



CLIMATE CHANGE ADAPTATION TECHNOLOGIES FOR THE FISHERIES SECTOR IN THE PACIFIC ISLANDS

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Outline

- Brief Description of the Study
- Climate Scenario Modeling Methodology
- Impacts of Climate Change and Adaptation Strategies for Fisheries and Aquaculture
- Policy Recommendations for Adapting to Climate Change

Brief Description of the Study

Objectives:

- Assess the future and projected impacts of climate change on key coastal and marine resources in the Pacific coral triangle countries
- Evaluate the impacts of climate change adaptation strategies to the fisheries resources



Source: http://www.nathnac.org/ds/map_wp_islands.aspx

Countries under study:

- Fiji
- Solomon Islands
- Vanuatu

Duration:
2011-2013



CLIMATE SCENARIO MODELING METHODOLOGY

Supply-and-Demand Model

Key fisheries subsectors <ul style="list-style-type: none">• Tuna• Other oceanic finfish• Coastal finfish• Coastal invertebrates• Freshwater finfish• Freshwater invertebrates	Application <p>Utilized for comparative analysis of alternative adaptation scenarios while taking account the impacts of climate change in the fisheries sector</p> <ul style="list-style-type: none">• Aquaculture• Natural resource management (e.g. marine protected areas)• Low-cost fish aggregating device
Model alternative scenarios <ul style="list-style-type: none">• Baseline (2006-2009)• Climate change adaptation strategies• Periods: medium-term (2035) and long-term (2050)	Impacts of climate change and climate change adaptation strategies are accounted as the difference in <ul style="list-style-type: none">• Production• Consumption• Trade• Income in the fisheries sector

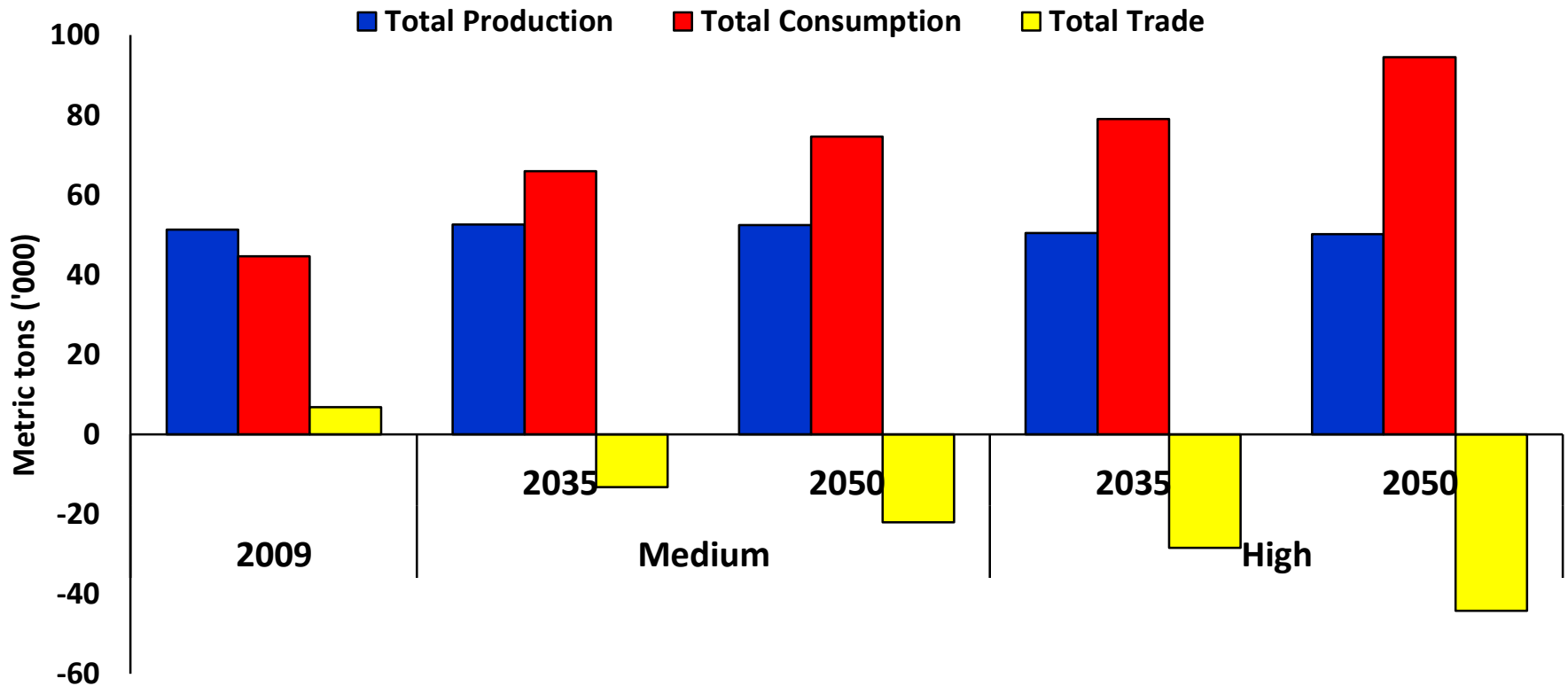
Represents climate change in terms of supply shocks, and works out its economic consequences using the microeconomic tools of supply and demand



IMPACTS OF CLIMATE CHANGE: Fiji, Solomon Islands and Vanuatu



FIJI: Production, Consumption, and Trade, Baseline (medium and high) scenarios, 2035 and 2050



Source: Dey, Rosegrant and Valmonte-Santos. 2013

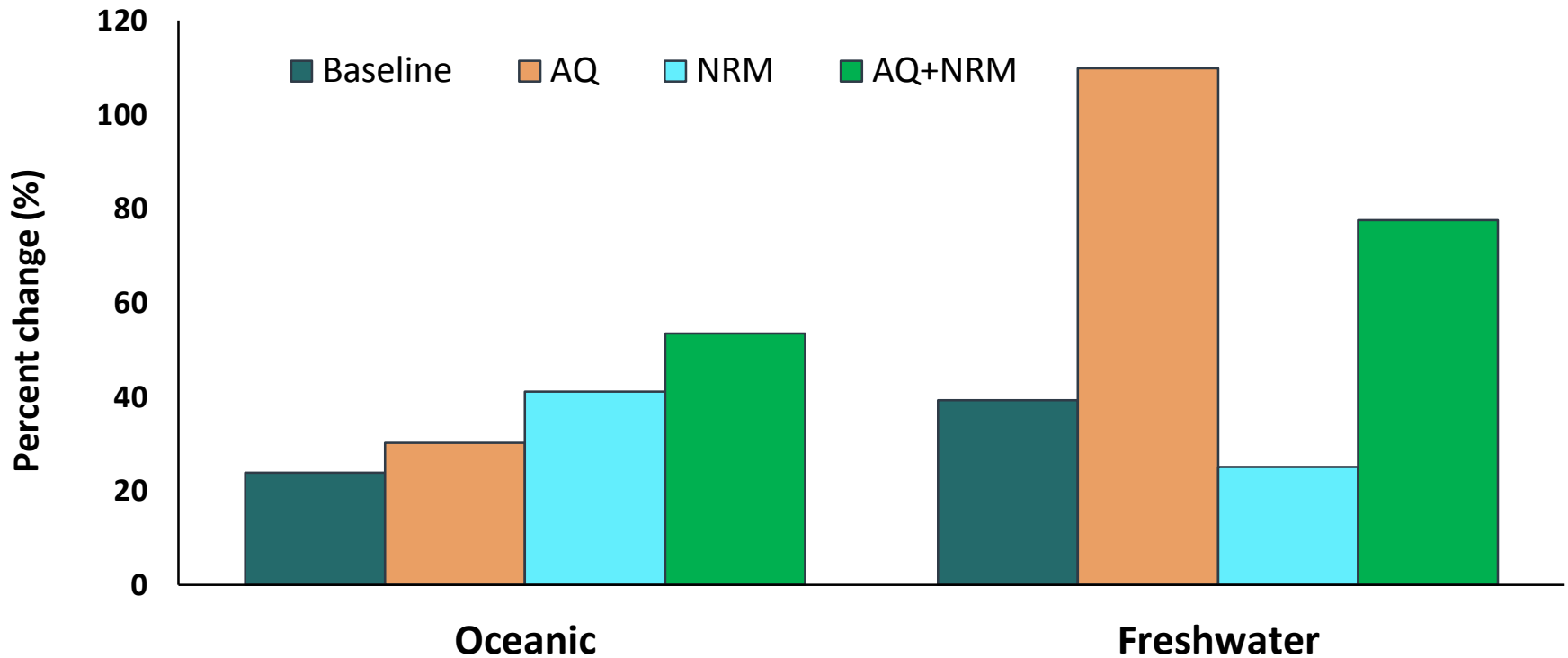
Note:

Baseline = trend + climate change (no adaptation strategies)

Medium = 1% annual growth rate of per capita real income

High = 2% annual growth rate of per capita real income

FIJI: Change (%) in Production, Baseline (2006-2009) and with Climate Change Adaptation Strategies (2035), Medium

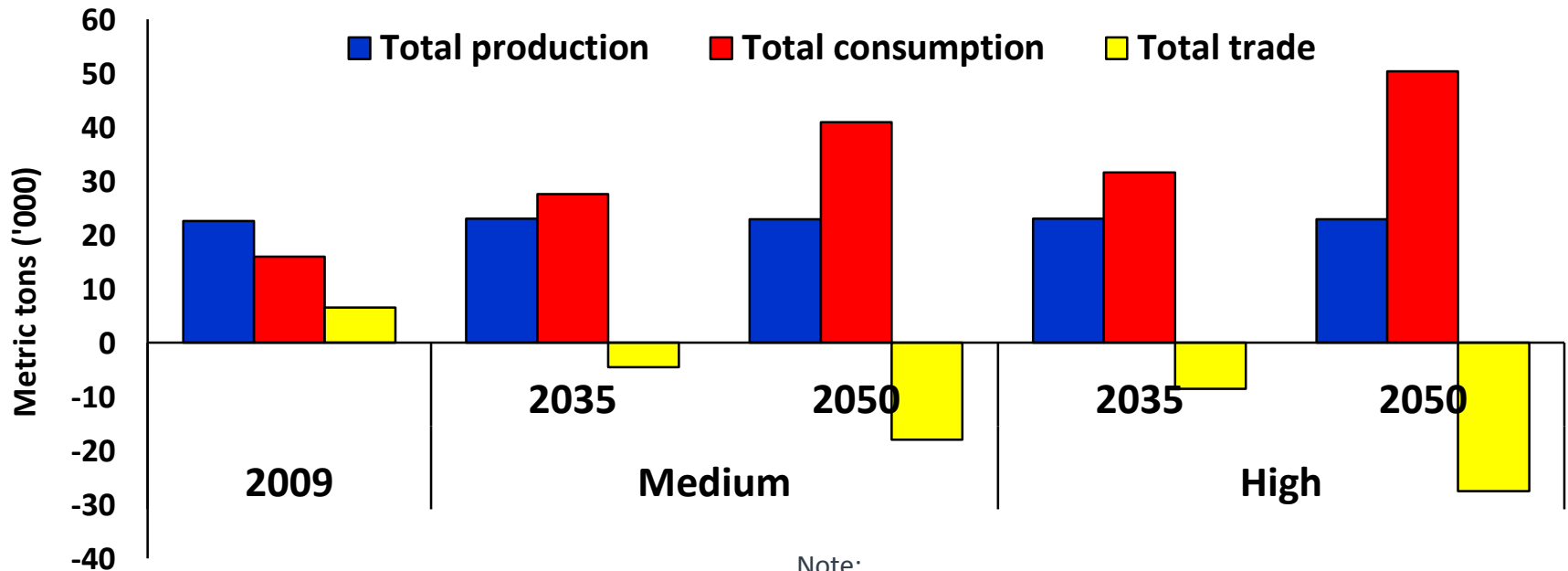


Source: Dey, Rosegrant and Valmonte-Santos. 2013

- **Aquaculture (AQ) development:** increase in freshwater production –targets food security and income opportunities particularly for coastal communities and poor households
- **Natural resource management (NRM) adoption:** expected to reduce Fiji’s fish and seafood importation substantially; lessen the burden on foreign exchange



SOLOMON IS: Production, Consumption, and Trade, Baseline, 2035 and 2050



Source: Dey, Rosegrant and Valmonte-Santos. 2013

Note:

Baseline – trend + climate change (no adaptation strategies)

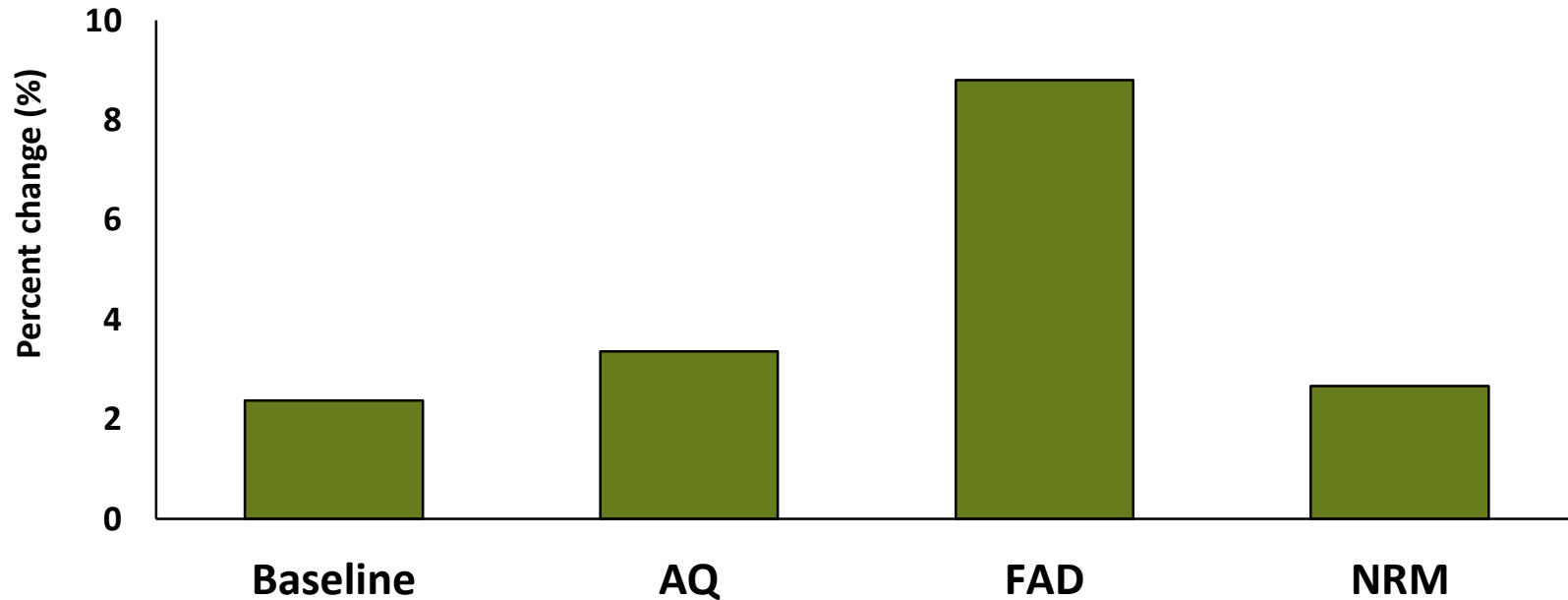
Medium = 2% annual growth rate of per capita real income

High = 3% annual growth rate of per capita real income

Total domestic fish consumption

- Likely to surpass domestic production
- Major part of this increased demand for oceanic fish species, like tuna
- Less oceanic fish catch in addition to harvest by foreign vessels - need to import fish in large volumes to meet the projected demand

SOLOMON ISLANDS: Change (%) in Oceanic Production, Baseline (2006-2009) and with Climate Change Adaptation Strategies (2035), Medium



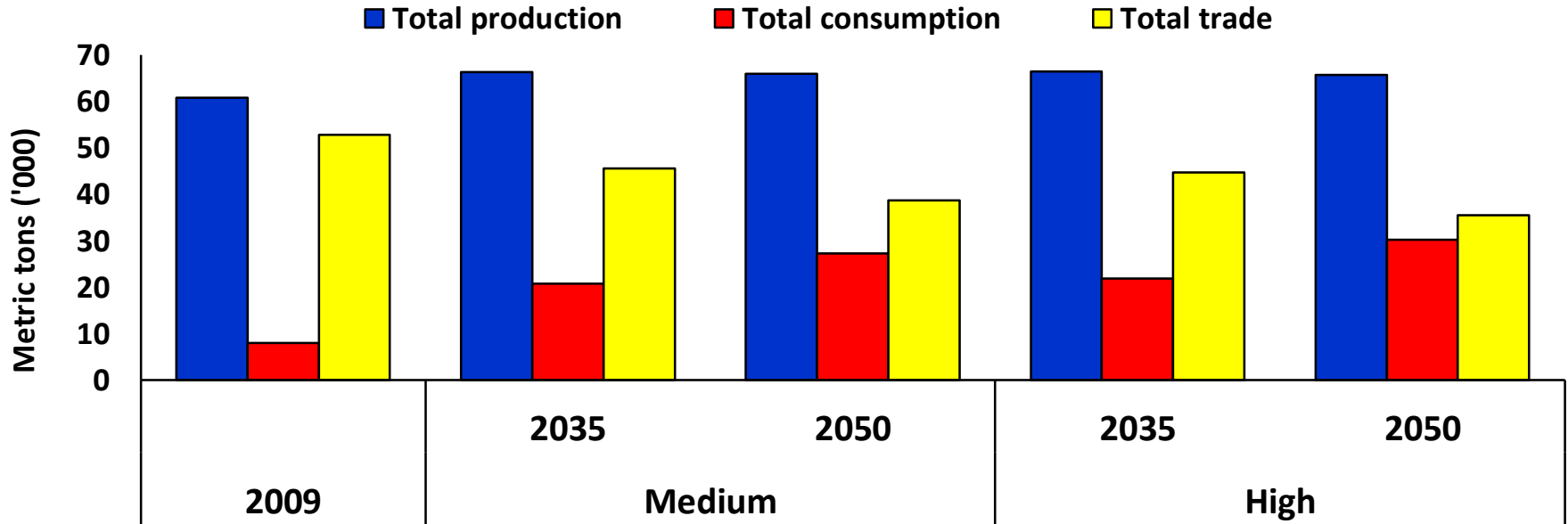
Source: Dey, Rosegrant and Valmonte-Santos. 2013

Low-cost fish aggregating device (FAD)

- Highest increase in production among the adaptation strategies
- Potentials to reduce projected dependence on fish imports
- Substantially enhance fisheries economy and food security given high contribution of tuna to fish and seafood consumption



VANUATU: Production, Consumption, and Trade, Baseline, 2035 and 2050



Source: Dey, Rosegrant and Valmonte-Santos. 2013

Note:

Baseline – trend + climate change

Medium = 1.5% annual growth rate of per capita real income

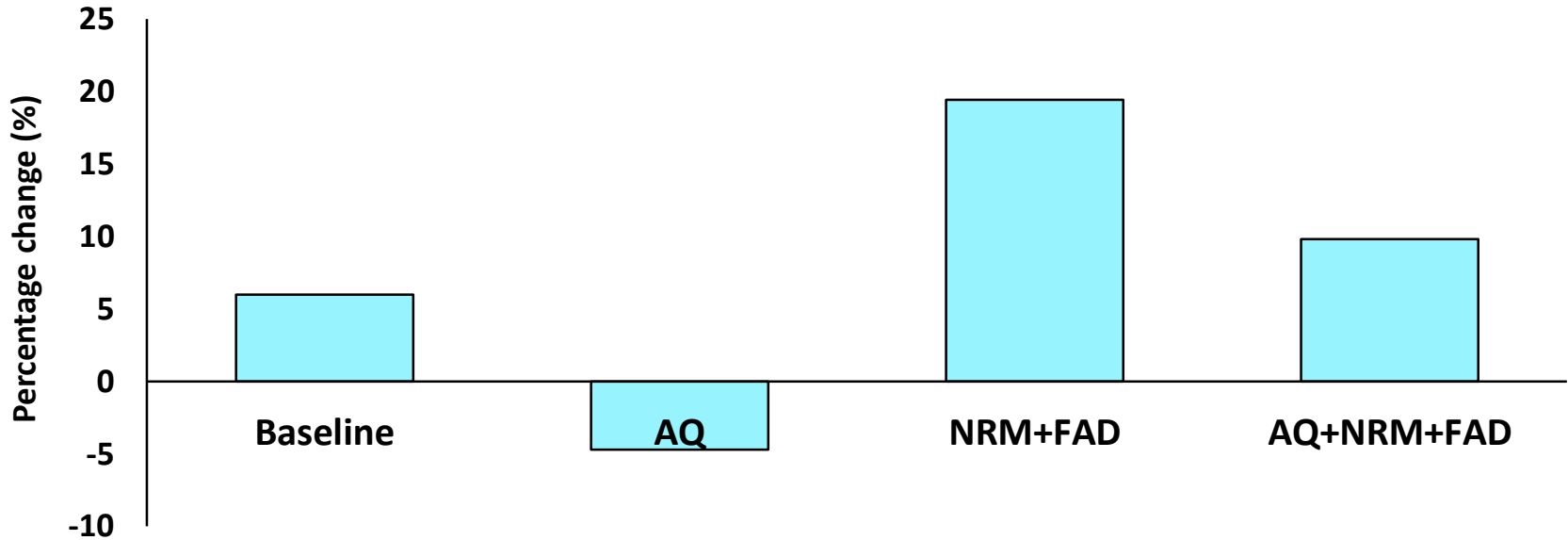
High = 2.5% annual growth rate of per capita real income

Aggregate fish consumption

- Projected to rise substantially due to increasing population and income growth
- Likely need to import coastal fish to meet rising demand
- Reliance of poorer households on coastal fisheries for consumption will have serious food security implications



VANUATU: Change (%) in Oceanic Production, Baseline (2006-2009) and with Climate Change Adaptation Strategies (2050), Medium income growth



Source: Dey, Rosegrant and Valmonte-Santos. 2013

- **NRM+FAD:** highest positive impact on oceanic fish supply - from 6% under baseline to about 20% in 2050
- **NRM, FADs:** expected to decrease prices of tuna, coastal finfish, coastal invertebrates, and freshwater finfish at 1.5% income growth per annum; implications to food accessibility, affordability and in the long-run food security of the poorer households

National-level economic gain (equivalent variation) resulting from climate change adaptation strategies

Climate Change Adaptation Strategies	Economic Gain per Year (US\$ in 2009 prices)					
	FIJI		SOLOMON ISLANDS		VANUATU	
	2035	2050	2035	2050	2035	2050
Aquaculture	802,701	2,638,290	91,432	131,491	4,093,545	4,531,688
NRM	11,560,219	14,496,463	597,876	586,285	-	-
Aquaculture + NRM	11,813,084	16,208,939	-	-	-	-
FAD	-	-	5,397,933	7,827,481	-	-
NRM+ FAD	-	-	-	-	17,488,902	34,594,460
Aqua+NRM+FAD	-	-	-	-	22,262,116	38,247,642

Source: Dey, Rosegrant and Valmonte-Santos 2013.

- **Benefits of policy support to fully implement, at a minimum, these three climate change adaptation strategies**
- **Policy support should include**
 - review and mobilization of existing national development plans related to climate change
 - adaptation options must reach target coastal communities and other vulnerable groups, as well as facilitate the approval of any pending associated development plans



CONCLUSIONS AND POLICY RECOMMENDATIONS



Modeling and Scenario Analyses

- Fiji, Solomon Islands, Vanuatu
 - Currently net exporters of fish (excluding foreign tuna catch)
 - But strong likelihood to become net fish importers under baseline policies
- Rising per capita income and population - fish and seafood demand expected to increase substantially up to 2050
- Growth in domestic fish production projected to be slow due to climate change and other constraints
- Aquaculture promotion - raise aggregate fish production, consumption and trade
- Low-cost fish aggregating device (FAD) and natural resource management (e.g. marine protected areas [MPA]) – positive impact: expansion of stock and catch of fish

Policy Lessons

- Current scale of implementation of these adaptation strategies (aquaculture, low-cost FAD and MPA) are too small to have the required impacts to meet demands
- Aggressive but judicious increases in investment in these three strategies require important policies to adapt to climate change and meet growing fish demand
- Essential to tailor these policies to the conditions in each of the countries and locations



Increase Investment in Supporting Policies

- With climate change, additional investments are needed to achieve development targets
- Key areas for increased investment
 - Fisheries research
 - Rural roads
 - Market support
 - Information technologies
 - Education
 - Extension services





Climate Change Requires Enhanced Flexibility and Responsiveness

- Increased information requirements
 - Enhanced fisheries advisory and extension services
 - Hydro-meteorological infrastructure
 - Cell phones, radio market information
- Use adaptive management, pilot projects, monitoring and adjustment to information feedback



Fisheries Policy

- Develop networks of low-cost inshore FAD to increase access to tuna fisheries for the subsistence fishers
- Improve and encourage use of more national tuna catch
- Reinforce government initiatives on reduction of coastal fisheries exploitation – overfishing; degradation of natural habitats; use of destructive fishing gears
- Expand MPAs/LMMAs
- Promote diet diversification to encourage production of freshwater aquaculture



Aquaculture Policies

- Promote aquaculture development - food security, livelihoods, foreign exchange potentials
- Reinforce inter-regional coordination and cooperation based on research, training and information exchanges
- Ensure security of tenure: provide long-term leases to farmers
- Ensure affordable and reliable supply of feed
 - Experimenting with local ingredients vs. imported fish meal
 - Reduced tariffs on imported feeds
- Ensure seed (fry) availability and quality
 - Funding of public fish hatcheries for freshwater species; provision of broodstock to hatcheries and conducts research on marine seed
 - Diagnostic services, research into new strains, certification, production standards, seed inspection to ensure seed quality
- Incentives for investment
 - Loans with preferential rate, access to loans made easier
 - Provides start-up funds
 - Loans without collateral to small-scale farmers



Marine Protected Areas

- Management should be based on traditional systems
 - Coastal fishing area part of community's customary property rights
 - Respect for the local system
- Partnerships with government and NGOs
- Ensure alternative sources of livelihood for communities when MPA established
- Multi-year funding
 - Need for sustainable funding to the grassroots levels
 - Need for community awareness on the level and duration of funding
- Performance-based funding
 - Management according to locally-established regulation
 - Require reporting
 - Establishment of policies and other action
- Legislation
 - Establish a system for funding and reporting
 - Gain people's confidence - money can be tracked and performance measured



Fisheries Policy Research

- Promote research on:
 - Sustainable fisheries management: research on role of protected areas and customary resource management regimes to support improved strategies for managing coastal fisheries; scale-up successful management experiences
 - Aquaculture: feasibility (environmental, economic) and sustainability; culture species; hatcheries; feeds using local ingredients
 - Product development to diversify export base - value adding and marketing studies
 - Stock assessment studies in support of fisheries management plans
 - Economic analysis and modeling of fisheries sector



Data System Improvement

- Integrate national institutions for fisheries data collection
- Seek regional harmonization for best practices and scale economies
- Rationalize data collection and management and analysis and delivery of policy relevant information
- Strengthen meteorological and fisheries data collection and management
- Build capacity to generate timely and accurate data both at national and sub-national level
- From data to value chains: Develop efficient market intelligence service and link potential buyers with producers and processors

Governments, NGOs, communities and other stakeholders of FIJI, SOLOMON ISLANDS and VANUATU

www.ifpri.org; www.adb.org



Dey, M.M., M.W. Rosegrant and R.A. Valmonte-Santos. 2013. Future Prospects and Adaptation Strategies for the Fisheries Sector under Climate Change in the Pacific Coral Triangle Countries. International Food Policy Research Institute, USA and Asian Development Bank, Philippines. 135pp

Vinaka Vakalevu... Tenkyu... Tanggio tumas... Thank you... Marami pong salamat