



Socio-Economic Impacts of Climate Change on Coastal Communities:

The Case of the north coast of java small-pelagic fisheries

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Outline



- A brief overview of the small pelagic fisheries of the north coast of central Java
- Climate variability and its impact on coastal areas
- How do climate variability affect small-scale fisheries in terms of production and livelihood
- Assessment of economic loss due to natural hazards
- Fishers' resilience on uncertainties
- How do fishers develop livelihood strategies to deal with climate change?
- Concluding remarks

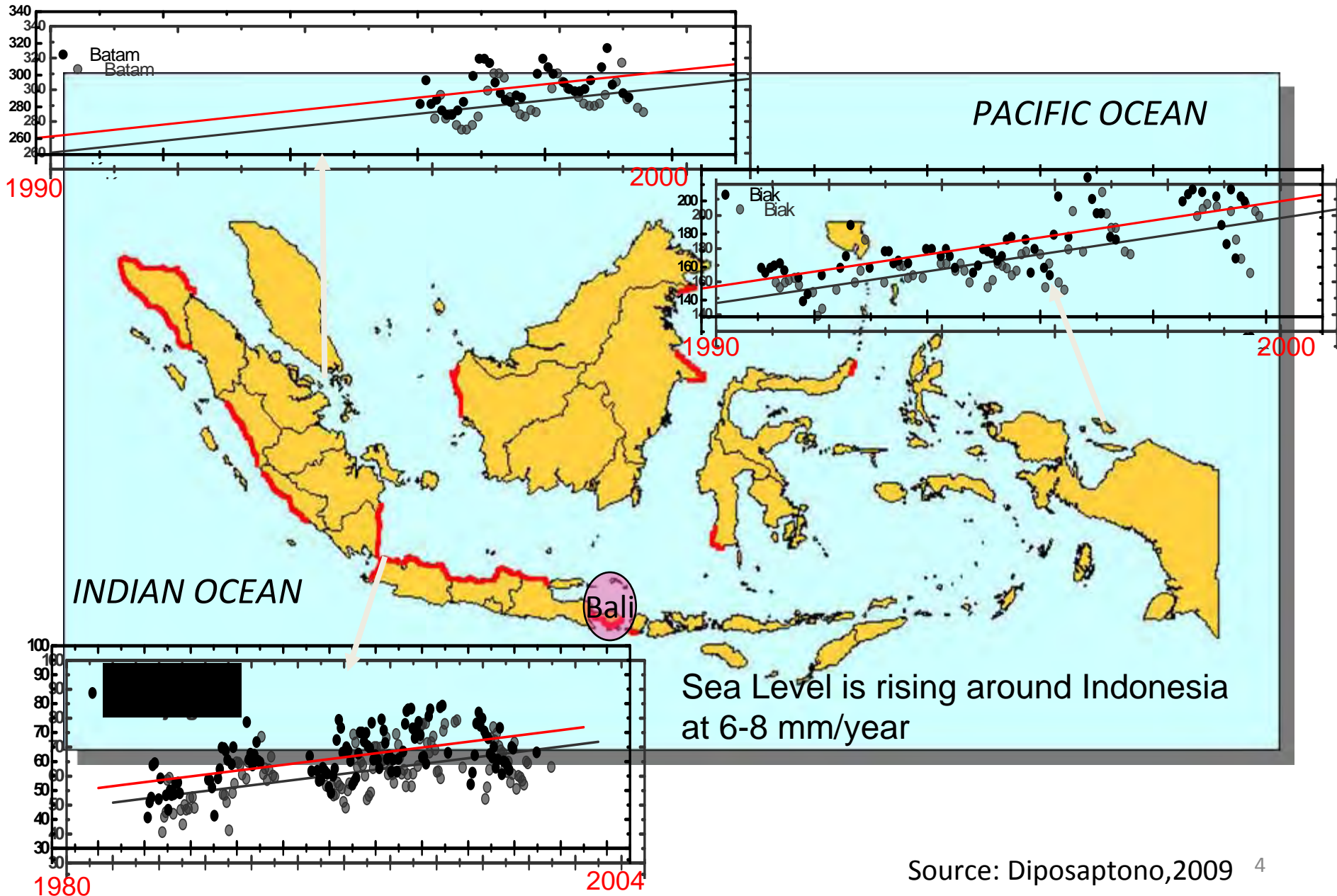
Small Pelagic fisheries of the north coast of Java

- The north coast of Java is home to thousands of fishers (both commercial and traditional)
- Prominent coastal areas: Semarang, Pekalongan, Tegal
- More than 80% of fishers are small-scale
- Typical gears: *payang* (scoop net), gill net
- Fish targets small pelagic fish (trevallies, scads, sardines, little tuna)
- Mostly below 10 GT
- In early 1990s was rank first in the total landing of marine fish in Indonesia

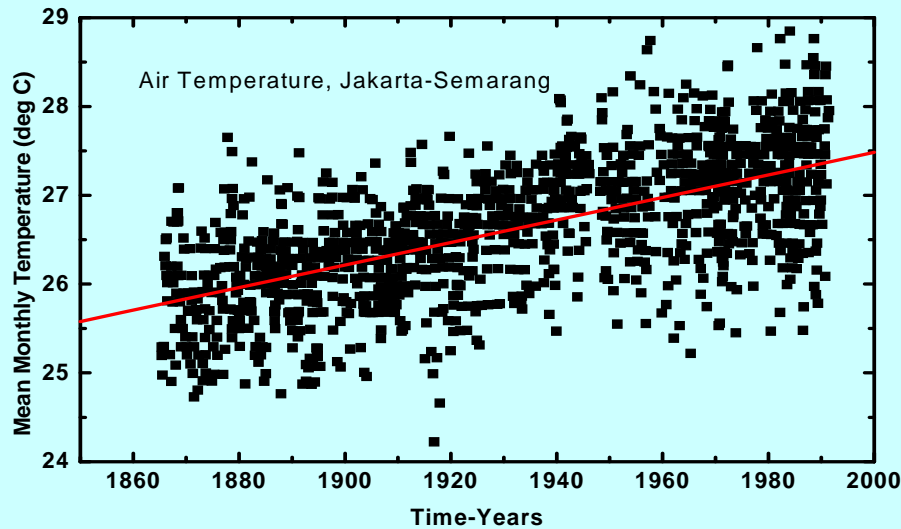


Year	Small-scale	Large Scale	Total	% of SSF
1998	15560	1393	16953	91.78
1999	15724	2531	18255	86.14
2000	16639	2814	19453	85.53
2001	17598	3076	20674	85.12
2002	19288	3307	22595	85.36
2003	22812	4092	26904	84.79
2004	22676	4717	27393	82.78
2005	21939	4658	26597	82.49

SEA LEVEL RISE IN INDONESIA

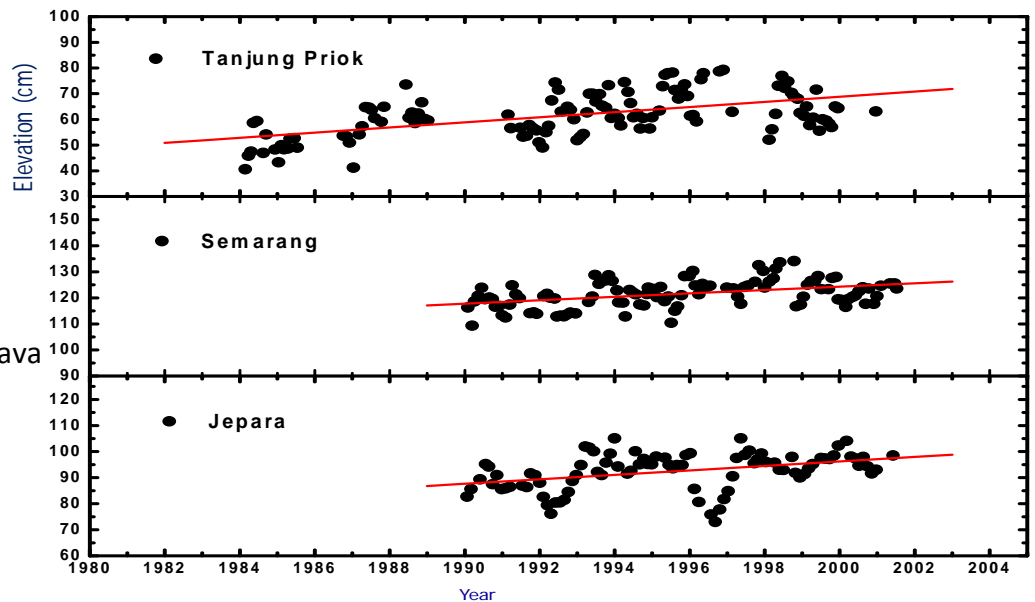


Climate change in the north coast of Java

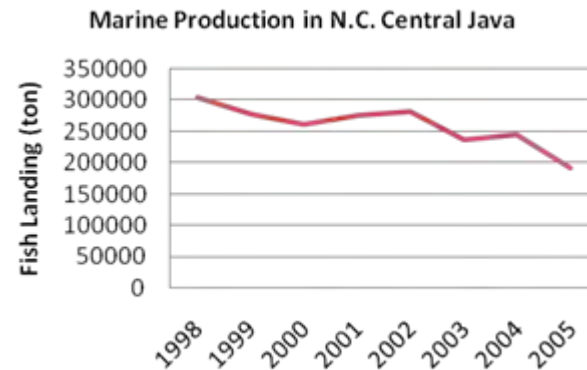
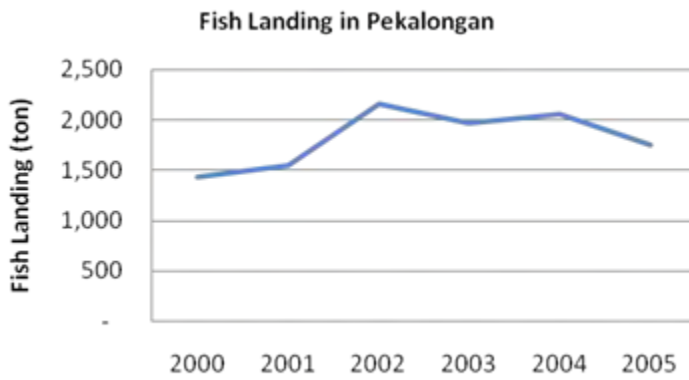
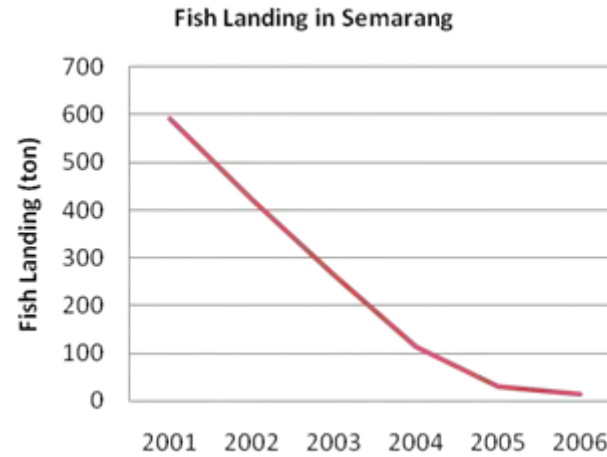
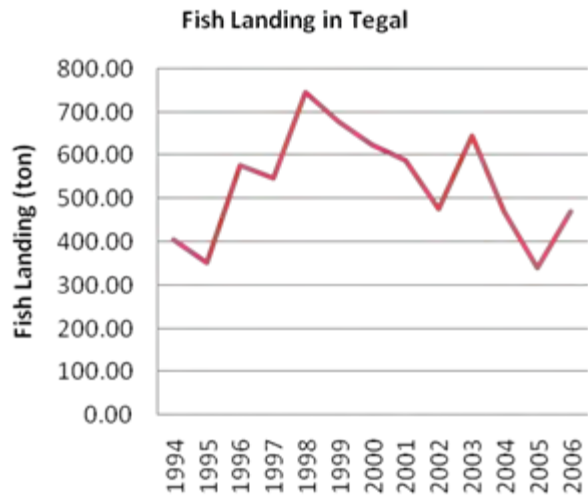


Trend in temperature in the north coast
(UNESCO/ROSTSEA, 1992)

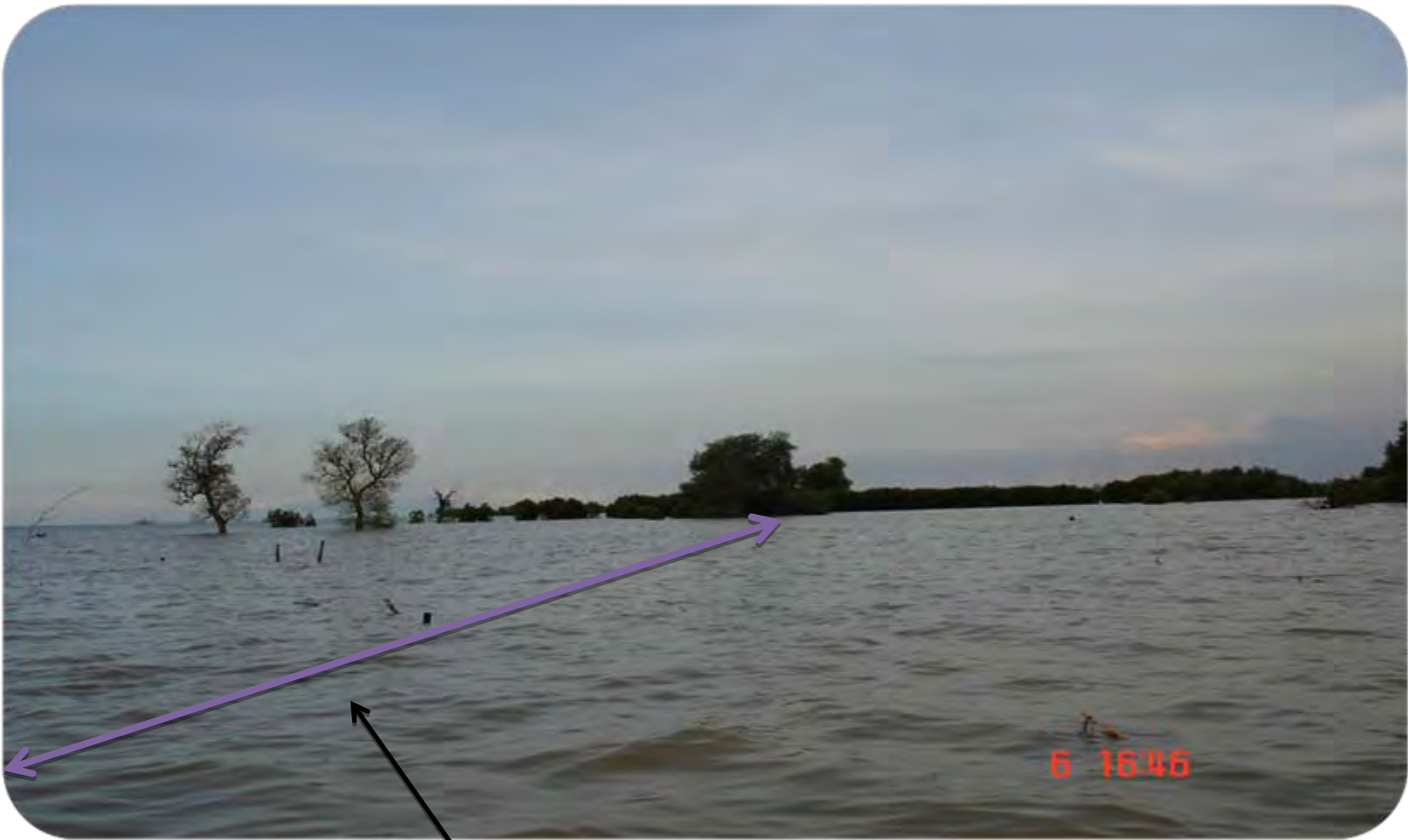
Sea level rise in n.c. of java
(Diposaptono,2009)



Trend of fish landing in north coasts of central java



Real fact of climate-related impacts on coastal areas in N.C. Central Java



It used to be land and fish ponds, now filled with sea water (500-1000 m)



Coastal Erosion in Pekalongan



“lonely mangrove” in Semarang



Inundation of coastal infrastructure

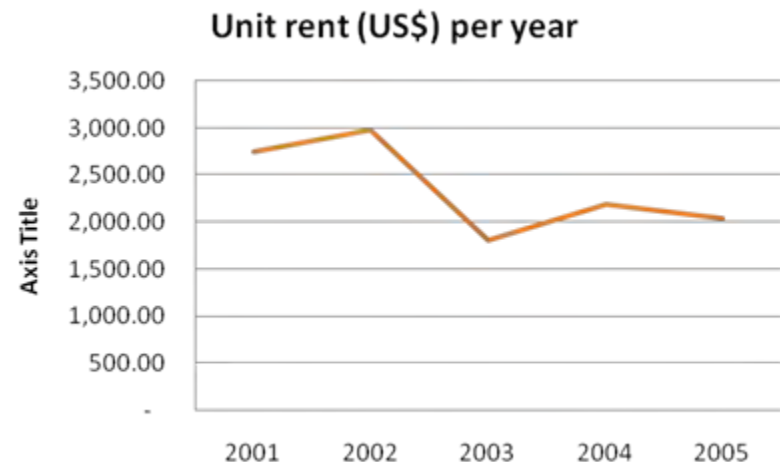
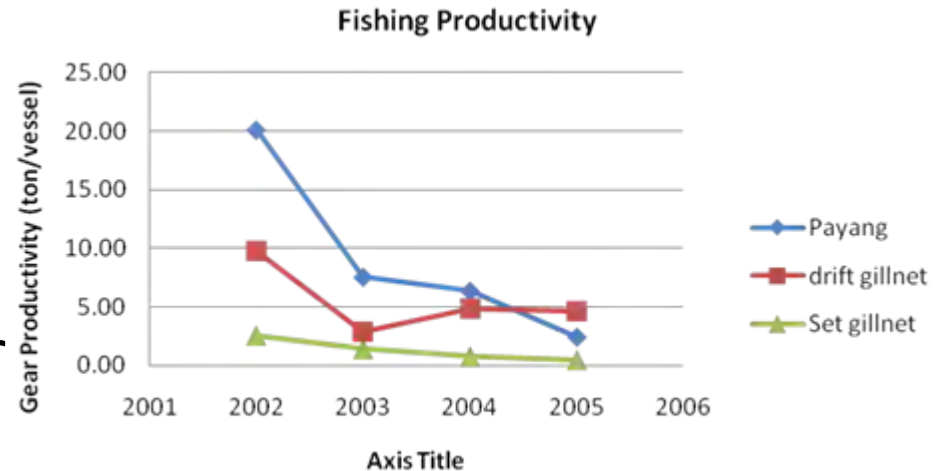


Flooding from seawater in Semarang



Impacts of climate variability on small-scale fisheries

- Productivity declines on average around 80%
- Unit rent (proxy for gross incomes) declines from US\$ 3000 to US\$ 2000 per gear per year
- Per capita income declines between US\$ 1.4 and US\$ 0.6 per capita per day
- In 2005 rising fuel price adds to “double jeopardy” of poverty

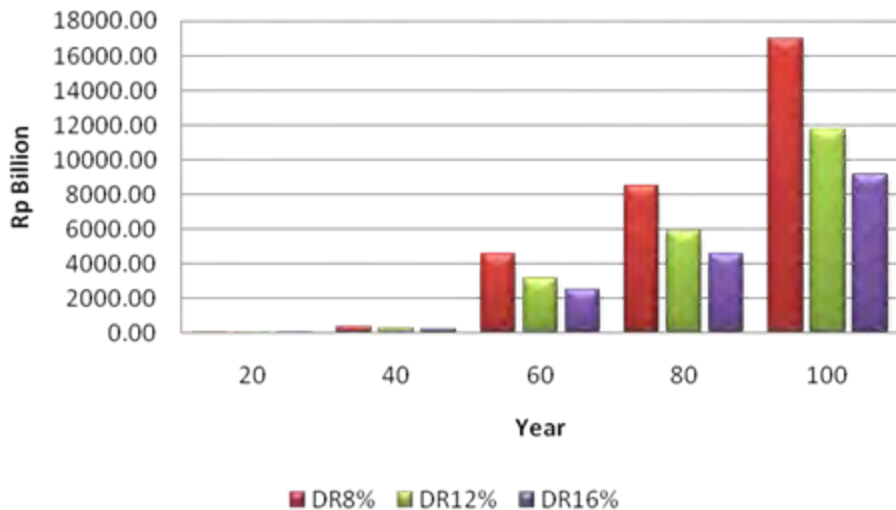


BACK OF THE ENVELOPE ECONOMIC LOSS: SEMARANG

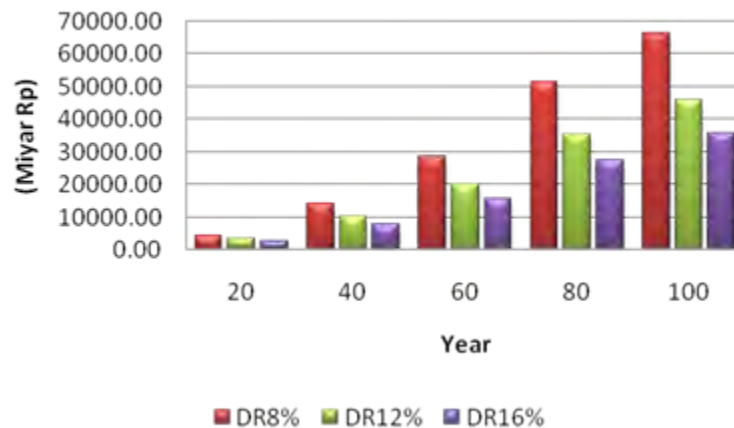
ITEMS	Current loss Rp/th	Future loss Rp/th
Loss in productivity:		
Fishing (per house hold)	5,200,000.00	65,000,000.00
Brackish water ponds (50 Ha)	40,000,000.00	500,000,000.00
Opportunity cost of labor (per person)	7,500,000.00	93,750,000.00
Average household Family reduction	12,000,000.00	150,000,000.00
Avoidance cost:		-
Loss in destroyed levy	50,000,000.00	625,000,000.00
Government spending	700,000,000.00	8,750,000,000.00
Community funding	350,000,000.00	4,375,000,000.00
Water pump	350,000,000.00	4,375,000,000.00
Cost of barriers	1,200,000,000.00	15,000,000,000.00

Estimated of Economic loss

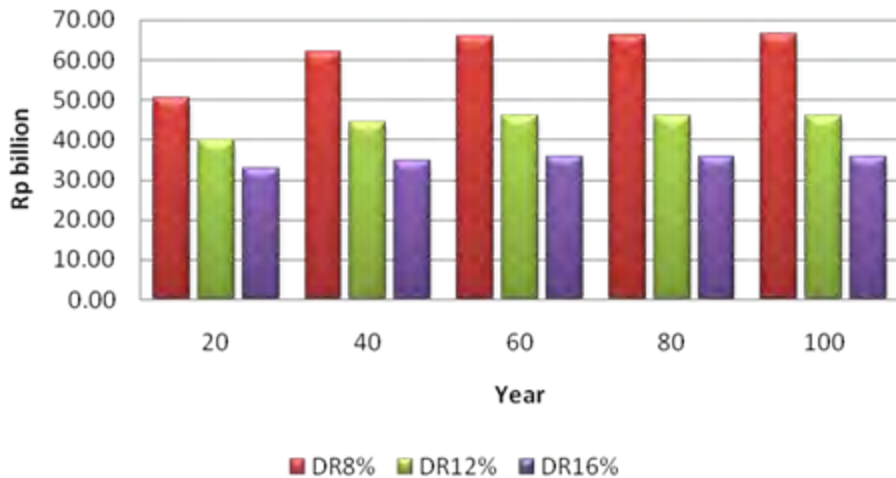
PV economic loss of housing in Pekalongan



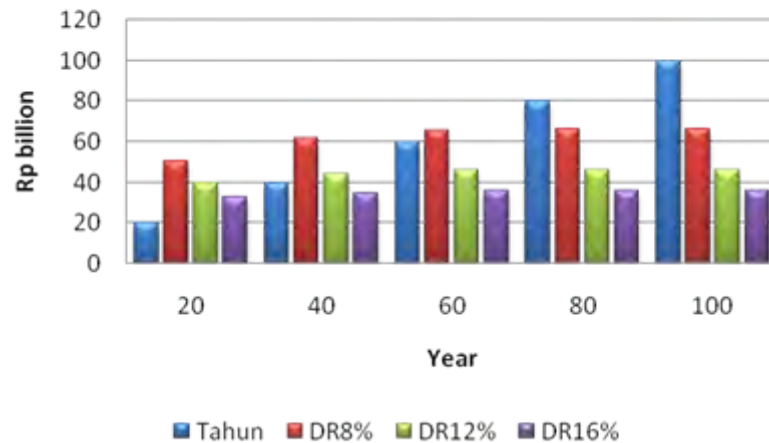
PV Economic loss of housing in Semarang



PV Economic loss of brackishwater ponds in Pekalongan



PV Economic loss of brackishwater ponds in Pekalongan

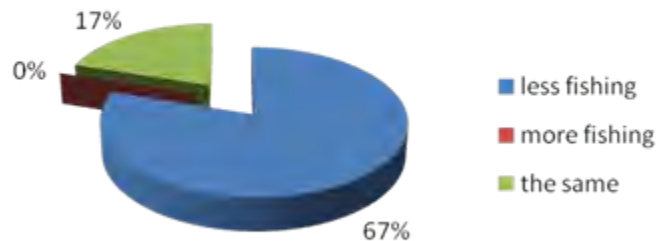


Income comparison of coastal communities (compared to five years ago)

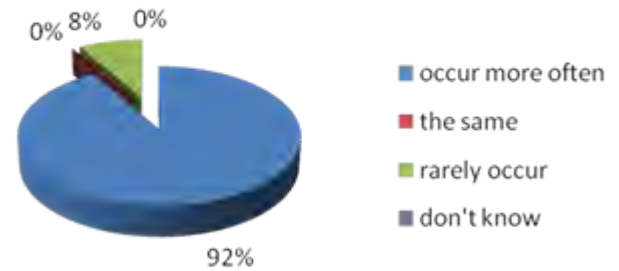
Type of job	Description	Income per capita/day (US\$)	Was..(US\$ per capita/day)
Small-scale fishers	Crew member of “payang” and gill net	0.5 - 2	2 - 5
Owner of boat	Owner of fishing boat, do not go fishing	10 - 20	20 -30
“Ojek”	Motorcycle taxi driver	5 - 10	Doesn’t change
Fish monger	Selling fish to middle man	5 - 10	Doesn’t change
Fish Pond fisher	Work on harvesting fish pond	4 - 5	10 - 20

And the survey reveals...

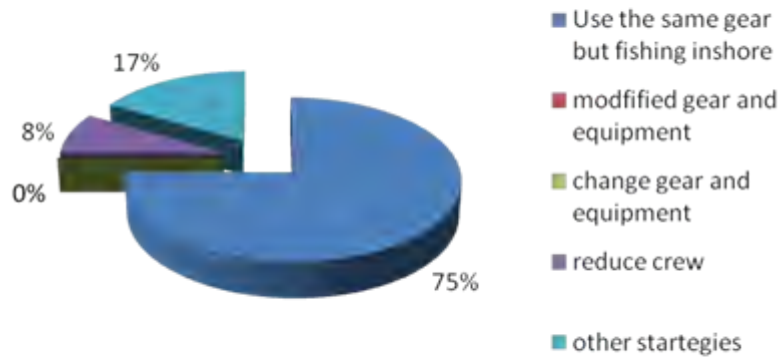
Frequency of fishing compared with 5 years ago



Perception on natural hazards compared to 5 years ago

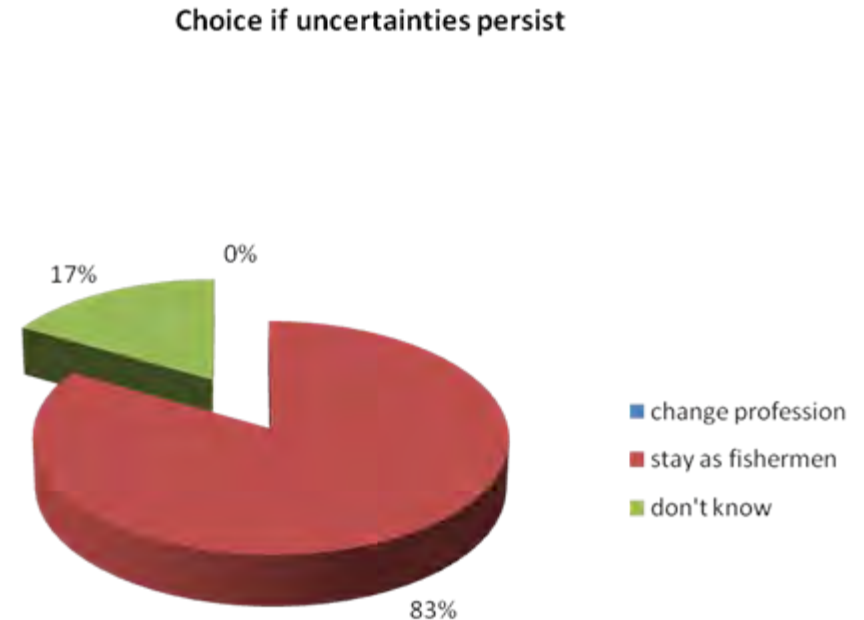


Response if they have to keep fishing



What if uncertainties due to climate variability persist?

- Stay as fishers no matter what
- Fishermen is the employment of the last resort
- Fishing is life style preference
- Reluctant to move out
- Develop strategies to with uncertainties



Fishers' resilience on natural hazards

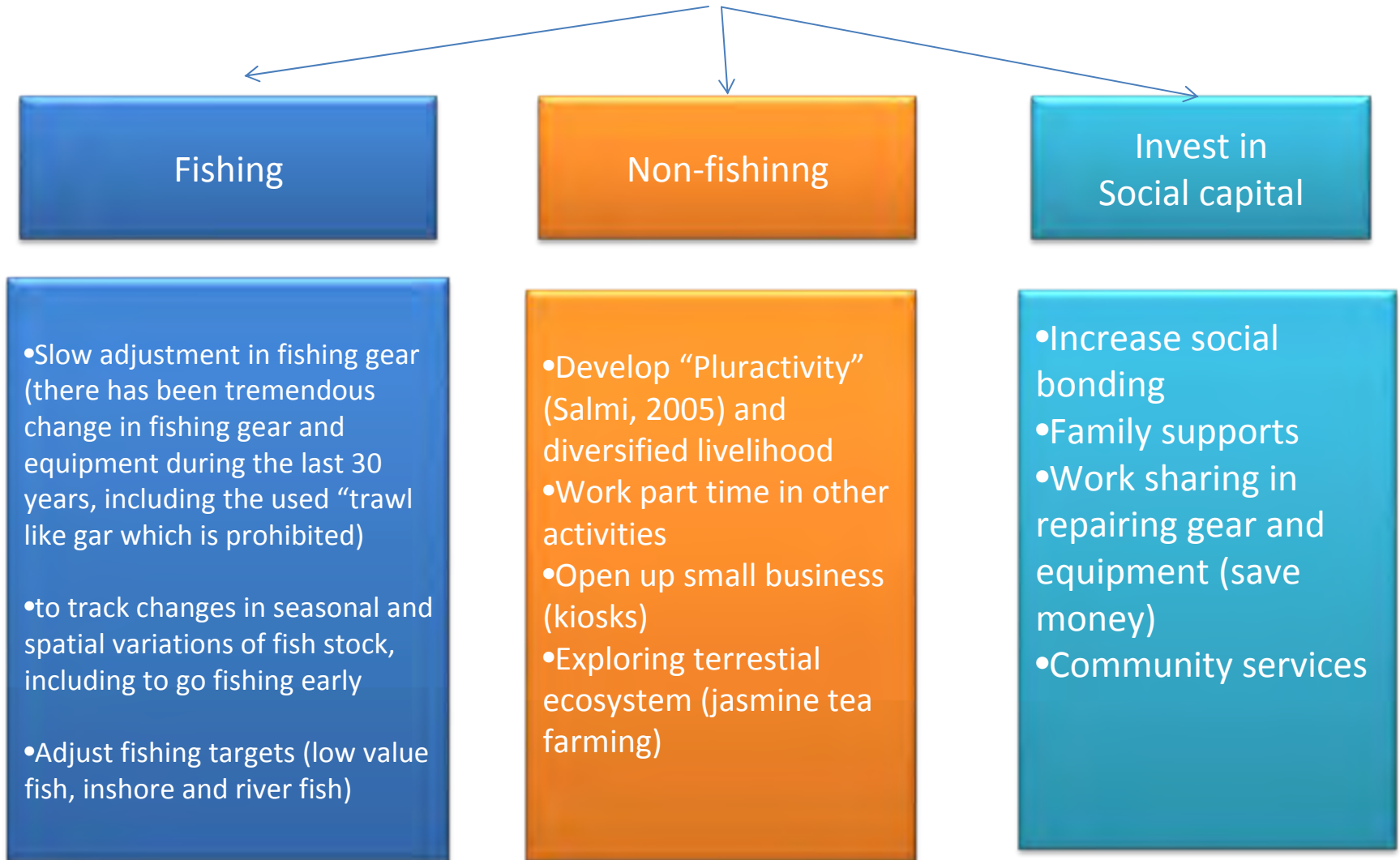
“the current uncertainty and bad season for fishing are just a matter of “*salah mongso*” (wrong season)..we don't even bothered with it” (Anonymous : Pekalongan Fisher)



“In my opinion, raising sea water and bad weather are due to too many boats in the sea.. it exerts too much pressure on the sea water, and therefore causing spill over of the sea water to the land...”
(Rokhimin, Fisher Semarang)



Adaptation strategies



Some local adaptation strategies



Adaptation strategies to leveling up house



Involvement of women groups in Fishing-related activities



Fishing inshore



Reduce fishing trips

Concluding remarks

- Fishing-dependent coastal communities in the north coast of java are endlessly challenged by uncertainties arising from climate variability and socio-economic forces
- Climate Variability manifested in bad season and fluctuation in fish catch has profound impacts on livelihood of small-scale fishermen and coastal community of the north coast java as a whole
- It has been observed that the fish catch continue declining leading to poverty and disruption of human well being such as health and education and other social lives.

- Nevertheless, coastal communities have developed some adaptation strategies to cope with uncertainties including fishing and non-fishing strategies as well as develop pluriactivity .
- This study shows that traditional fishers have ample knowledge and strategies to cope with negative impacts of climate change.
- These locally built-in strategies can be enhanced and maintained so as to minimize government intervention and waste of resources due to ineffective top down derived policies

Thank you

Acknowledgment

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