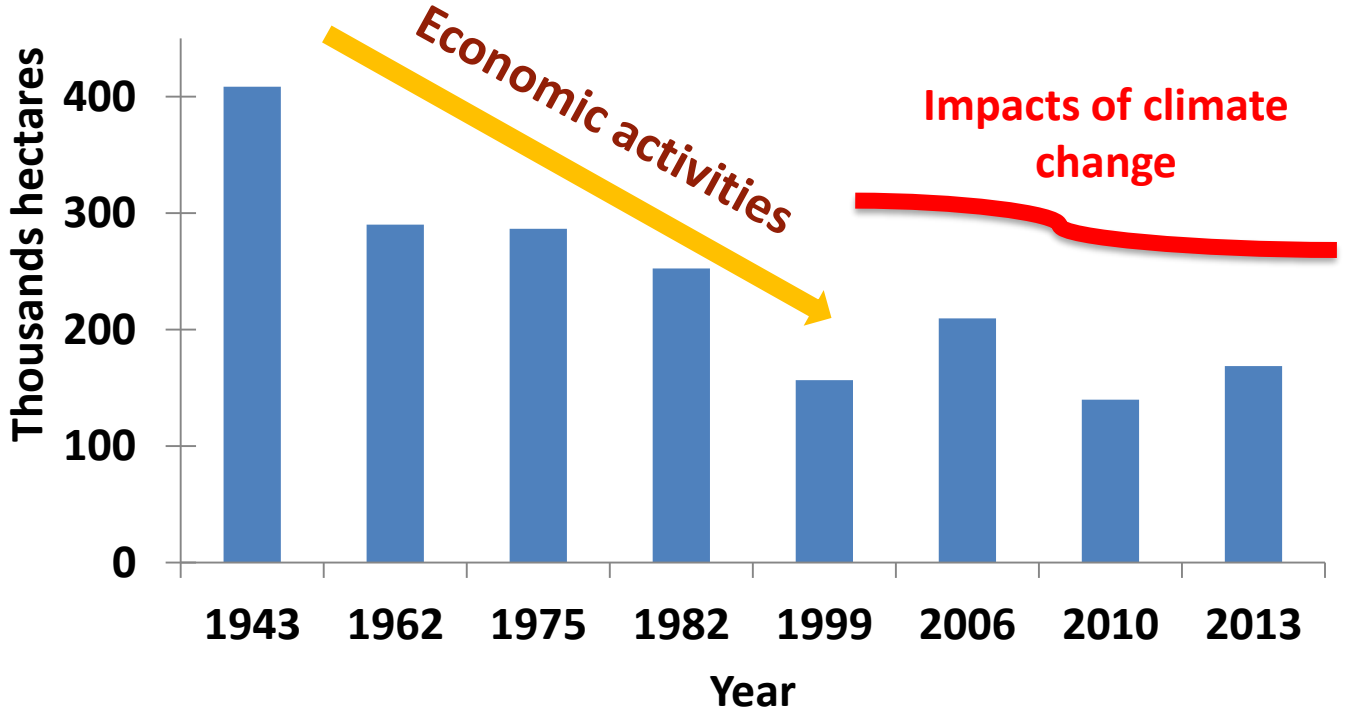
Restorated forest protect coastal

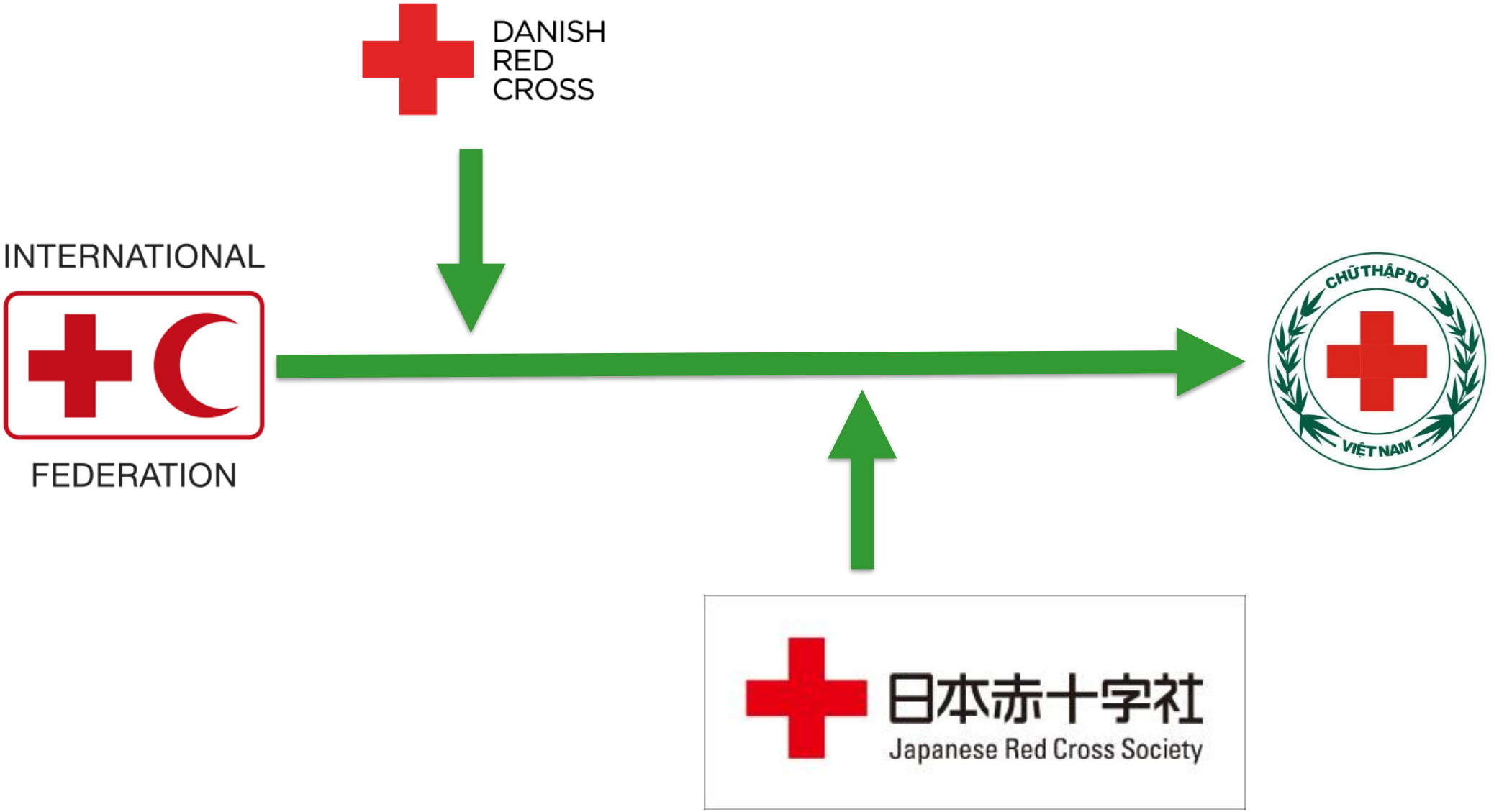
- Different effects of wave reduction in (a) mangrove
- (b) without-mangrove areas
- (Source: Y. Mazda, M. Michimasa, M. Kogo, P.N.Hong, 1997)



Mangrove area in Vietnam through the years

(Maurand, 1943; Rollet, B., 1963; Hong P.N., H. T. San, 1993; FIPI, 2001; 2007; 2011, 2013)

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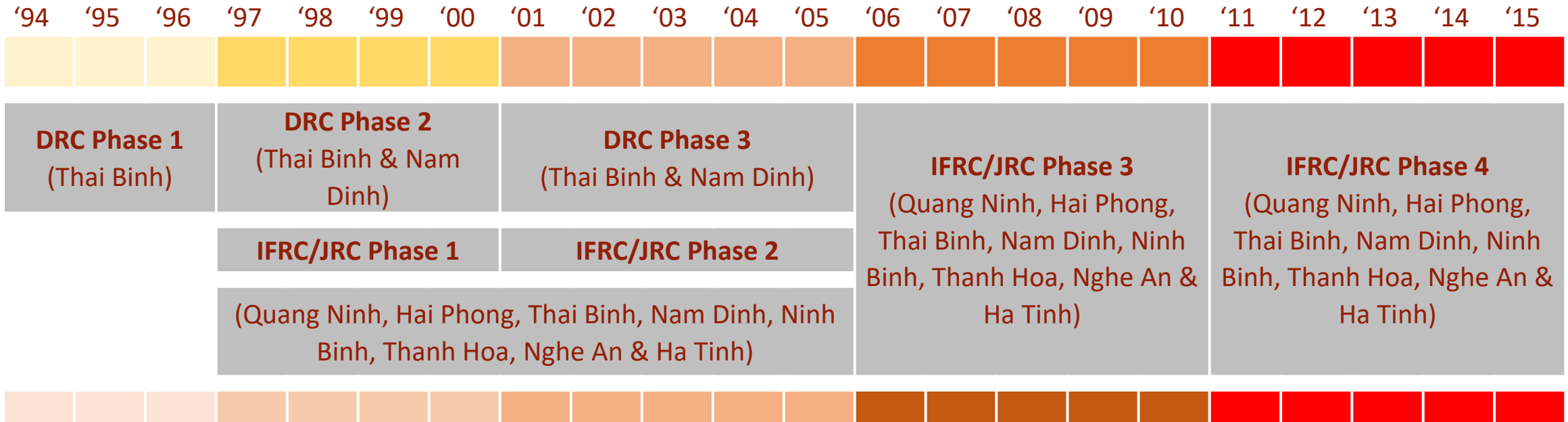
CHỮ THẬP ĐỎ
VIỆT NAM
日本赤十字社
Japanese Red Cross Society

1 | Programme overview

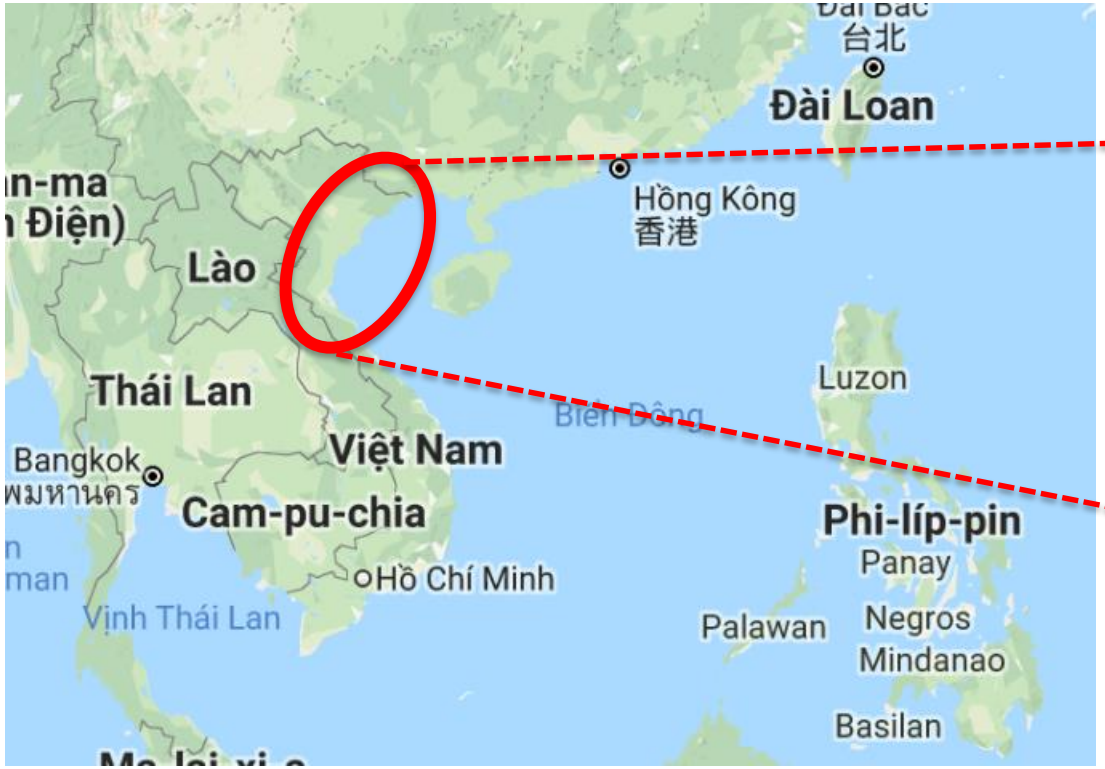
- The programme started in **1994** at the initiative of the Thai Binh chapter and was soon expanded to include eight Northern coastal provinces
- The **Viet Nam Red Cross (VNRC)** has been implementing the programme with the support of **Danish Red Cross and IFRC/Japanese Red Cross (JRC)**

Programme timeline



Programme location

- Community-based mangrove reforestation and disaster risk reduction



Programme focus

- Started as **an environmental protection programme and added disaster preparedness** components over time (e.g. DP in schools)
- Started with an **exclusive focus on mangroves along the sea coast** and added other tools for risk mitigation (casuarina, eucalyptus trees), also along river banks (bamboo)
- The core activities remain centred around **tree plantation** (DRC Phase 3 and 4 entailed more comprehensive risk mitigation measures)

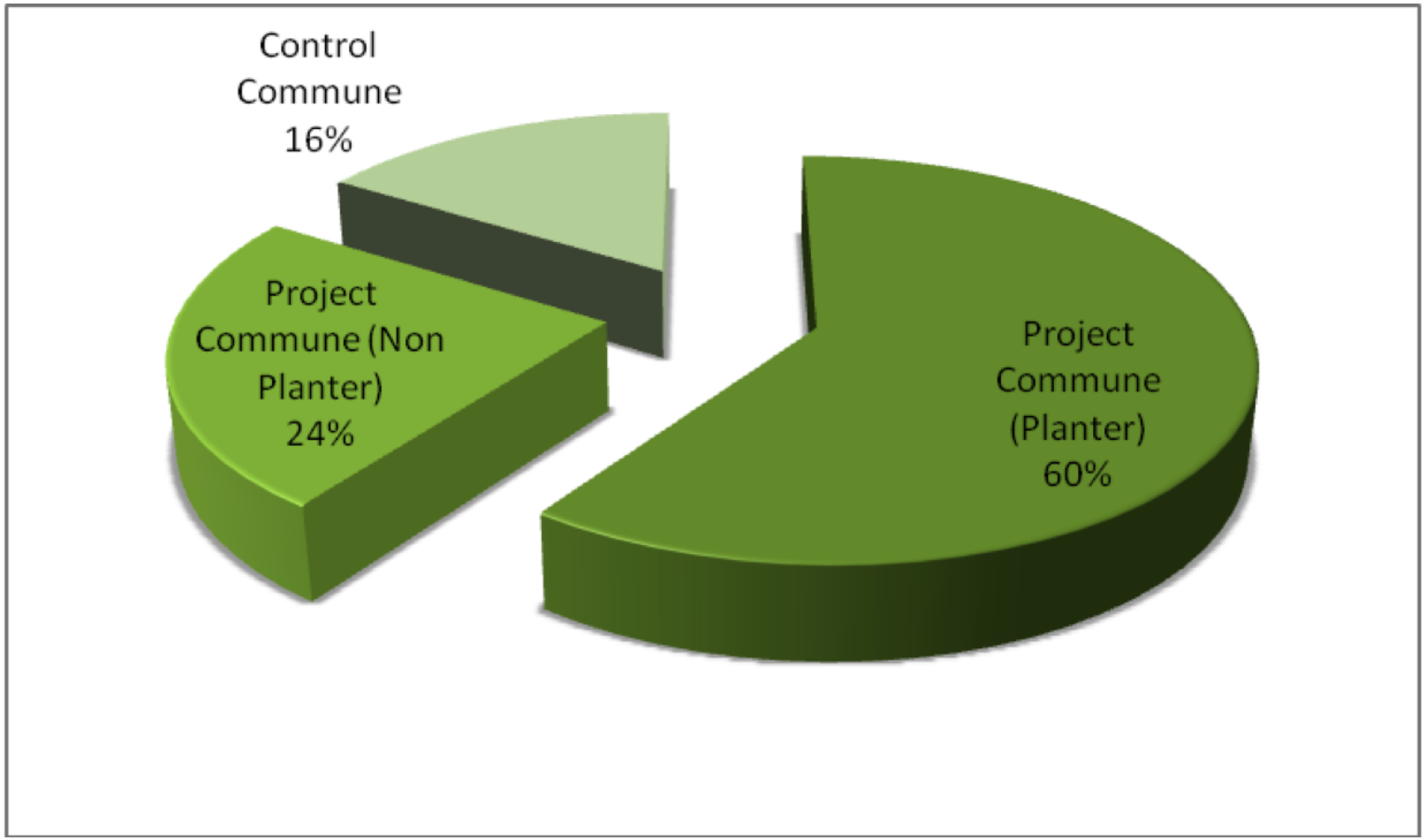
Programme scale

- The programme involved **101 communes focusing on mangroves plantation**
- Overall investment was **USD 8.8 Mio** or VND 128 Bio (representing USD 11.4 Mio or VND 221 Bio at present value) for **20 years**
- As a result of the programme, more than 9,648 ha (96km$^{2)}$ of trees exist today.
  In general **the figure is become bigger** due to **natural regeneration** process which was happened surrounding the planted vegetation.

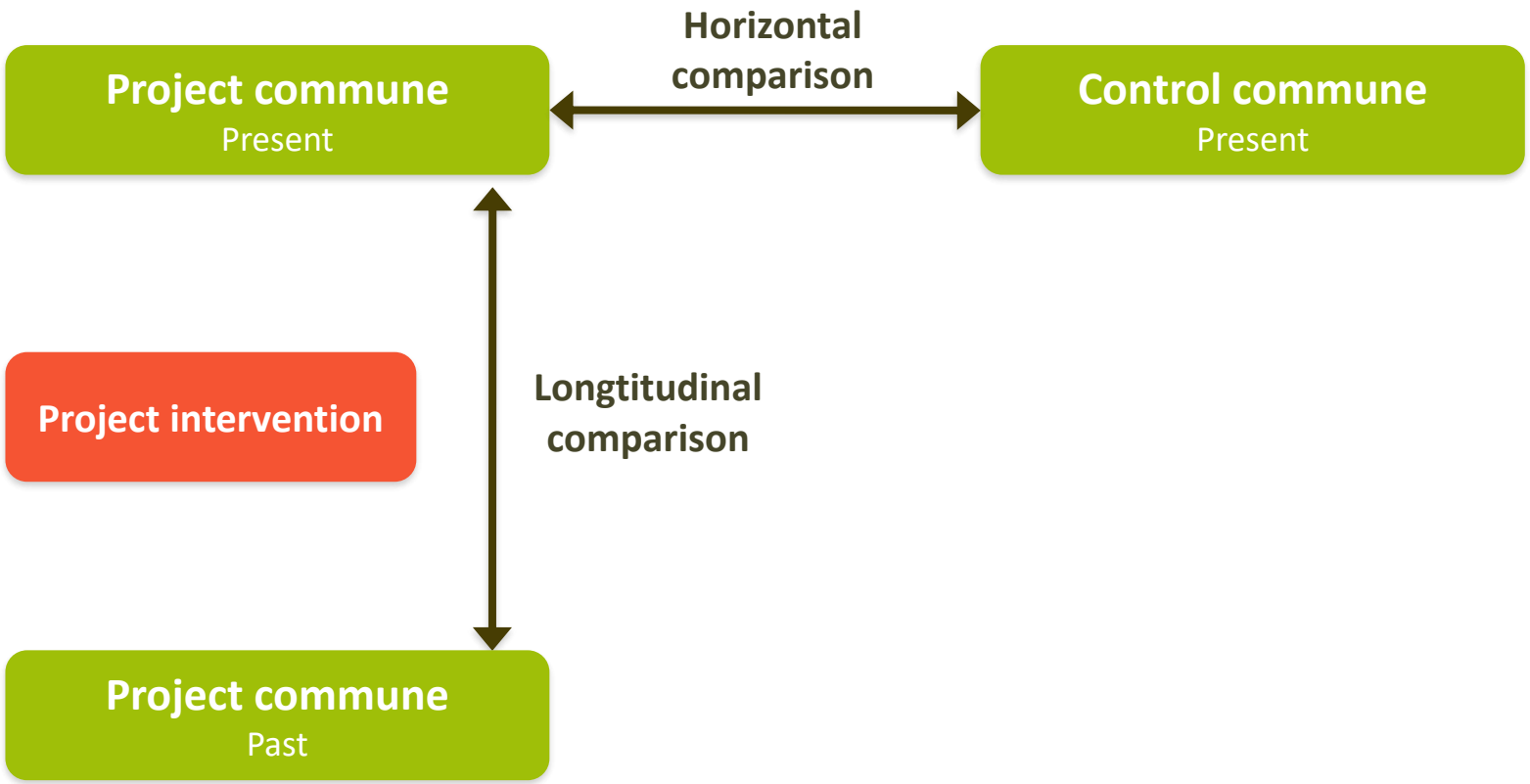
2 | Methodology

- Review of key documents
- Key informant interviews
- Household survey amongst 372 HH in 25 communes (mangrove 12, bamboo 6, casuarina 3, control communes 4)
- 18 site visits to replanted areas
- 24 focus group discussion with RC Chapters (incl. DARD, DET) and communes
- Data analysis for calculation of cost-benefit ratios

Household survey: Distribution of 372 respondents



How to determine impact



→ Causality can only be inferred if all other variables are constant or can be controlled

Identification of costs and benefits

Costs

- Overhead
- Training + capacity
- building
- Awareness + drills
- Planting
  Protection and care

Benefits

- Reduction of losses
  (dyke repairs, infrastructure, houses, crops, deaths/injuries, aquaculture, indirect long-term losses)
- Direct economic benefits
  (planters' income, increased income from collection of crabs, shrimps etc)
- Ecological benefits
  (Carbon value and CO_2-absorption, marine habitat, biodiversity)
- 'Disbenefits'/externalities
  Reduced income due to intervention

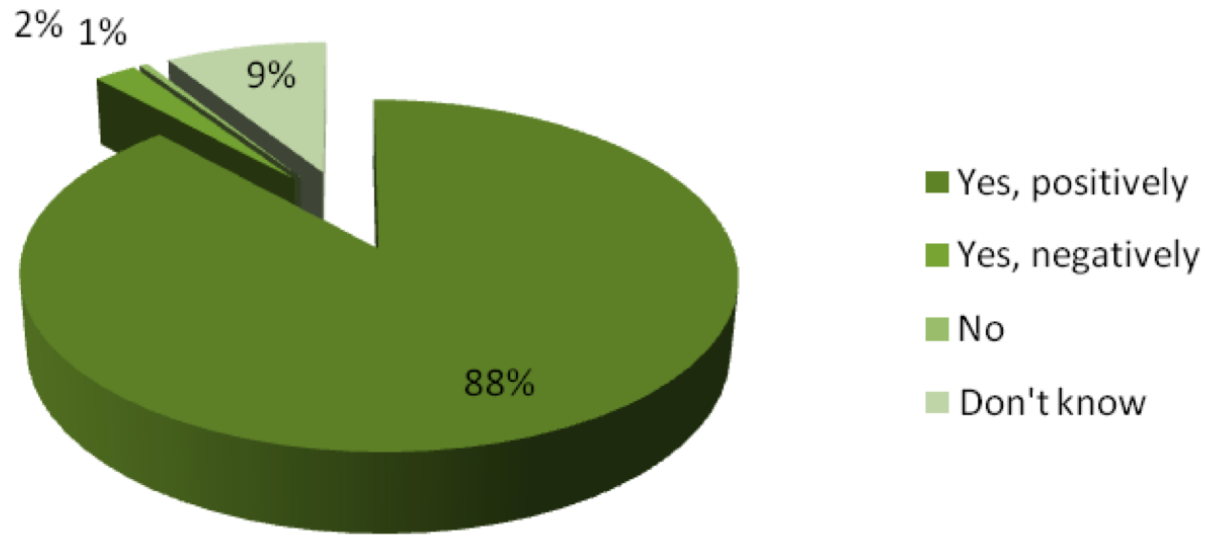
3 | Impact

- **Reduced disaster losses**
  In all mangrove communes visited, significantly reduced losses were incurred from comparable typhoons. Anecdotal comparisons between mangrove and non-mangrove communes support this observation.

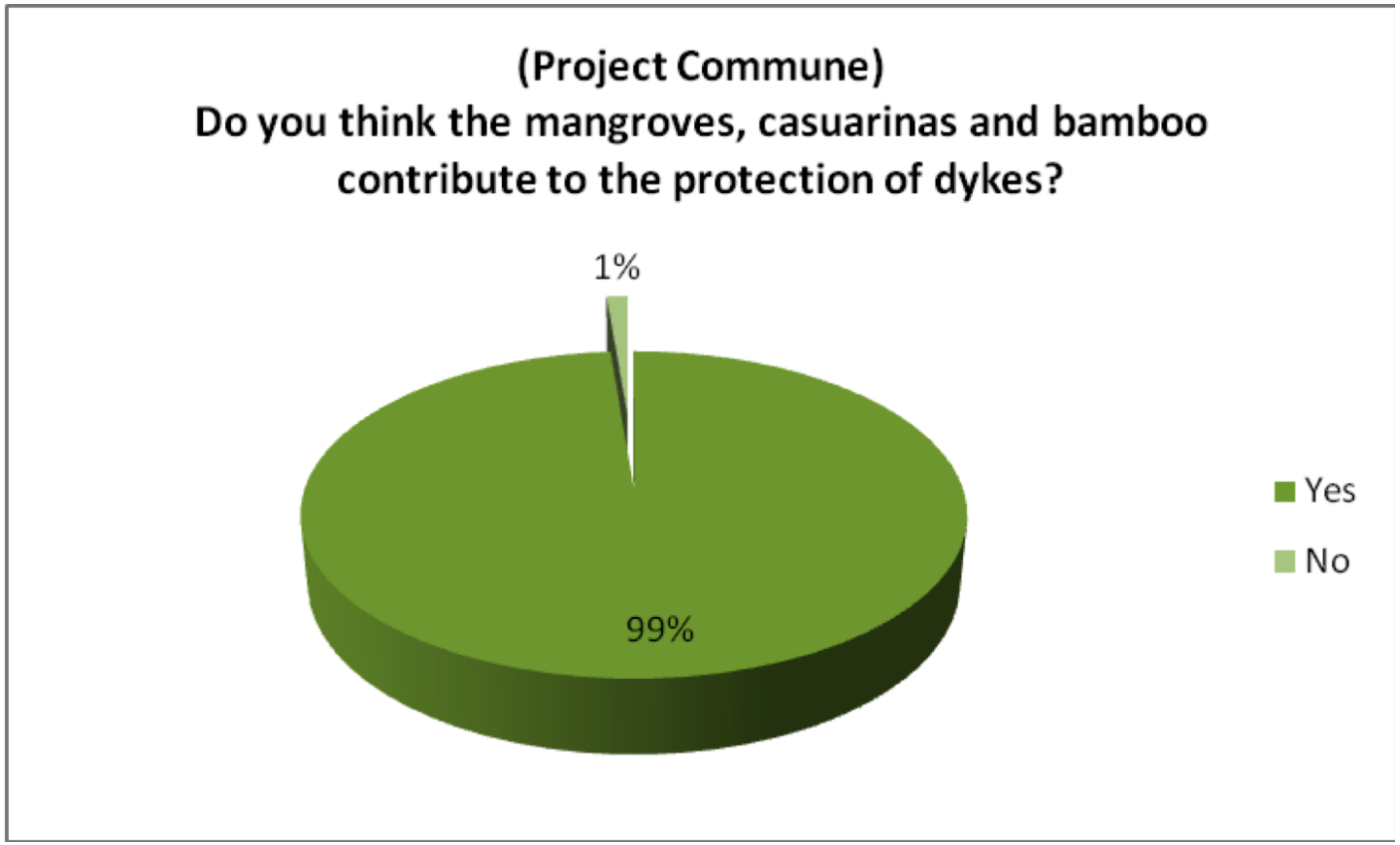
- **Communities feel safer**
  96% of project commune respondents feel better protected now than before the beginning of the programme.

- **Increased income due to the mangroves**
  Based on the household survey results, average income per mangrove hectare and year is VND 6 Mio. This compares to VND 1.5 Mio income from an empty mudflat. 67% of planters and 22% of non-planters attribute a positive impact of the project on their income

Sustainability



Sustainability



Storm No 2 in 2007

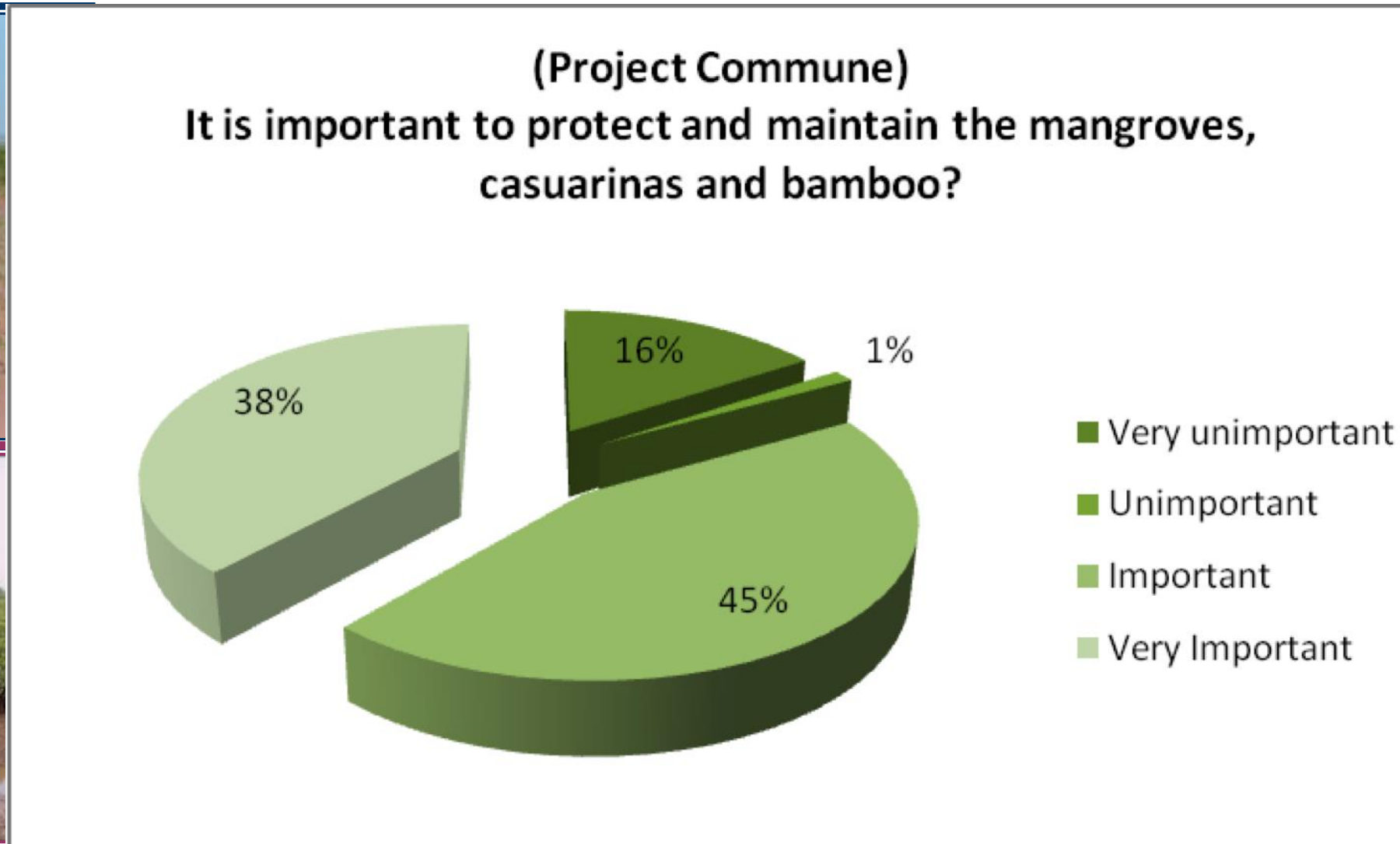
- Without mangroves

Without mangroves protection seadyke in Cat Hai was destroyed

- With mangroves

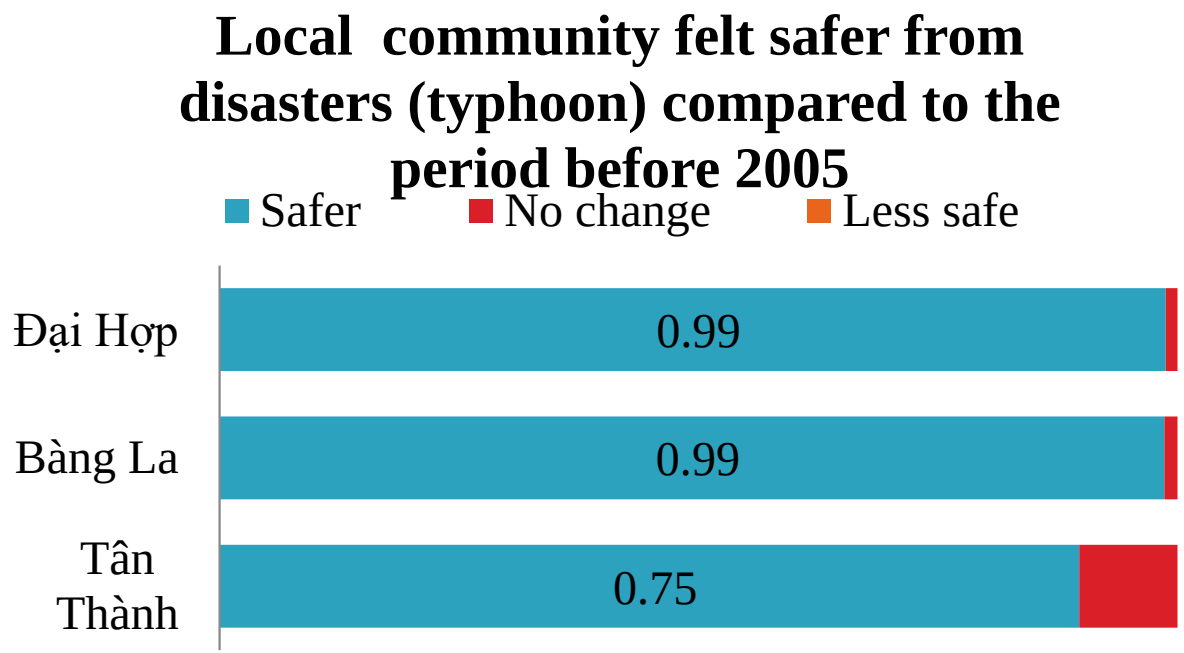
The sea dyke in Bang La was protected with mangroves

Sustainability



Restorated forest protect coastal

331/430 (77%) of respondents said they felt safer from disasters (typhoon) compared to the period before 2005

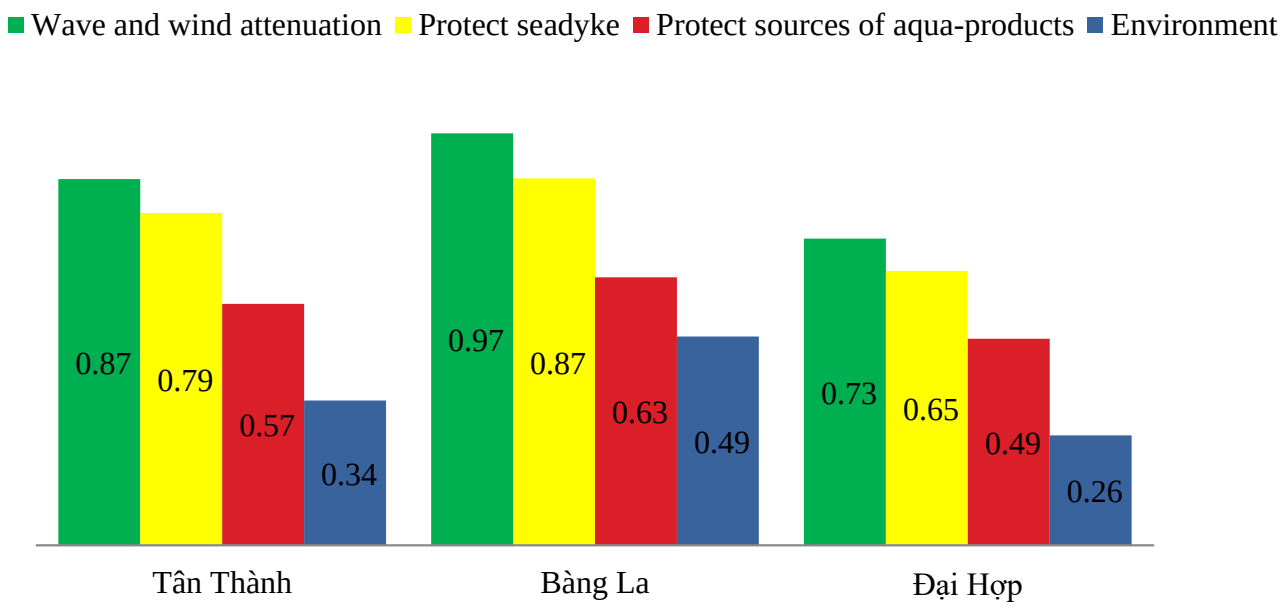


Restorated forest protect coastal

from 73% to 97% of the households confirmed the role of mangroves in buffering seawater/waves,

65-87% mentioned the protective role of sea dykes

Awareness of local comunity of the role of mangroves through natural disaster in the region recently



Restorated forest protect coastal

The two **level 9** typhoons that hit Dai Hop in 1987 and 2005 under similar conditions of direction, tides, waves etc.. :

- In 1987, the storm caused serious damage to a 3 km-stretch of the sea-dyke that needed to be repaired at a cost of VND 6 Bio (at present value/ **USD 300,000**).
- The same dyke undamaged by the 2005 typhoon, being now protected by a mangrove forest of more than 1 km in width. A small outer mini-dyke suffered some damage and needed to be fixed at an estimated maximum cost of VND 100 Mio (**USD 5,000**).

3 km of seadyke (300 ha of planted mangroves)

VND 5.9 Bio (USD 295,000)

It take 5-10 year to recovered the soil which was submerged under the sea water from the typhoon

Restorated mangroves and livelihoods of coastal communities

Mangrove reforestation has contributed to improving the Socio - economic life of some coastal communities.

- ☐ Generating jobs (planting, caring and protection of mangroves) for some poor people.
- ☐ Increasing income from rising marine resources.

Restorated mangroves and livelihoods of coastal communities

Mud crab seeds harvested in mangroves for aquaculture

Average income from mud crab seeds of 30 households in November 2000 at Nam Dinh Prov.

Commune	Income (USD)
Nam Dien – Nghia Hung Dist.	2,031
Nghia Hung – Nghia Hung	536
Giao Lam – Giao Thuy Dist.	596

Restorated mangroves and livelihoods of coastal communities

Comparison of the benefits of collecting aqua-products inside and nearby mangrove areas before 2005 (rare and young stand of planted mangroves) and in 2013 (mature restored forest)

	2005	2014
Area (ha)	210	300
Average income (VND/day)	123.573	266.860
Number of working days (day/month)	13	15
Number of working months (month/year)	6	6
Number of collectors (people/day)	89	115
Total income/commune (VND)	918.054.132	2.733.450.008
Income per ha (VND)	4.113.852	9.136.138

Restorated mangroves and livelihoods of coastal communities

- socio-economic report of Bang La authority, the value of aqua-product collection in was 16.65 billion VND equivalent to $ 2,643/year

All value from agricuture (USD/ha/year) in Hai Phong, 2013
(Statistic book, 2013)

Cultivation	3,042
Livestooks	2,907
Services	180
Total	**6,129**

Restorated mangroves and livelihoods of coastal communities

Bee keeping
45 USD/ha/year

Carbon stock

Mangrove's carbon burial
2 times greater than seagrass
50 times greater than tropical forest

Carbon burial rates (g C m^{-2} y^{-1}) in different coastal systems

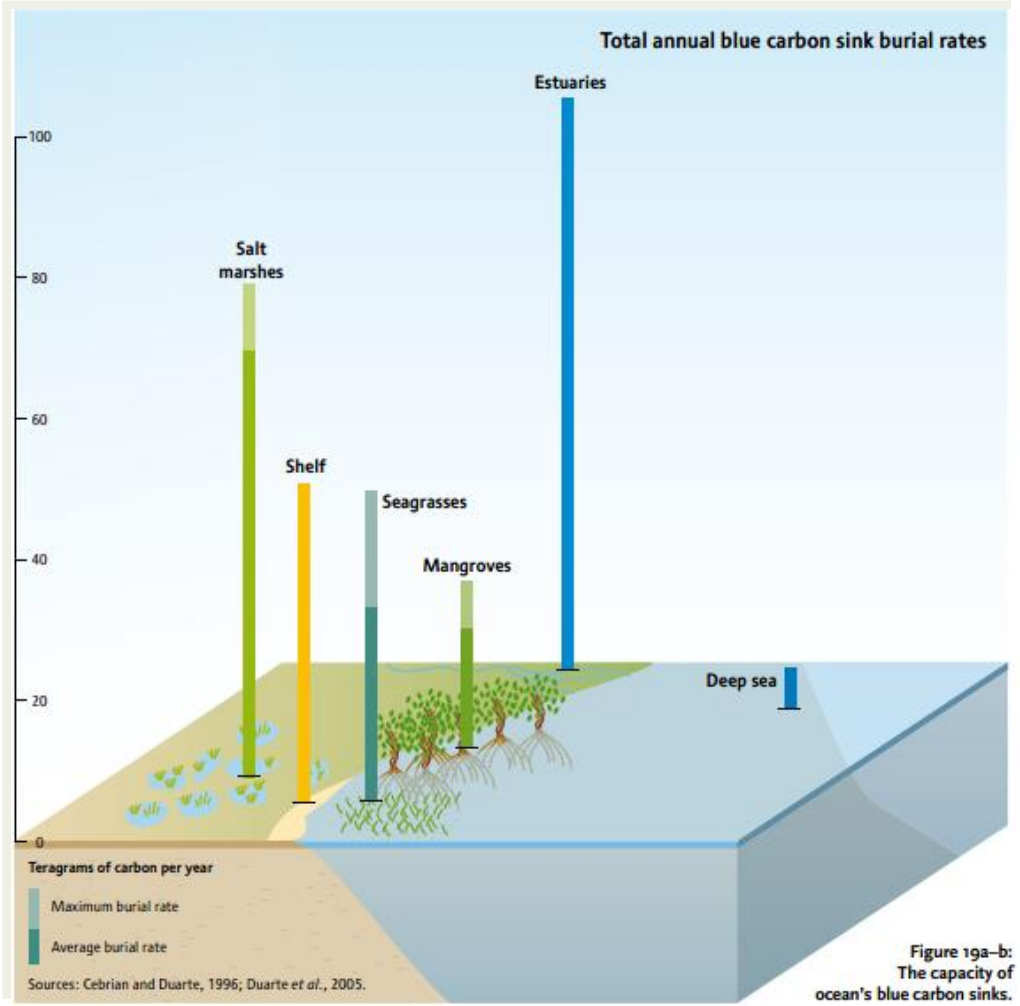


Figure 19a–b: The capacity of ocean's blue carbon sinks.

Carbon stock

- the amount of carbon sequestration by mangroves in the study area up to 2013 was estimated to be 295,433 tons -
- equivalent to 1,083,291 tonnes of CO_2 (1,204 ton/ ha) and

Estuarine, Coastal and Shelf Science 213 (2018) 28–39

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Seasonal variability of CO_2 emissions from sediments in planted mangroves (Northern Viet Nam)

Ha Thi Hien[a,*], Cyril Marchand[b,c], Joanne Aimé[b,c], Nguyen Thi Kim Cuc[a]

Forest Ecology and Management 407 (2018) 191–199

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Forest Ecology and Management

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Belowground carbon sequestration in a mature planted mangroves (Northern Viet Nam)

Ha Thi Hien [a], Cyril Marchand [b,c], Joanne Aimé [b,c], Dang Hoai Nhon [d], Phan Nguyen Hong [e], Nguyen Xuan Tung [f], Nguyen Thi Kim Cuc [a,e,*]

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Science of the Total Environment 593–594 (2017) 654–663

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Science of the Total Environment

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Changes in soil characteristics and C dynamics after mangrove clearing (Vietnam)

Séraphine Grellier [a,*], Jean-Louis Janeau [b], Dang Hoai Nhon [c], Nguyen Thi Kim Cuc [d,e], Le Thi Phuong Quynh [f], Pham Thi Thu Thao [g], Tran-Thi Nhu-Trang [h], Cyril Marchand [h,i]

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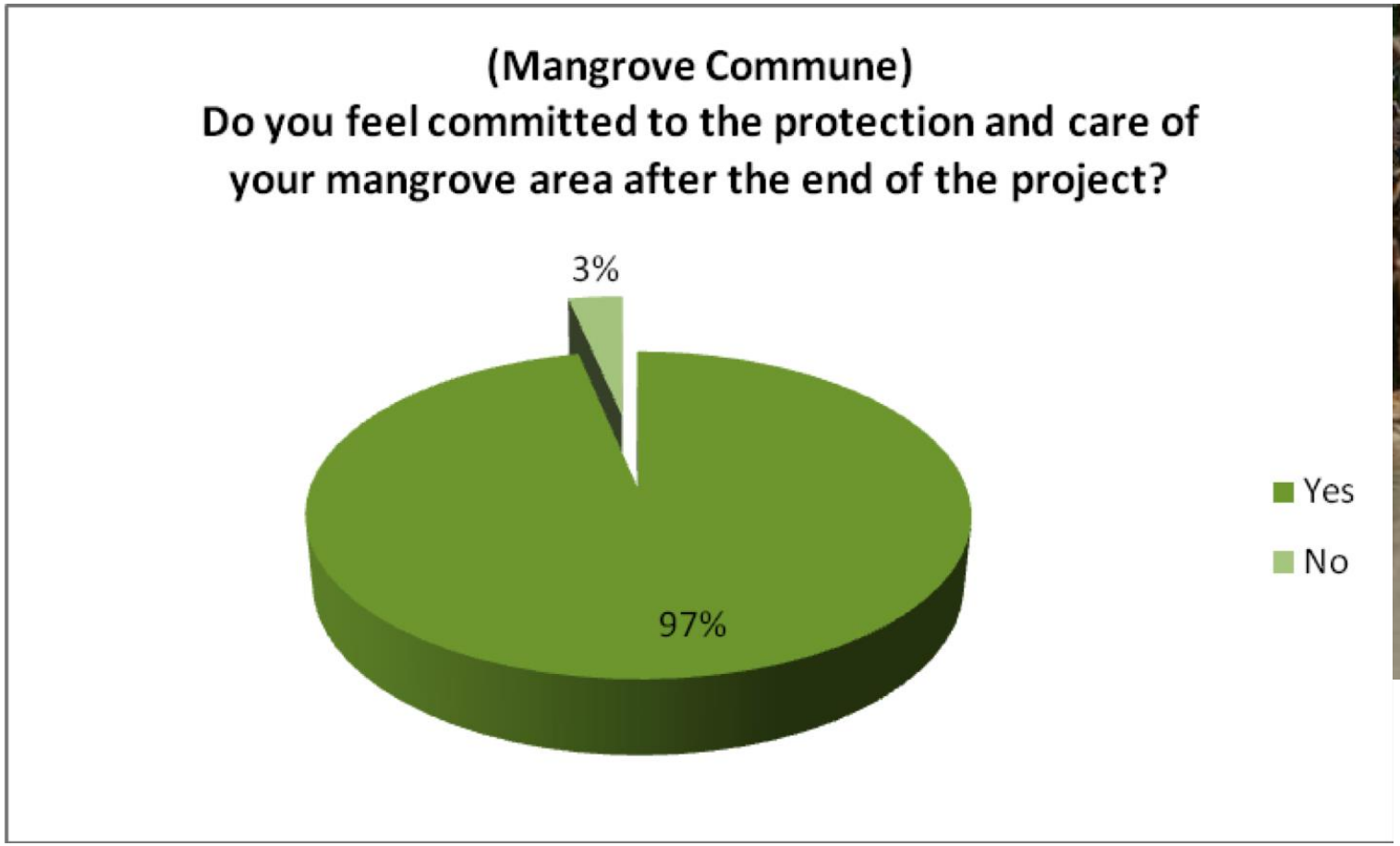
Sustainability



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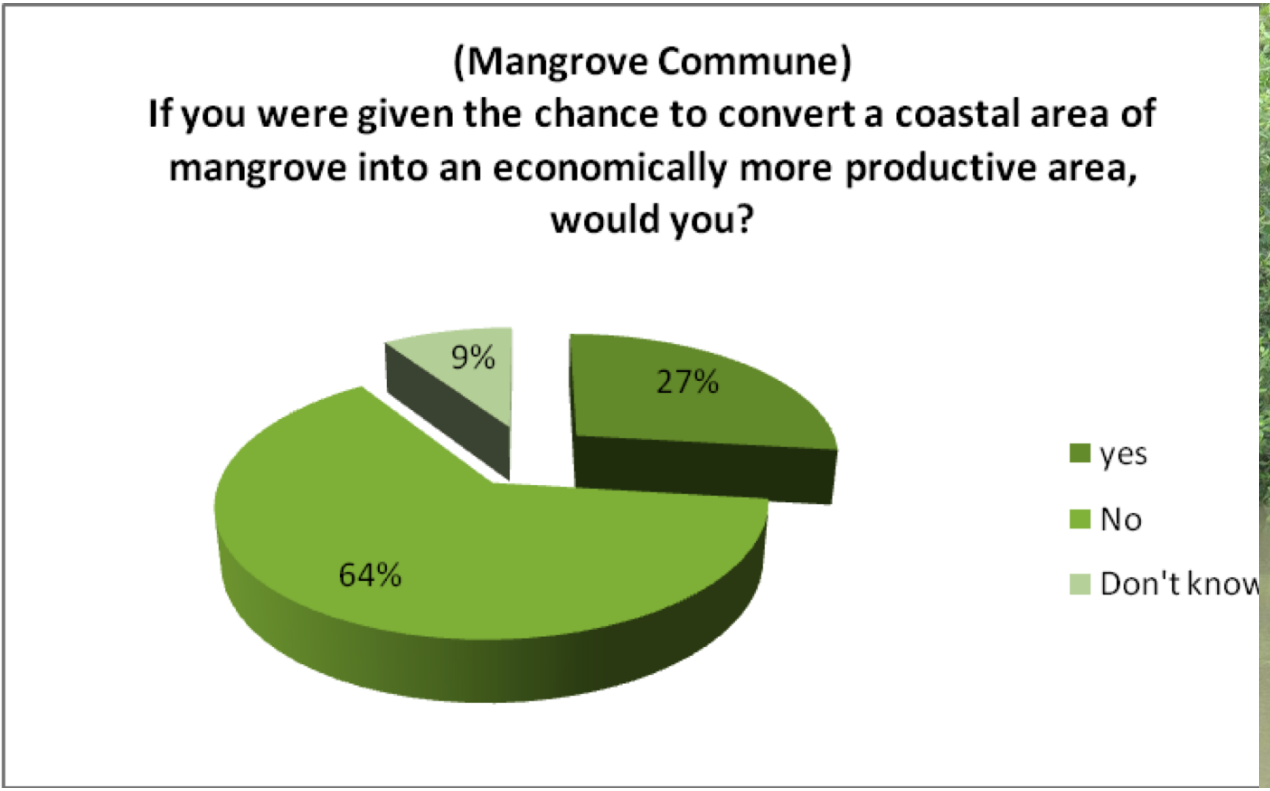

Conclusions

- The restored mangrove ecosystems have provided livelihoods to the poor coastal inhabitants through the service provision of **fisheries nursery and habitat** and **regulation of protecting the coastal communes** from natural disasters (typhoon, waves) and **carbon sequestration**.
- In turn, these ecosystem products and services **both directly and indirectly contribute significantly to the coastal households** all the way up to the national food security and economy

Although the assessments in this research could not quantify all the values of mangroves in the locality, the results shown the **important role of restorated mangrove forest in the contribution of forest protection, production and other services**.

Current challenges

-Degradation of planted mangroves due to too high density, soil texture, ….;

-Less diversity in both species and structure (forest layer, stands…);

-Impacts of climate changes: too cold and too hot;

-Mangroves become special protection forest;

-Still lack of specific policy, national strategy and decision of the state on mangrove protection issued

-Lack of coordination among the related sectors from the central to local levels

-Lack of long-term plan for mangroves development

Thank you!

4 | Efficiency

- It is assumed that 80% of all project costs were related directly or indirectly to the plantation and care of mangroves (exact figures still outstanding). That means that the overall average **costs per existing hectare amount ha amount to USD 735** or VND 10.62 Mio or, at current value, **USD 964** or **VND 18.3 Mio**. For the calculation of the benefit/cost ratio, current values are used.

- The share of administrative costs could not yet be identified due to incomplete budget breakdowns

2 | Study objectives

- To assess the long-term impact (outcomes) of the program in the communities
- To assess the performance and progress achieved (outputs) with respect of the objectives of the IFRC/JRC Programme
- To analyse the return on investments for both outputs and outcomes through a cost-benefit analysis