



WP04A

**Regional Meeting on
Indicators for Fisheries Refugia Management and
Discussion on Project Follow-up**

9-11 September 2019

A-One the Royal Cruise Hotel, Pattaya City, Chonburi Province, Thailand

**RESULTS OF THE
BRAINSTROMING SESSION
ON
INDICATORS FOR LONG TERM MANAGEMENT
OF FISHERIES *REFUGIA***



SOUTHEAST ASIAN FISHERIES DEVELOPMENT CENTER

11 SEPTEMBER 2019

Dimensions	Sub-dimensions	Criteria	Indicators
1) Ecosystem	Fisheries Resources	Abundance stock / Distribution / Fishing Effort	Biomass Estimation (ton)
			Level of MSY (ton)
			Level of MEY (ton)
			Level of CPUE (Kg/...)
			CPUA (Kg/Area)
			Catch landing (ton or Kg)
		Biological Parameter	Length at first capture (Lc)
			Length at first mature (Lm)
			Sex ratio
			Spawning Potential Ratio
			Length frequency
			Exploitation rate
			GSI (Gonadosomatic Index)
		Species composition / Catch structure	Percentage of dominance species
			Number of species
	% Main economic/commercial species		
	Percentage of Bycatch		
	Habitat (mangrove, coral, seagrass, and other critical habitats)	Healthy/condition/ Area	Size Coverage (Percent)
			Healthy Index
			Target habitat density (IUCN reference)
	Environment (Impact from human act.)	Pollution	Standard Water Quality (e.g. COD, BOD)
			Eutrophication
		Phosphate, Nitrate Concentration (Nutrient loading)	
Anthropogenic (Human activity)		Coastal reclamation area	
		Level of maritime activity (If appropriated)	
Erosion		Level and distribution of sedimentation	
		Loss of area/habitat	

Dimensions	Sub-dimensions	Criteria	Indicators
2) Social	Livelihoods	Choice of Occupation	Number of option/ Occupation/ work (Alternative, Permanent work, Subsistence work)
		Fish consumption	Fish consumption per capita per year
	Stakeholder Participation (Indigenous People, Gender, etc.)	Nutrition	% animal protein (if appropriate)
		Participation	Ratio of Number of participations (gender and IP)
		Local Organization	Number of organizations,
			Number of Best practices applied
		Networking	Number of networking
			Type /way of direct or indirect communication
	Education (Local knowledge, Local wisdom)	Number of agreements	
		Awareness program (e.g. information center, information education campaign (IEC))	Number of information center or similar.
			Number of consultations
			Number of best practices
			Number of awareness program
Capacity building	Number of understanding by stakeholder		
3) Economic	Economic Condition (to community)	Poverty incident	Poverty Index
		Capital accessibility	Number of financial accessible
			Income
	Fisheries Production, Fishing Efforts	Contribution of target species / Availability	Value of contribution/production
	Innovative Fisheries Technology	Effectiveness fishing gear	level of CPUE
		Cost effectiveness	Cost reduction, time, human power
		Environment friendly (Green technology)	Reduce of fuel consumption
			Reduce bycatch
		Investment	Number of investment (for e.g. fishing fleet, processing, ship builder, management tools/software, etc.)
	New domestic product		

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4. Governance	Fisheries management policy (Fishing/User Right, Precautionary approaches/Science-based management, and Synergistic Way/Strategy)	Legal framework	Number of law and regulation
		Harvest strategy/ Limit of fishing effort	Fishing close, (area and seasonal closure, Zoning)
			Number of Input control (Number, mesh size, length of fishing gear, Licensing control, Capacity (e.g. Gross tonnage, horsepower, etc.))
			Number of output control (TAC, Quota, Target species)
		Fisheries management plan/ strategy/ framework	Available/not available
			Management plan of Fisheries refugia in place,
			Habitat rehabilitation, protection and stock enhancement.
	Efficiency fishing gear		Length limit (e.g. crab fishery)
	Stakeholder Cooperation/Coordination (Regional / national levels)	Management mechanism	Management board/ committee, transboundary committee, RPOA for refugia in place
			Linkage to the existing management/conservation framework (e.g. MPAs)
	Enforcement	Coordination mechanism	Inter-agency coordination in place, Number of joint operations
		Fishery Law enforcement	Level of enforcement
			Frequency of regular patrol
			Number of violation prosecution
	Capacity Building	Best Practice	Adoption of best practice in place
		Maritime policy and regulation/ International policy	Number of training/workshops
	Funding (Infrastructure, Enforcement, etc.)	Sustainability	Long term commitment of Government on finance
		Source of funding (incentive, soft loan, donation/CSR)	Number of donors
			Type of funds
		incentive	Type of incentive
Number of activities			
Number of best practices			

Dimensions	Sub-dimensions	Criteria	Indicators
5) Climate Change and Disaster	Fish Stock	Impact to Fish Stock	Availability/levels of knowledge abundance, distribution, genetic diversity, recruitment
			Update information impact to fish stock
	Impact to Habitat	Coral bleaching	Area
			Incident/ frequency
			Recovery Rate
		Destruction of mangrove	Area coverage
			Recovery Rate
		Destruction of sea grass	Area coverage
	Recovery Rate		
	Impact to Environment	Sea level rise	Saline intrusion
			Mean sea level annual
			Coastal Erosion (Area)
		Physical/chemical parameters (T, Salinity, PH, DO)	Level of physical and chemical parameters
Precipitation (rainfall) Ocean acidification	Level of Precipitation PH level		