Artisanal Tuna Data Workshop

11TH – 14TH November 2013

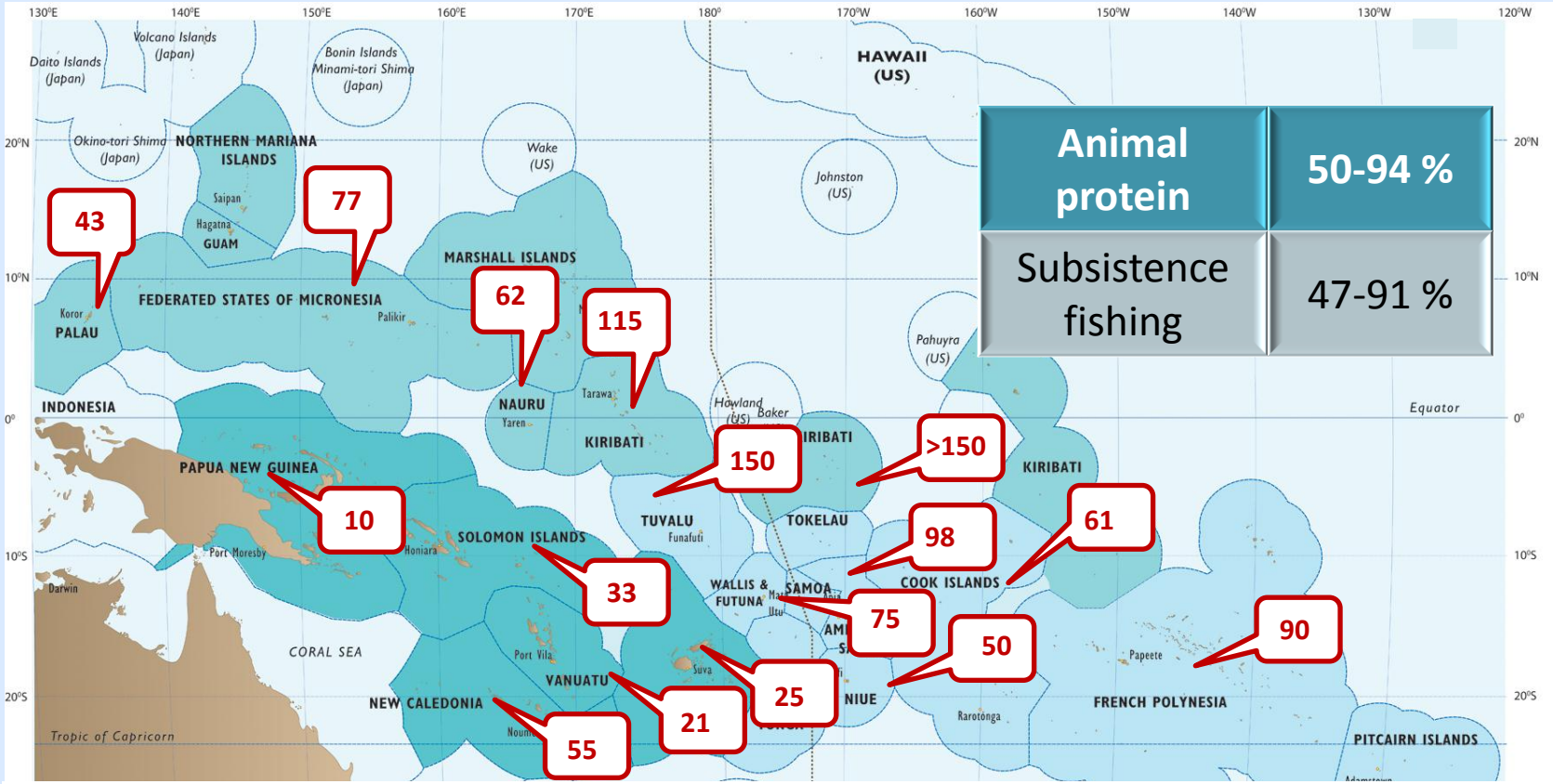
Food security and climate change

Outline

- Importance of fish for food security
- Factors affecting availability of fish for food
- Projected effects of climate change
- Implications for food security
- Practical adaptations
- Data needed

How much fish do we eat?

- Fish consumption in rural areas (kg/person/year)



Source: Bell et al. (2009), Gillett (2009)

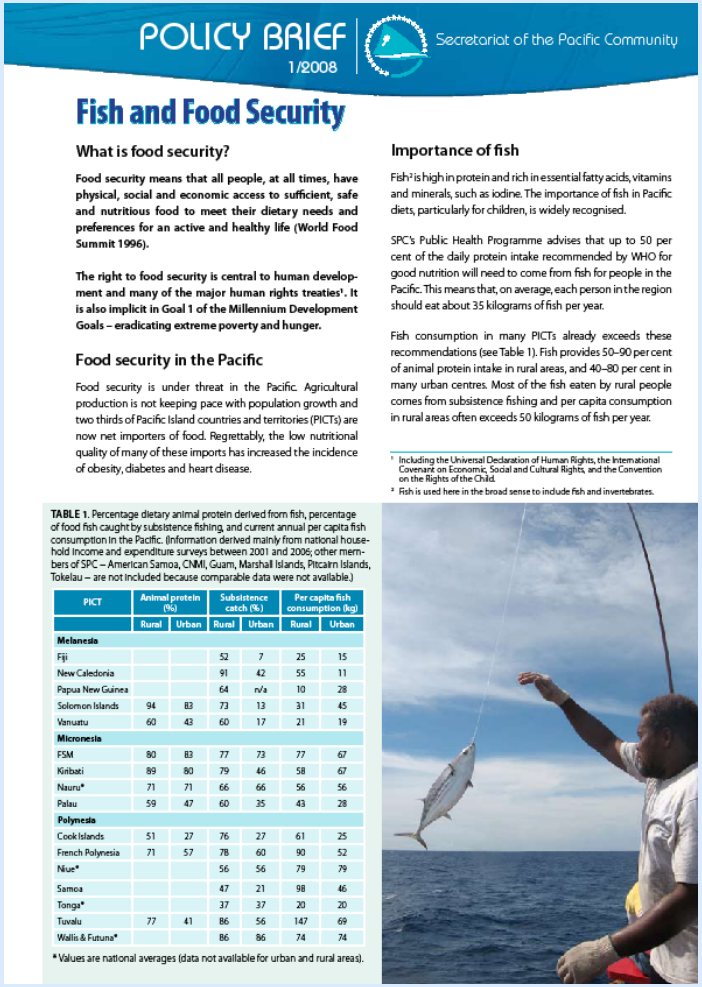
Fish needed for good nutrition

Basic protein requirement is 0.7 g/kg body weight/day (WHO)

- Ideal: 50% of protein derived from fish
- = 35 kg/person/year

Plans to use fish for food security

- Provide 35 kg of fish per person per year
- Maintain traditional fish consumption where it is >35 kg



POLICY BRIEF 1/2008 — Secretariat of the Pacific Community

Fish and Food Security

What is food security?

Food security means that all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food to meet their dietary needs and preferences for an active and healthy life (World Food Summit 1996).

The right to food security is central to human development and many of the major human rights treaties[1]. It is also implicit in Goal 1 of the Millennium Development Goals – eradicating extreme poverty and hunger.

Food security in the Pacific

Food security is under threat in the Pacific. Agricultural production is not keeping pace with population growth and two thirds of Pacific Island countries and territories (PICTs) are now net importers of food. Regrettably, the low nutritional quality of many of these imports has increased the incidence of obesity, diabetes and heart disease.

Importance of fish

Fish[2] is high in protein and rich in essential fatty acids, vitamins and minerals, such as iodine. The importance of fish in Pacific diets, particularly for children, is widely recognised.

SPC's Public Health Programme advises that up to 50 per cent of the daily protein intake recommended by WHO for good nutrition will need to come from fish for people in the Pacific. This means that, on average, each person in the region should eat about 35 kilograms of fish per year.

Fish consumption in many PICTs already exceeds these recommendations (see Table 1). Fish provides 50–90 per cent of animal protein intake in rural areas, and 40–80 per cent in many urban centres. Most of the fish eaten by rural people comes from subsistence fishing and per capita consumption in rural areas often exceeds 50 kilograms of fish per year.

[1] Including the Universal Declaration of Human Rights, the International Covenant on Economic, Social and Cultural Rights, and the Convention on the Rights of the Child.
[2] Fish is used here in the broad sense to include fish and invertebrates.

TABLE 1. Percentage dietary animal protein derived from fish, percentage of food fish caught by subsistence fishing, and current annual per capita fish consumption in the Pacific. (Information derived mainly from national household income and expenditure surveys between 2001 and 2006; other members of SPC – American Samoa, CNMI, Guam, Marshall Islands, Pitcairn Islands, Tokelau – are not included because comparable data were not available.)

PICT	Animal protein (%)		Subsistence catch (%)		Per capita fish consumption (kg)	
	Rural	Urban	Rural	Urban	Rural	Urban
Melanesia						
Fiji			52	7	25	15
New Caledonia			91	42	55	11
Papua New Guinea			64	n/a	10	28
Solomon Islands	94	83	73	13	31	45
Vanuatu	60	43	60	17	21	19
Micronesia						
FSM	80	83	77	73	77	67
Kiribati	89	80	79	46	58	67
Nauru*	71	71	66	66	56	56
Palau	59	47	60	35	43	28
Polynesia						
Cook Islands	51	27	76	27	61	25
French Polynesia	71	57	78	60	90	52
Niue*			56	56	79	79
Samoa			47	21	98	46
Tonga*			37	37	20	20
Tuvalu	77	41	86	56	147	69
Wallis & Futuna*			86	86	74	74

* Values are national averages (data not available for urban and rural areas).

Where does most fish come from?

- Coastal fisheries / coral reefs, mangroves and sea grasses

Photos: Eric Clua, Gary Bell, Christophe Launay

The problem!

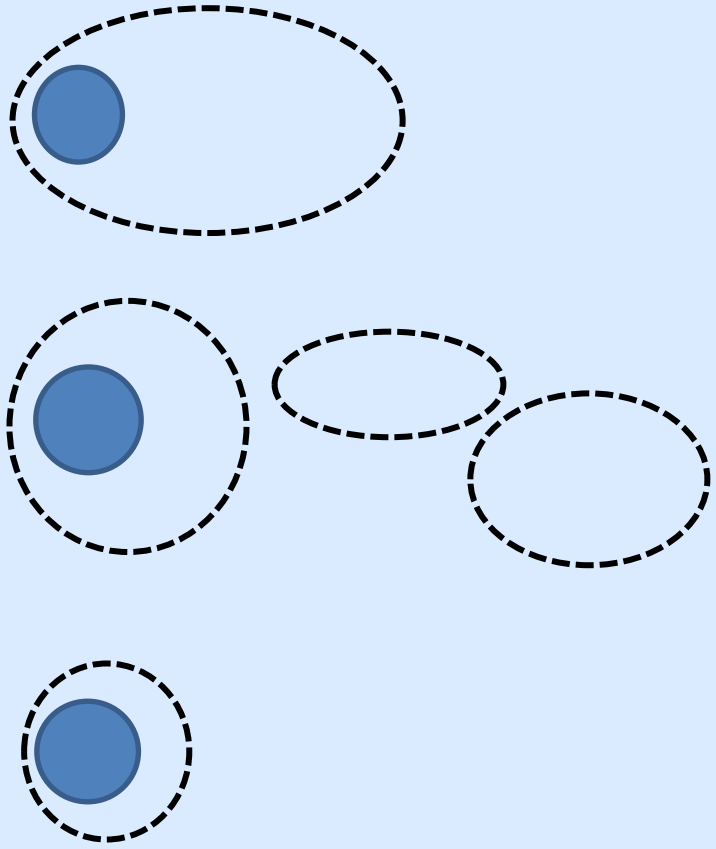
- Sustainable catches from most reefs are unknown

Solution: use median estimate of 3 tonnes per km^2 per year

Factors affecting availability of fish

- Coral reef area – three groups of PICTs

Group 1	**Large area of reef per person**
Group 2	**Large area of reef per person but remote**
Group 3	**Small area of reef per person**



Factors affecting availability of fish

Group	PICT
1	Cook Islands, Marshall Islands, New Caledonia, Palau, Pitcairn Islands, Tokelau
2	Fiji, FSM, French Polynesia, Kiribati, Niue, Tonga, Tuvalu, Wallis and Futuna
3	American Samoa, Guam, Nauru, CNMI, PNG, Samoa, Solomon Islands, Vanuatu

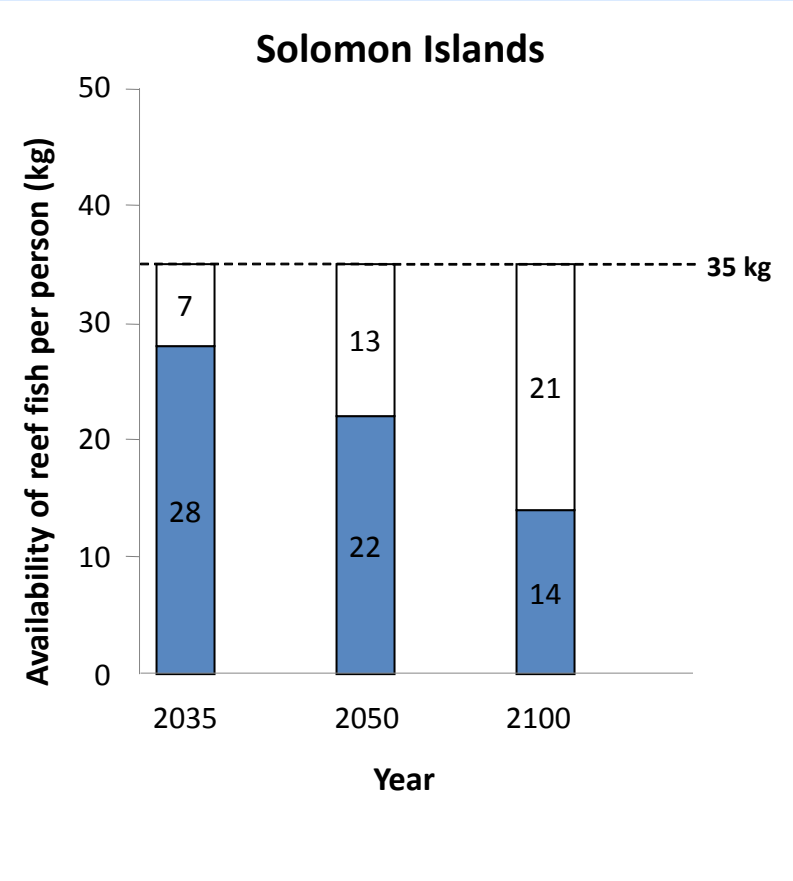
Factors affecting availability of fish

- Population growth

Year	Population (million)	
2013	**11**	
2035	**16**	
2050	**18?**	
2100	**27?**	

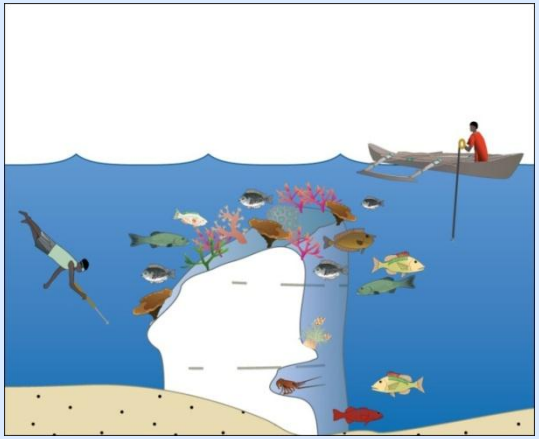
Source: SPC Statistics for Development Division

Effects of population growth on availability of fish per person

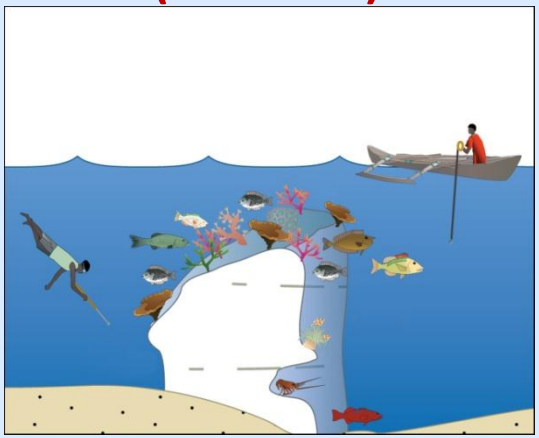


Effects of climate change

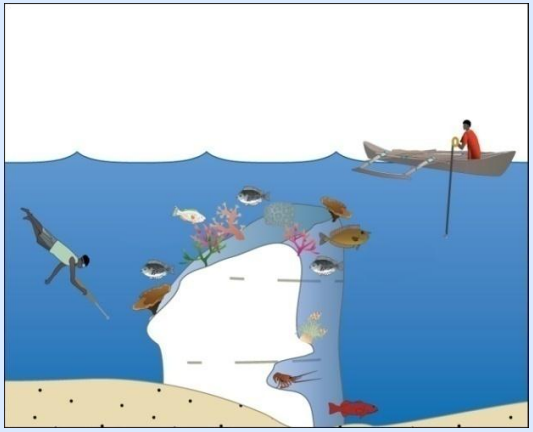
Today



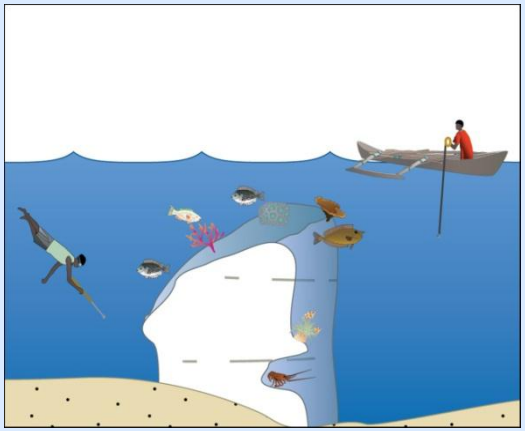
2035 (-2 to -5%)



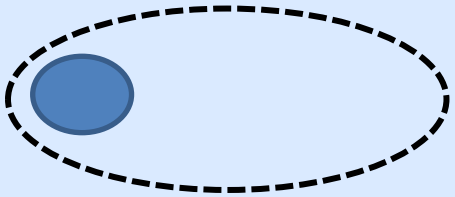
2050 (-20%)



2100 (-20 to -50%)



Group 1



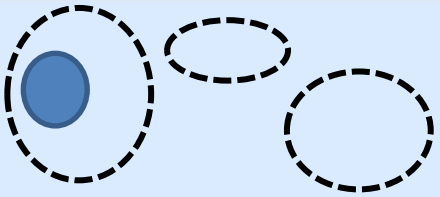
Effects of population growth AND climate change

- **No implications!**

PICT	Fish available per person per year (kg)*		
	2035	2050	2100
Cook Islands	115	101	92
Marshall Islands	644	556	484
New Caledonia	326	268	215
Palau	320	283	250
Tokelau	495	451	388

*Based on 3 tonnes of fish and invertebrates per km2 of reef per year, and A2 emissions scenario

Group 2



- Effects of population growth AND climate change
- **Some implications**

PICT	Fish available per person per year (kg)*		
	2035	2050	2100
Fiji	77	58	38
FSM	418	352	307
French Polynesia	131	109	85
Kiribati	86	65	42
Niue	125	114	104
Tonga	145	116	81
Tuvalu	711	570	362
Wallis & Futuna	197	171	145

*Based on 3 tonnes of fish and invertebrates per km2 of reef per year, and A2 emissions scenario

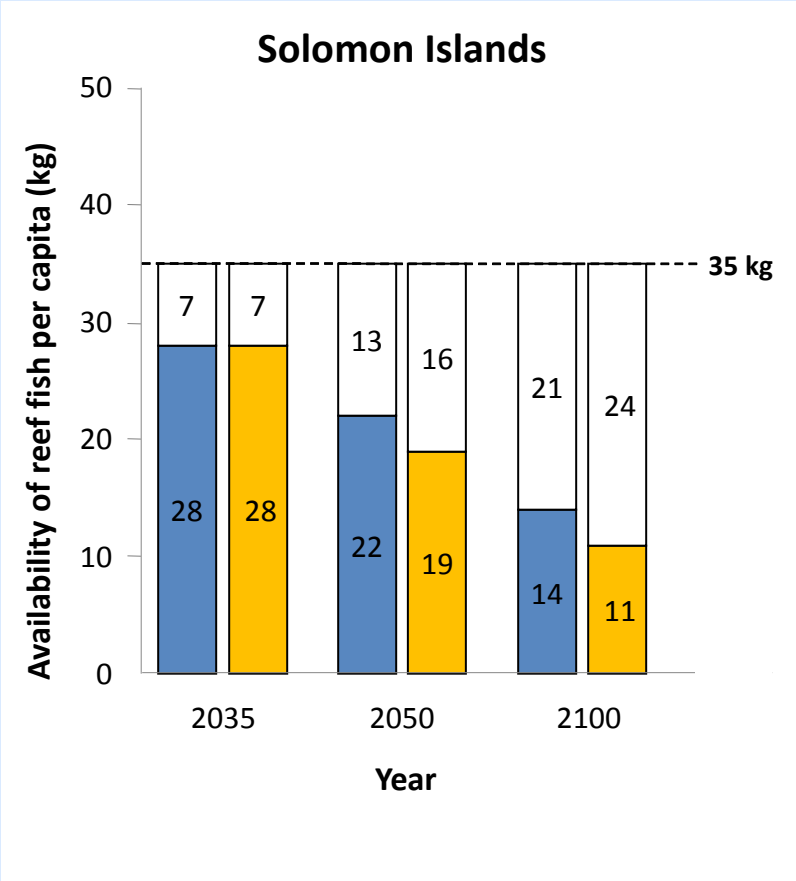
Group 3

- Severe implications due to population growth alone!

PICT	Fish available per person per year (kg)		
	2035	2050	2100
American Samoa	13	11	8
Guam	3	3	2
Nauru	1	1	1
PNG	8	6	4
CNMI	10	9	9
Samoa	30	29	25
Solomon Islands	28	23	14
Vanuatu	10	8	6

*Based on 3 tonnes of fish and invertebrates per km2 of reef per year, and A2 emissions scenario

Additional effects of climate change



Effects of population growth

Additional effects of climate change

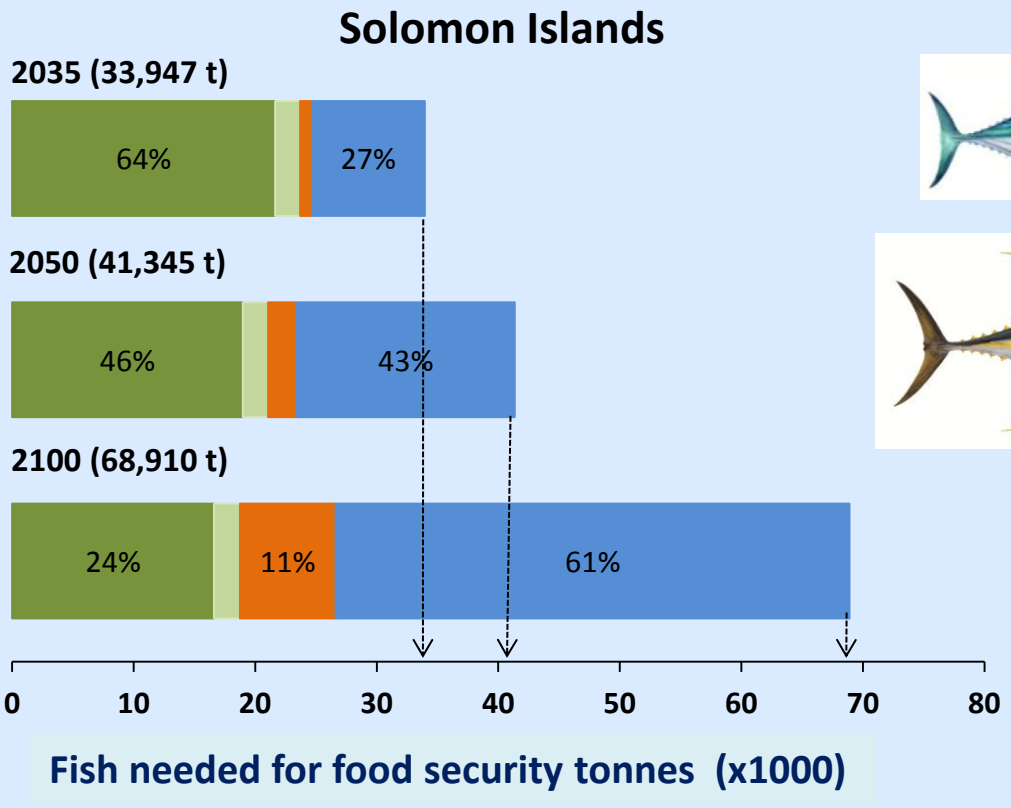
Group 3

- Gap to be filled

PICT	Gap in fish needed per person per year (kg)					
	2035		2050		2100	
	Popn	CC	Popn	CC	Popn	CC
American Samoa	22	23	24	26	27	29
Fiji	0	1	3	7	9	15
Guam	32	32	32	33	33	33
PNG	27	27	29	29	31	32
Nauru	34	34	34	34	34	34
CNMI	25	25	26	27	26	29
Samoa	5	6	6	11	10	16
Solomon Islands	7	7	13	16	21	24
Vanuatu	26	26	28	29	31	32

*Based on 3 tonnes of fish and invertebrates per km2 of reef per year, and A2 emissions scenario

Group 3 - How best to fill the gap?

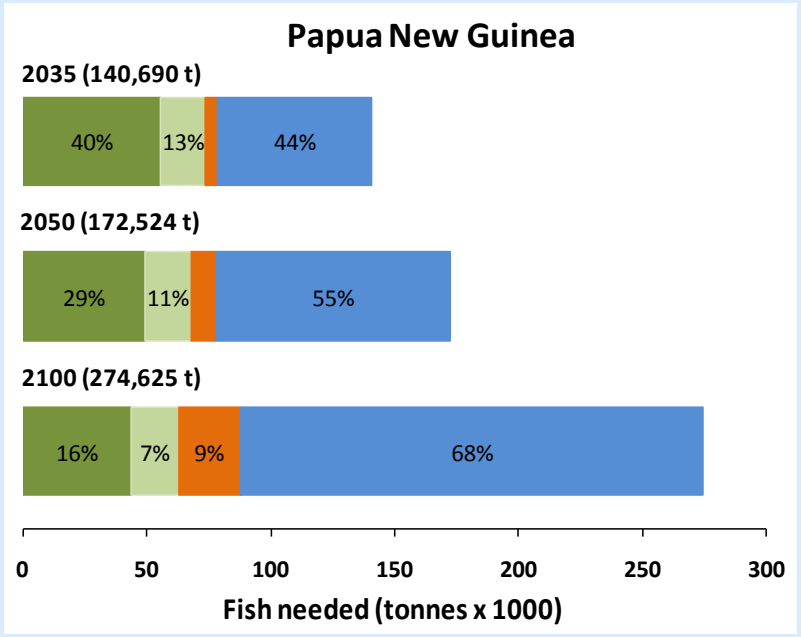


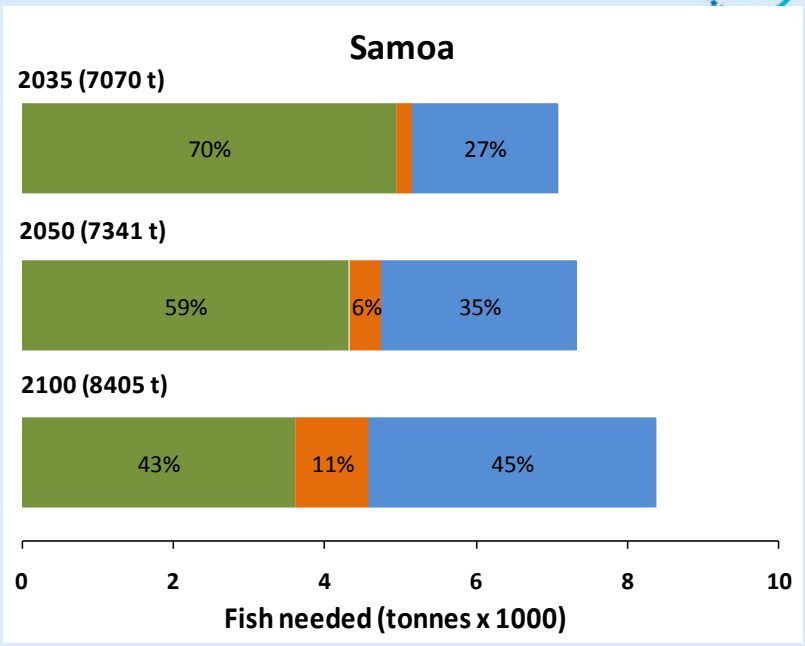
Coastal fisheries

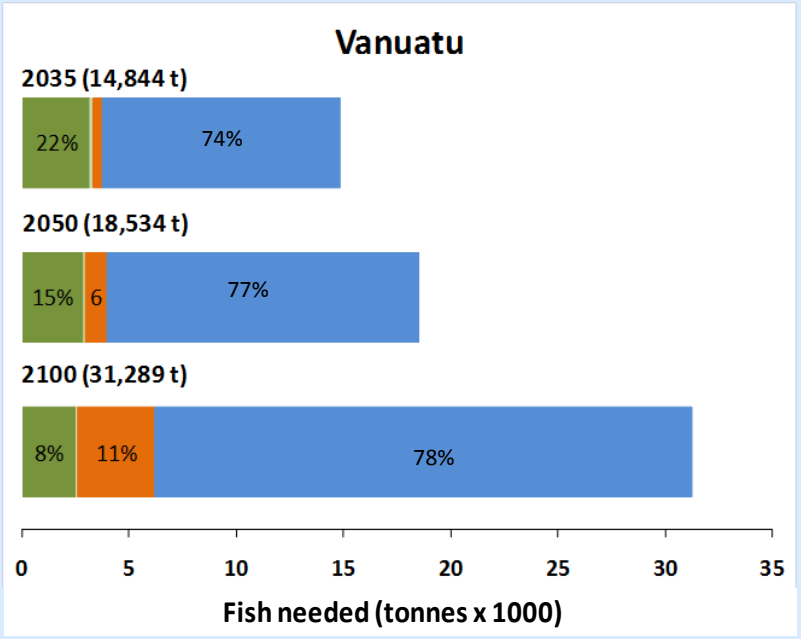
Freshwater fisheries

Pond aquaculture

Tuna (and bycatch)

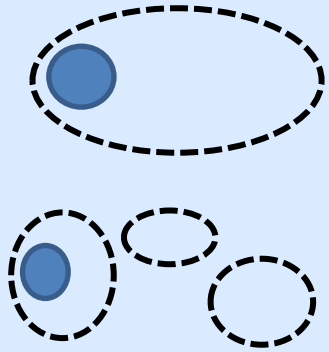

Papua New Guinea
2035 (140,690 t)
40%
13%
44%
2050 (172,524 t)
29%
11%
55%
2100 (274,625 t)
16%
7%
9%
68%
0
50
100
150
200
250
300
Fish needed (tonnes x 1000)


Samoa
2035 (7070 t)
70%
27%
2050 (7341 t)
59%
6%
35%
2100 (8405 t)
43%
11%
45%
0
2
4
6
8
10
Fish needed (tonnes x 1000)


Vanuatu
2035 (14,844 t)
22%
74%
2050 (18,534 t)
15%
6
77%
2100 (31,289 t)
8%
11%
78%
0
5
10
15
20
25
30
35
Fish needed (tonnes x 1000)

Main points so far

- PICTs in Groups 1 and 2 have sufficient coral reef per person to provide fish for food security well into the future

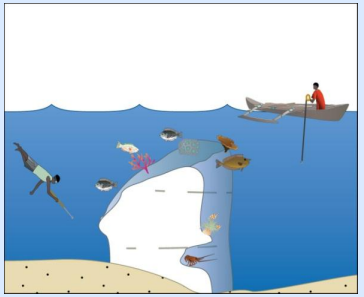


- Shortages of fish may occur near major towns due to distribution problems

Main points so far

- Population growth in PICTs in Group 3 will have a much stronger effect on availability of fish than climate change

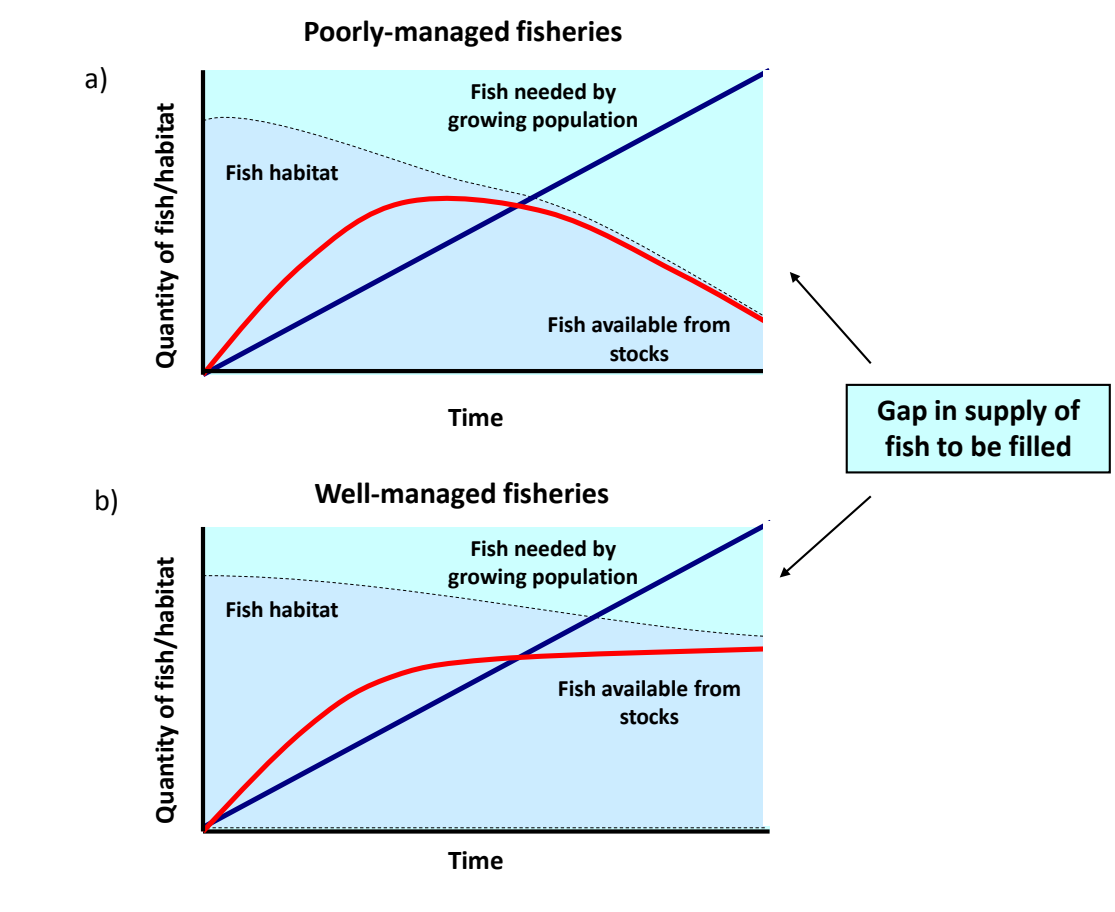
- Shortages of reef fish will occur in all these PICTs



- Most of the gap will need to be filled by tuna

Next steps

- Practical adaptations to minimise and fill the gap

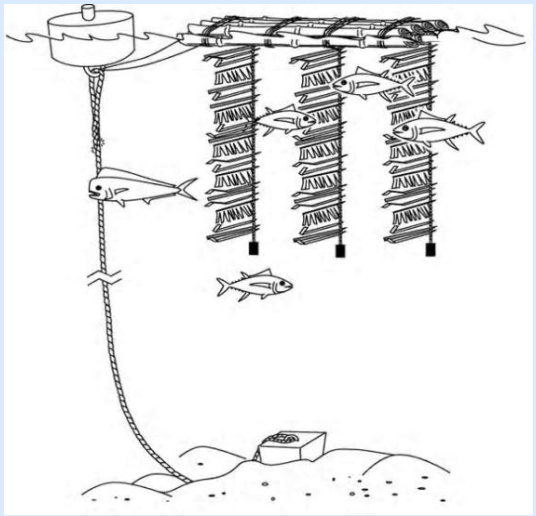


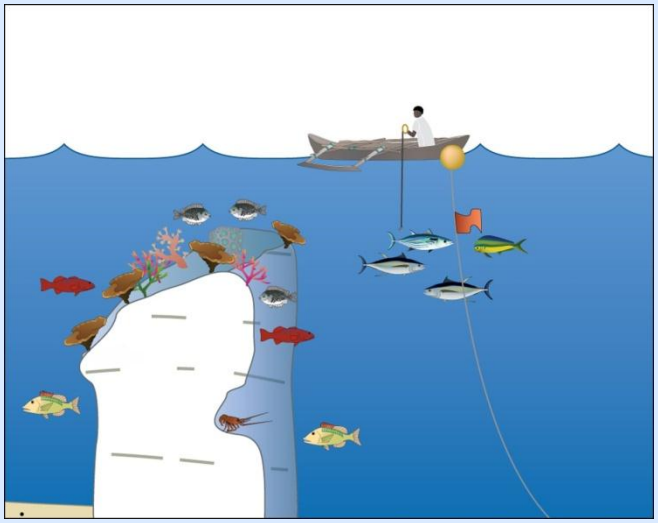
Practical adaptations

- Store and distribute tuna and bycatch from industrial fleets to urban areas

Practical adaptations

- Increase access to tuna with anchored inshore Fish Aggregating Devices



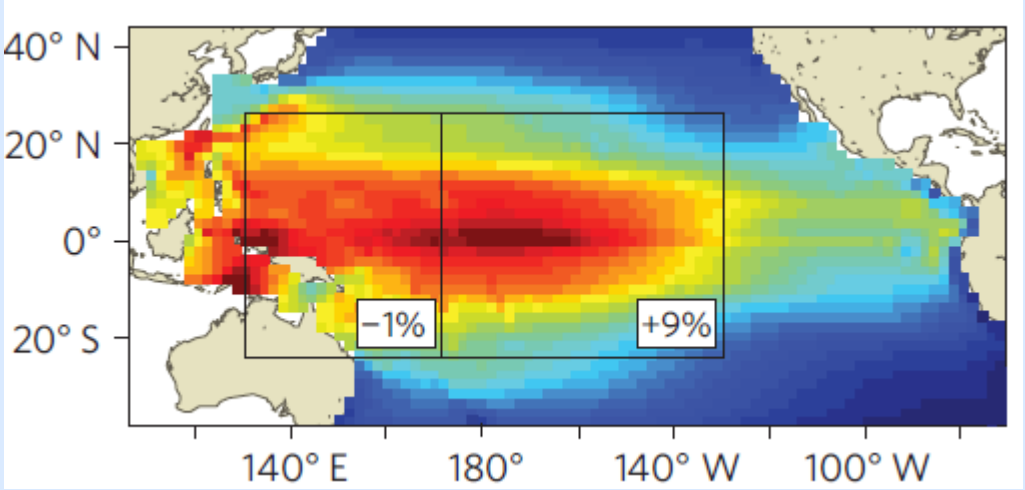


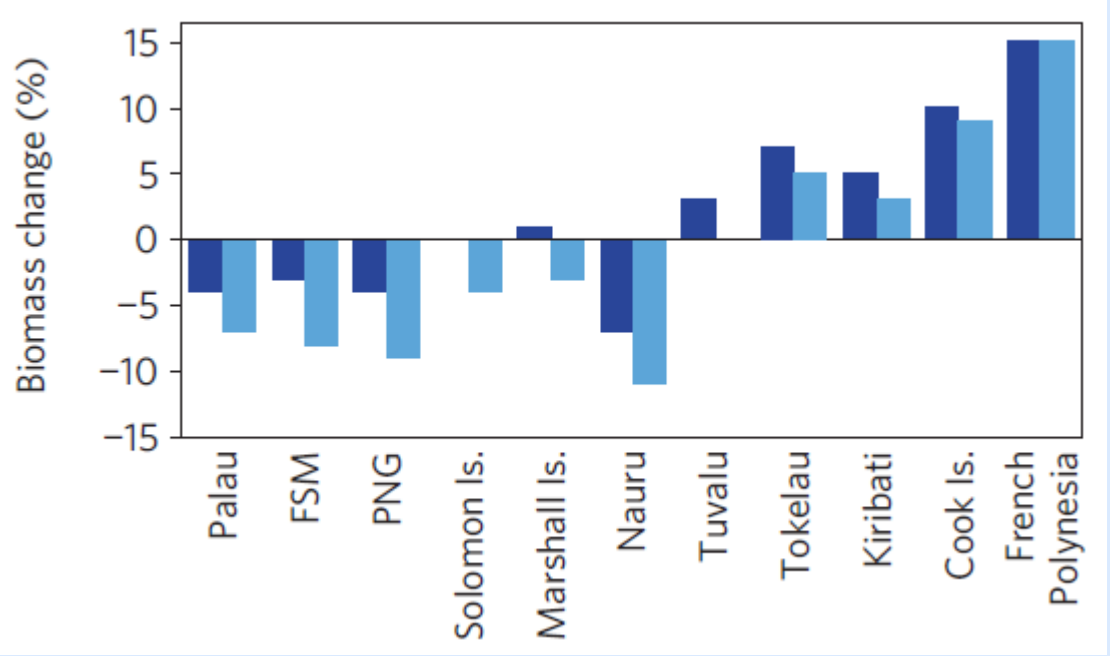
Win-win adaptations

Projected changes in skipjack tuna by 2035

Relative to virgin stock levels

Average fishing effort x 1.5





Data needed

- How much small tuna and bycatch is being landed during transhipping operations?
- How much fresh tuna is being caught by artisanal fisheries for sale in urban centres?
- How much tuna is being caught by subsistence fishers in rural areas?
- What proportion of artisanal catch is from FADs (including species, sizes and catch rates)

Thank you