Pengelolaan Perikanan *(Fisheries Management)* dan Strategy Pemanenan *(Harvest Strategy)*

Peninsula Hotel

Manado, 11 Desember 2017

1 Natural Resources National Policy

Natural Resources National Policy
(Including Fish Resource)

Pasal 33 ayat (3) Undang-Undang Dasar 1945 mengamanatkan bahwa bumi, air dan kekayaan yang terkandung didalamnya dikuasai oleh negara dan dipergunakan untuk sebesar-besarnya kemakmuran rakyat.	**Article 33 Para 3 Indonesia Constitution 1945 stipulates that the earth, waters and resources contained therein are owned by the State and used for the greatest prosperity of the Indonesia people.**

2 Pengelolaan Perikanan

Berdasarkan UU No.31 Tahun 2004 sebagaimana telah diubah dengan UU 45 Tahu 2009 tentang Perikanan

Pasal 1 butir (7) UU 45 Tahun 2009 :

Pengelolaan perikanan adalah semua upaya, termasuk proses yang terintegrasi dalam pengumpulan informasi, analisis, perencanaan, konsultasi, pembuatan keputusan, alokasi sumber daya ikan, dan implementasi serta penegakan hukum dari peraturan perundang-undangan di bidang perikanan, yang dilakukan oleh pemerintah atau otoritas lain yang diarahkan untuk mencapai kelangsungan produktivitas sumber daya hayati perairan dan tujuan yang telah disepakati.

Fishery management is all efforts, including integrated processes in the collection of information, analysis, planning, consultation, decision making, allocation of fish resources, and the implementation and enforcement of regulation or rules in the fishery, exercised by the Government or other authorities directed to achieve a continuous productive water bio-resources and agreed objectives.

Fisheries Department, FAO

Fishery management is all efforts, including integrated processes of information gathering, analysis, planning, consultation, decision making, allocation of fish resources, **and formulation and** implementation with enforcement as necessary, of regulation or rules which govern fisheries activities in order to ensure the continued productivity of the resources and the accomplishment of other fisheries objectives.

CCRF-FAO 1995

Article 6.2 Fisheries management should promote the maintenance of the quality, diversity and availability of fishery resources in sufficient quantities for present and future generations in the context of food security, poverty alleviation and sustainable development. Management measures should not only ensure the conservation of target species but also of species belonging to the same ecosystem or associated with or dependent upon the target species.

CCRF-FAO 1995

Article 7.1.1 States and all those engaged in fisheries management should, through an appropriate policy, legal and institutional framework, adopt measures for the longterm conservation and sustainable use of fisheries resources. Conservation and management measures, whether at local, national, subregional or regional levels, should be based on the best scientific evidence available and be designed to ensure the long-term sustainability of fishery resources at levels which promote the objective of their optimum utilization and maintain their availability for present and future generations; short-term considerations should not compromise these objectives.

Substansi Pengelolaan Perikanan

1. Pengumpulan Informasi
2. Analisis
3. Perencanaan
4. Konsultasi
5. Pembuatan Keputusan
6. Alokasi Sumberdaya Ikan
7. Implementasi dan penegakan peraturan perundang-undangan di bidang perikanan oleh Pemerintah atau otoritas lain
8. Untuk mecapai kelangsungan sumberdaya hayati perairan dan tujuan lain yang telah disepakati

1. The collection of information
2. Analysis
3. Planning
4. Consultation
5. Decision making
6. Allocation of fish resources
7. Implementation and enforcement of rules and regulation in fisheries by government or other authorities.
8. In order to achieve a continued productivity of the resources and agreed other objectives.

Pasal 2-UU 45/2009
Pengelolaan perikanan dilakukan berdasarkan asas

Manfaat	Benefit
Keadilan	Fairness
Kebersamaan	Togetherness
Kemitraan	Partnership
Kemandirian	Independent
Pemerataan	Equity
Keterpaduan	Integrated
Keterbukaan	Transparency
Efisiensi	Efficiency
Kelestarian	Sustainability
Pembangunan yang berkelanjutan	Sustainable Development

Based on Article 3 Act No. 31 year 2004 which was amended by Act No. 45 year 2009 on Fisheries, there are at least 9 (nine) **objectives of capture fisheries development as follow:**

- Increase small scale fishermen welfare.
- Increase the country's income and foreign exchange.
- Promote work expansion and employment.
- Increase the availability and consumption of fish protein resources.
- **Optimize fish resources management.**
- Increase productivity, quality, value added and competitiveness.
- Increase the availability of raw material for fish processing industry.
- Achieve fish resources and environment utilization optimally.
- **Ensure fish resources sustainability.**

The need of collecting data

Data Collected → Science → Management → Sustainability

No data → No Analyses

→ No Management (precautionary at best)

Poor data → Analyses with uncertainty

→ Precautionary Management

Good data → Informed Analyses

→ Management [more certainty]

→ **HS, HCRs and RPs can be set**

→ Better chance of Sustainability

Pengumpulan Data

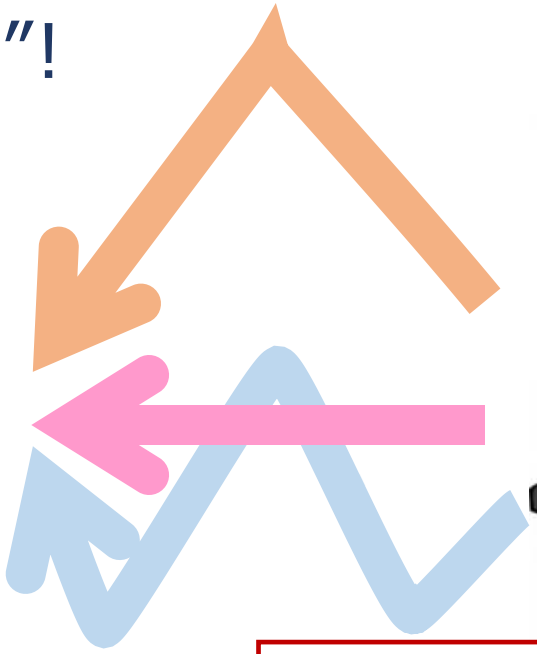
1. Pasal 41A para (2) UU 45/2009 : Salah satu fungsi pelabuhan perikanan adalah pengumpulan data tangkapan dan hasil perikanan;
2. Pasal 42 ayat 2 huruf (f) : salah satu tugas syahbandar adalah memeriksa logbook penangkapan dan pengangkutan ikan.
3. Pasal 46 ayat (1) Pemerintah dan pemerintah daerah menyusun dan mengembangkan sistem informasi dan data statistik perikanan serta menyelenggarakan pengumpulan, pengolahan, analisis, penyimpanan, penyajian, dan penyebaran data potensi, pemutakhiran data pergerakan ikan, sarana dan prasarana, produksi, penanganan, pengolahan dan pemasaran ikan, serta data sosial ekonomi yang berkaitan dengan pelaksanaan pengelolaan sumber daya ikan dan pengembangan sistem bisnis perikanan. (2) Pemerintah dan pemerintah daerah mengadakan pusat data dan informasi perikanan untuk menyelenggarakan sistem informasi dan data statistik perikanan.

Kerahasiaan Data

Pasal 46A Pemerintah menjamin kerahasiaan data dan informasi perikanan yang berkaitan dengan data log book penangkapan dan pengangkutan ikan, data yang diperoleh pengamat, dan data perusahaan dalam proses perizinan usaha perikanan.

Management is …

… like “driving”!



Destination = Goal

Fishery Policy

Someone want go faster,
Someone want go slower,
Someone want go other way…

Management Objectives

3 HARVEST STRATEGY

What is a Harvest Strategy ?

Campbell Davies :

An agreed basis for ***monitoring*** and ***assessing*** a fishery **AND**;

adjusting the level of fishing;

using a specified ***management measure***,

BASED ON the ***harvest control rule***

to meet specific ***objectives***

What is a Harvest Strategy ?

Doug Butterworth:

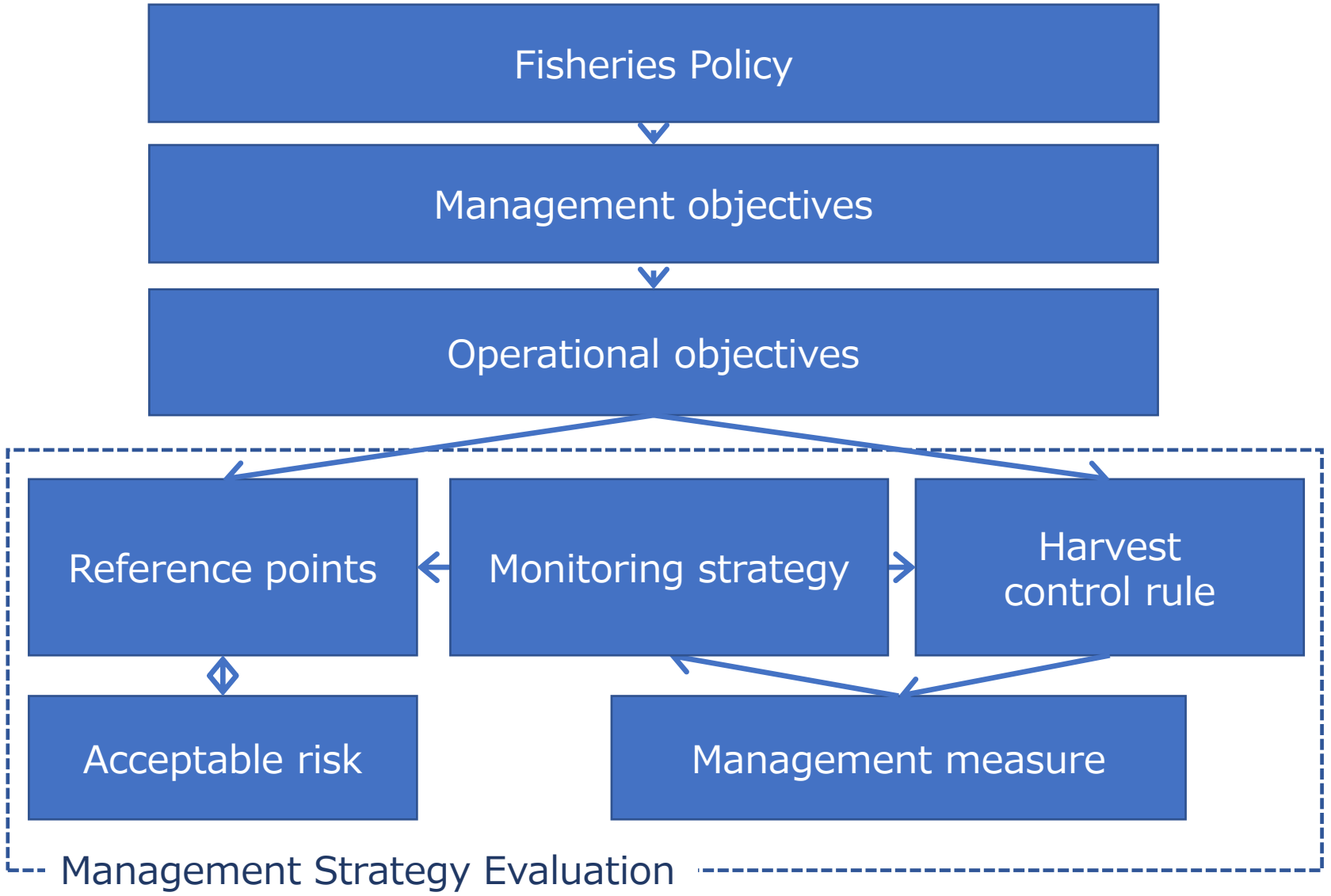
- In essence, harvest strategies amount to agree the rules before you play the game *(to agree rules before fishing operation)*
- You set up the rules first, and then you stick to the rules. Because if you don't have that situation, when you get into trouble, the action that’s taken is too little too late.

Harvest Strategy Elements

There are six (6) elements:

1. Management objective and operational management objectives.
2. Acceptable level of risk.
3. Reference Points (TRP and LRP)
4. Harvest Control Rules (Provide an automatic management responce when a reference point is reached).
5. Monitoring Strategy
6. Management Strategy Evaluation (MSE)

Harvest strategy framework



“Operational objectives”

- The “operational objectives” is concrete goal based on the conceptual management objectives. Therefore operational objective must be;

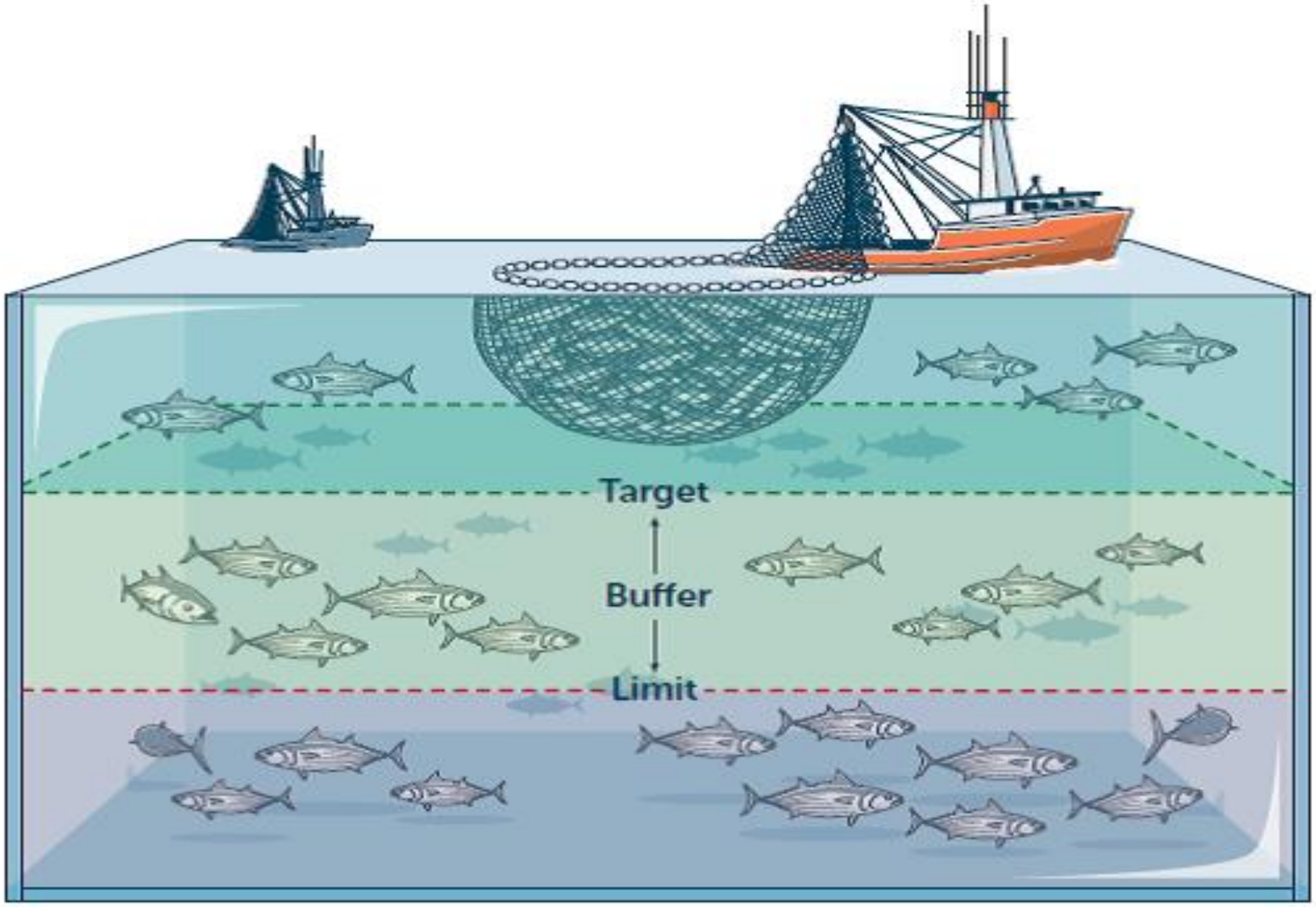
  - Measurable,
  - Realistic and achievable,
  - Accepted by the interested parties in the fishery, and
  - Linked to a time-frame.

- The “operational objectives” should be the frame of reference for the manager to evaluate how well the management is working.

  [Example]
  - To maintain the stock at all times above XX% of its mean unexploited level.

from “A fishery manager’s guidebook” (FAO 2002)

The need for Reference Point



Reference points are benchmark

We can indicate the stock status easily based on the reference point..

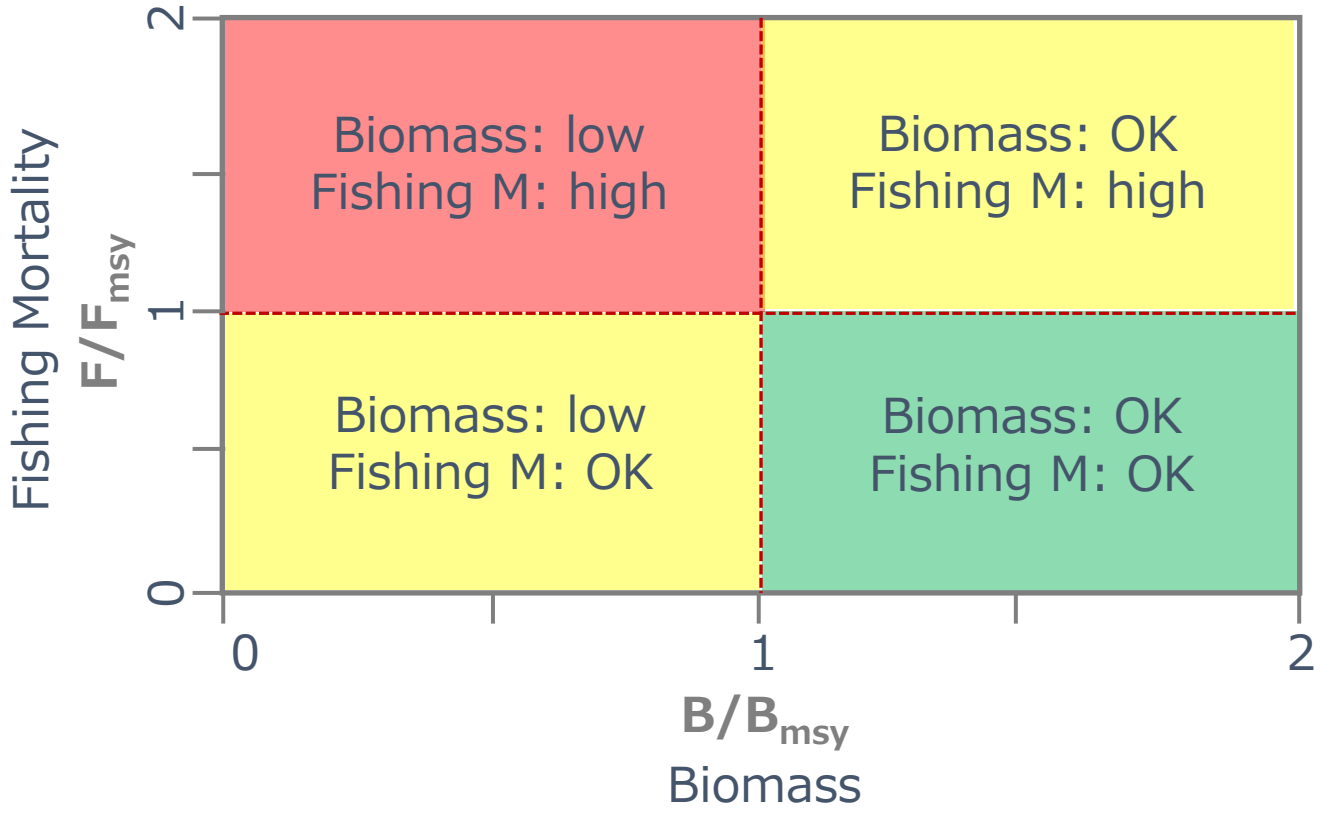
Bad!

Warning!

Good!

Kobe-plot

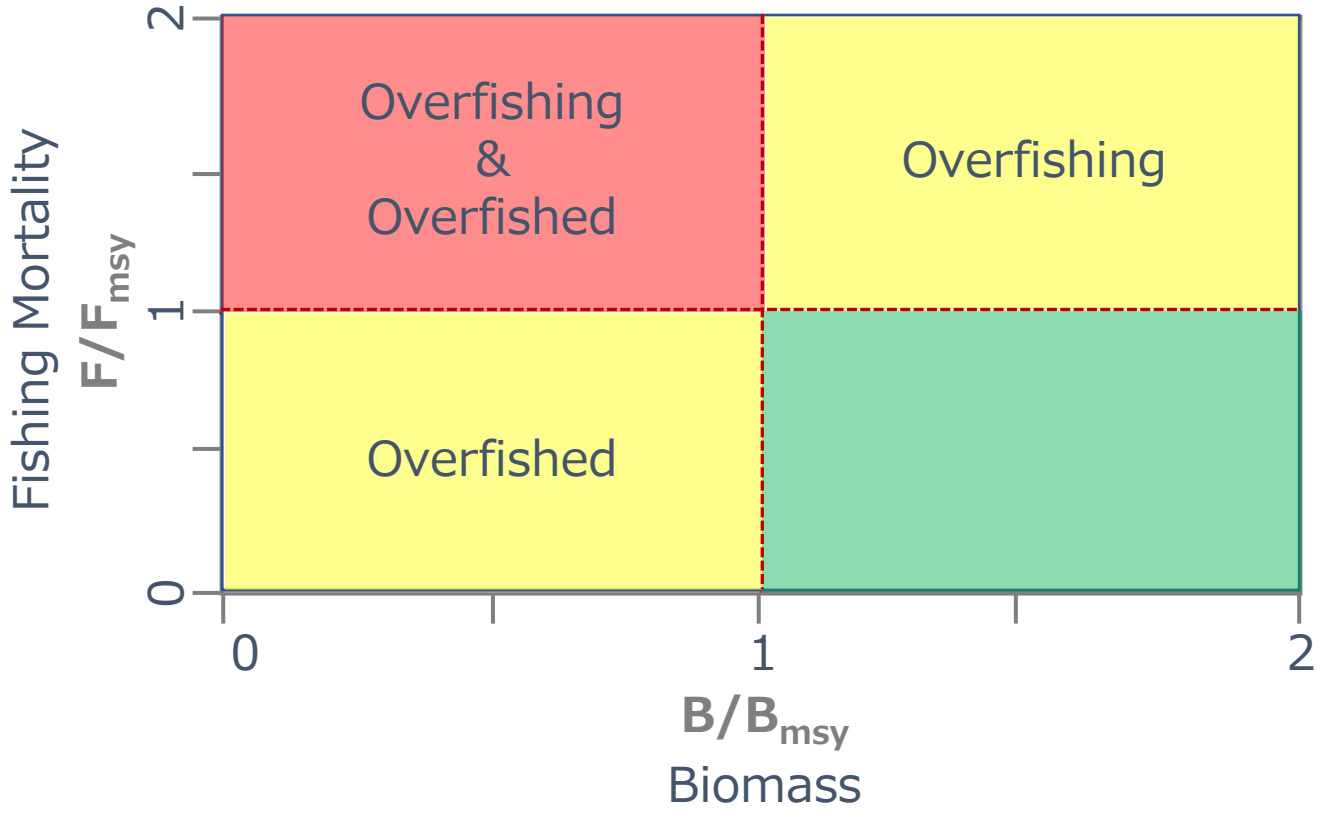
- Standardized method for the presentation of stock assessment results by tuna-RFMOs using “Biomass reference point” and “Fishing mortality reference point”.



Presentation: Osamu Sakai and Hidetada Kiyofuji (2016)

Kobe-plot

- Kobe-plot shows the current and historical status of stock ("Overfishing" occurring? & "Overfished" stock?) .
- Current and historical biomass and fishing mortality are estimated from stock assessment.

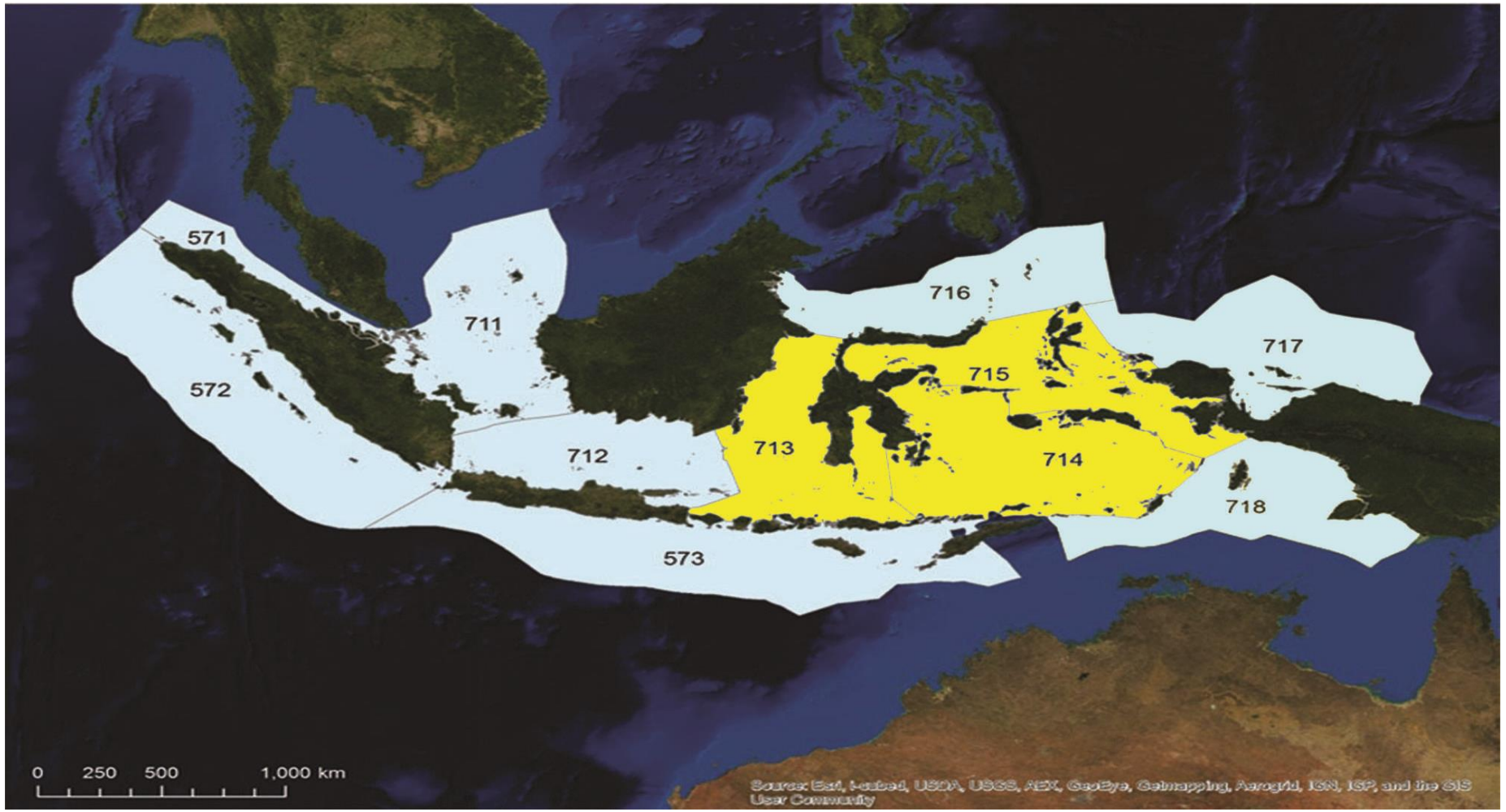


Presentation: Osamu Sakai and Hidetada Kiyofuji (2016)

4 APA YANG SEDANG KITA KERJAKAN ?

PENYUSUNAN HARVEST STRATEGY DI PERAIRAN KEPULAUAN INDONESIA

Indonesia Fisheries Management Area (IFMA) (Minister Regulation No. 18/2014)



Management Objective

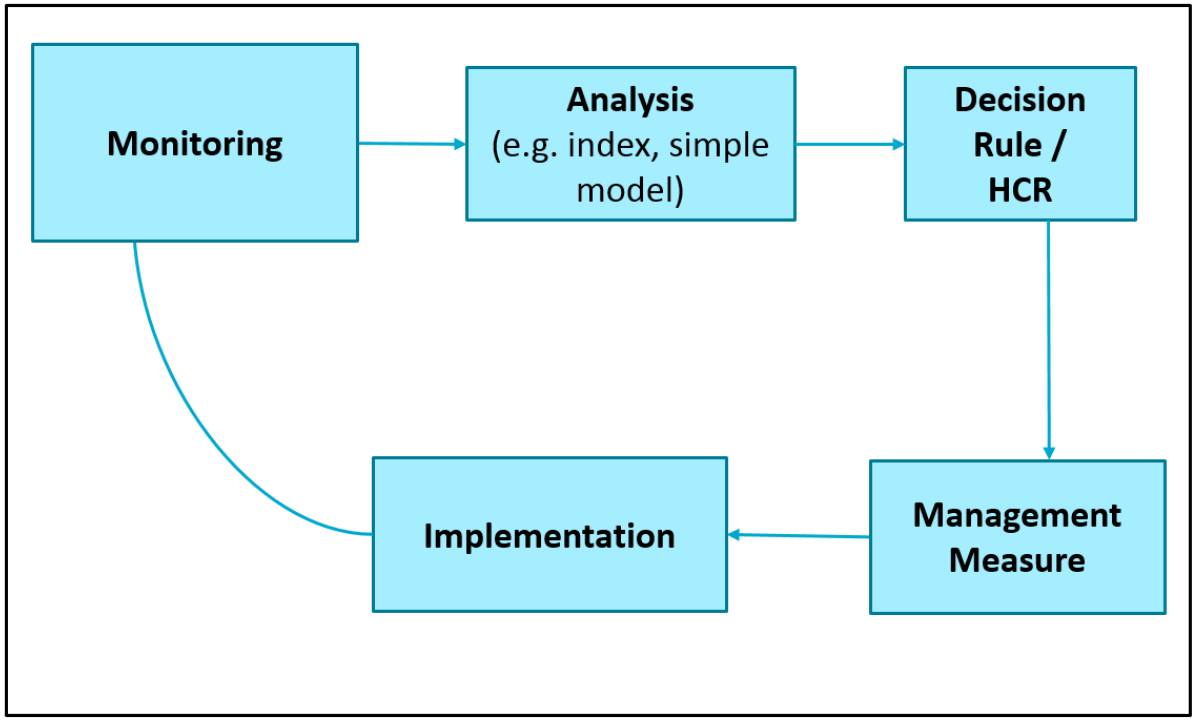
↓

Operational Objective

↓

Reference Points
- Target
- Limit

Components of a harvest strategy



Presentation: Davies (2016)

Data Sets for Potential Use in HS Development

Data series name	Sampling period	Sampling frequency	FMA coverage	% landing/gear coverage	Source of effort/catch data	Rel. abundance?	Size indices?	On going?	Comments
RCFMC-WCPFC WPEA	2010 →	Daily	713, 714, 715, 716 & 717	30% of # vessels landed. PL,PS,SHL,TLH,TR,LHL,LL	effort (fishing days, hooks), total catch volume per port-sampled vessel	√, SKP, YFT, BET, ALB(Bitung)	√	√	Best series in terms of time, area, gear coverage
ACIAR / CSIRO / RCMFC	Oct 2013 - Dec 2015	Daily	714, 715	20% of # vessels landed. Mainly HL and TL, but also PL, PS at 4 ports	Number of fishing days, catch per trip recorded by enumerator		√	Data collection at Kendari is still on-going under CFRD	Would be considerable benefit in continuing coverage at Sorong.
BPPL / RIMF	2011, 2013,	Daily, sometimes weekly	714, 716	PL,PS,HL,TL	No effort data		√		What are we losing if ACIAR monitoring discontinues: e.g. FAD fishing information.
SDI - logbook	2012 - 2014	Per trip	713, 714, 715	LL, PS, TR	No effort data		√		Provided by the skipper as part of the requirements from the port authority. Minimalist info but generally collected for all vessels in major ports. Is likely the data presented on the port authority wedsite.
RITF observer trips	2002	2 trips only	714	LL	Number of hooks available				
AP2HI	2010 - 2014 →	Monthly aggregate	714, 715, 716	HL, PL	No effort data			√	No length data and they use GT as effort (Ibu Titta moved). Only send summarised data (monthly). Not clear whether Co. may have more detailed effort/catch data
SFP	2015	Not everyday??	714	HL	effort data		√		Sustainable Fishery Partnership. Ibu Gaytri; Planning for 5 year data collection.
MDPI	2012 →	Daily	713, 714, 715	HL,PL	Number of fishing days & catch (not clear)	√, YFT, SKP,?BET?	√	√	Need some clarifications for information data table that we don't understand
WWF	2006 →	Daily	714	HL <5GT, GN	Number of fishing days (no available for Wakatobi)		√	√	no length and effort data in Wakatobi sampling site.
PSB	1978-1994	Set by set data by skipper	714	LL, 1 fishing company	Number of hooks available & catch per set (# fish)				One company, historical, Co. no longer exists. May be a more recent update of data into the 2000's.
Logbook Bitung (RCFMC)	2011 - 2013		714, 715	PS					Currently lead by Pak Dutto. Collected from the ports by Pak Dutto. Coleected by PPS-Bitung PA.
SDI - statistics/catch estimate WS	2002 →		713, 714, 715	all gears	Estimated total catch for each FMA	x		√	This is the catch estimate ws data

Current status in HS process

Specifying plausible harvest strategies

1. Select monitoring series
2. Specify “analysis” and “harvest control rule”
3. Identify “management measures”
4. 1+2+3 = harvest strategy

Create a set of “candidate harvest strategies” that are:

i) **“Sensible”**, given conceptual models for how fishery operates and available data series

ii) **“Feasible”** in terms of practical implementation in the context of current monitoring and management and compliance capacity.

Challenges

- Sufficient monitoring data for HS implementation
  - Maintaining and expanding existing port and catch and effort monitoring
  - Essential for relative abundance (CPUE) and size data

- Building confidence in estimates of total Catch & Effort

- Capacity to implement practical management measures
  - FAD management?
  - Effort control?
  - Seasonal/Area closures?
  - Size limits for different sectors/gears?
- Clarity of purpose and maintaining momentum. Harvest Strategies are about managing fishing to achieve agreed objectives.

Presentation: Davies (2017)

Harvest strategy Framework for Skipjack

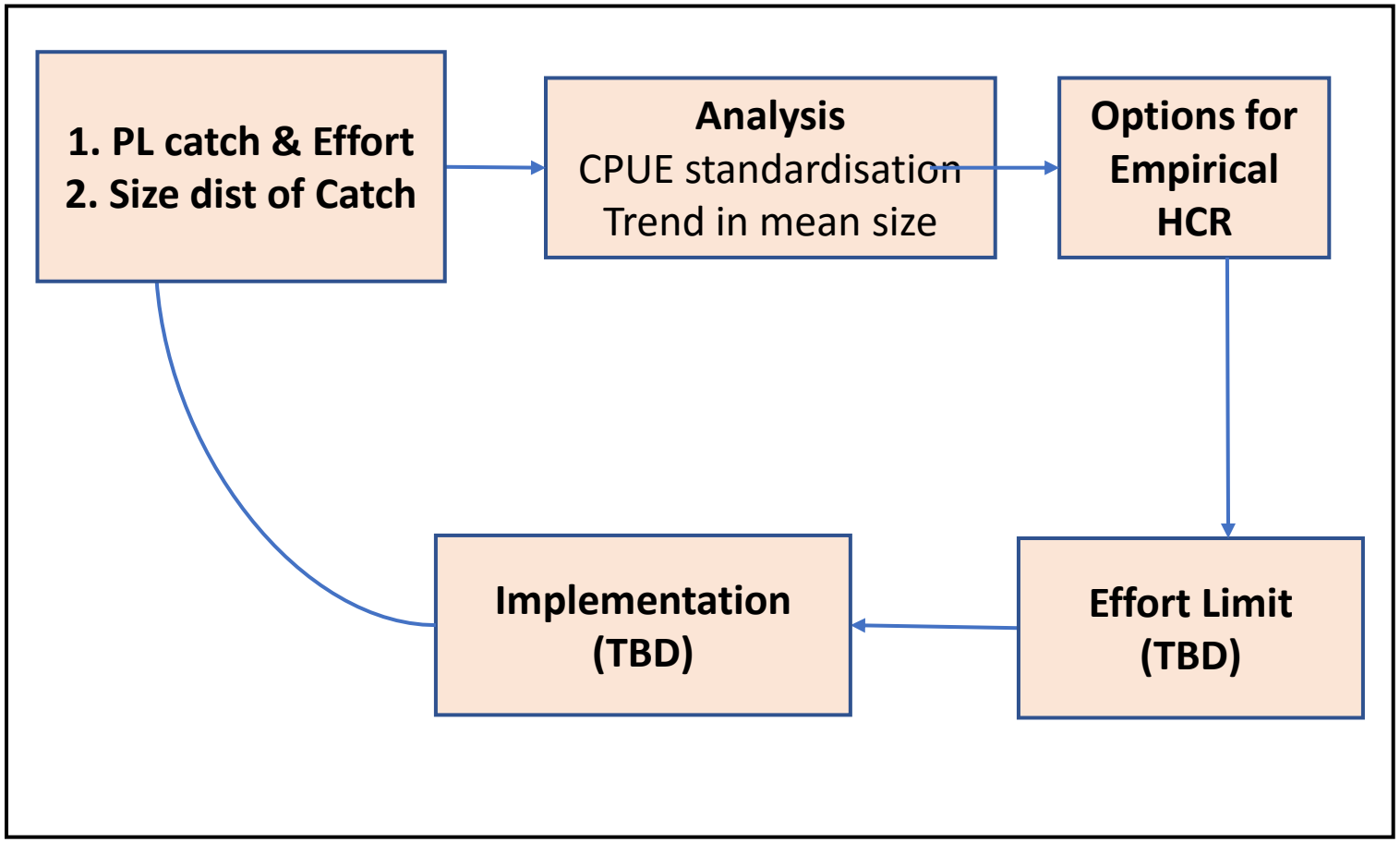
- *Monitoring data series*
  - Catch and effort data from pole and line used to calculate CPUE
  - Size distribution of catch from port monitoring
- *Analysis method*
  - Statistical standardization of CPUE to provide a relative abundance index (Sadiyah et al 2016)
  - Calculation of trend in average size of fish in catch [which sector/fleet] (Sadiyah et al 2016)
- *Forms of Harvest Control Rule*
  - Empirical harvest control rule using a weighted combination of standardized CPUE and average size of fish in catch (Hoshino et al 2017)

Presentation: Davies (2017)

Harvest strategy Framework

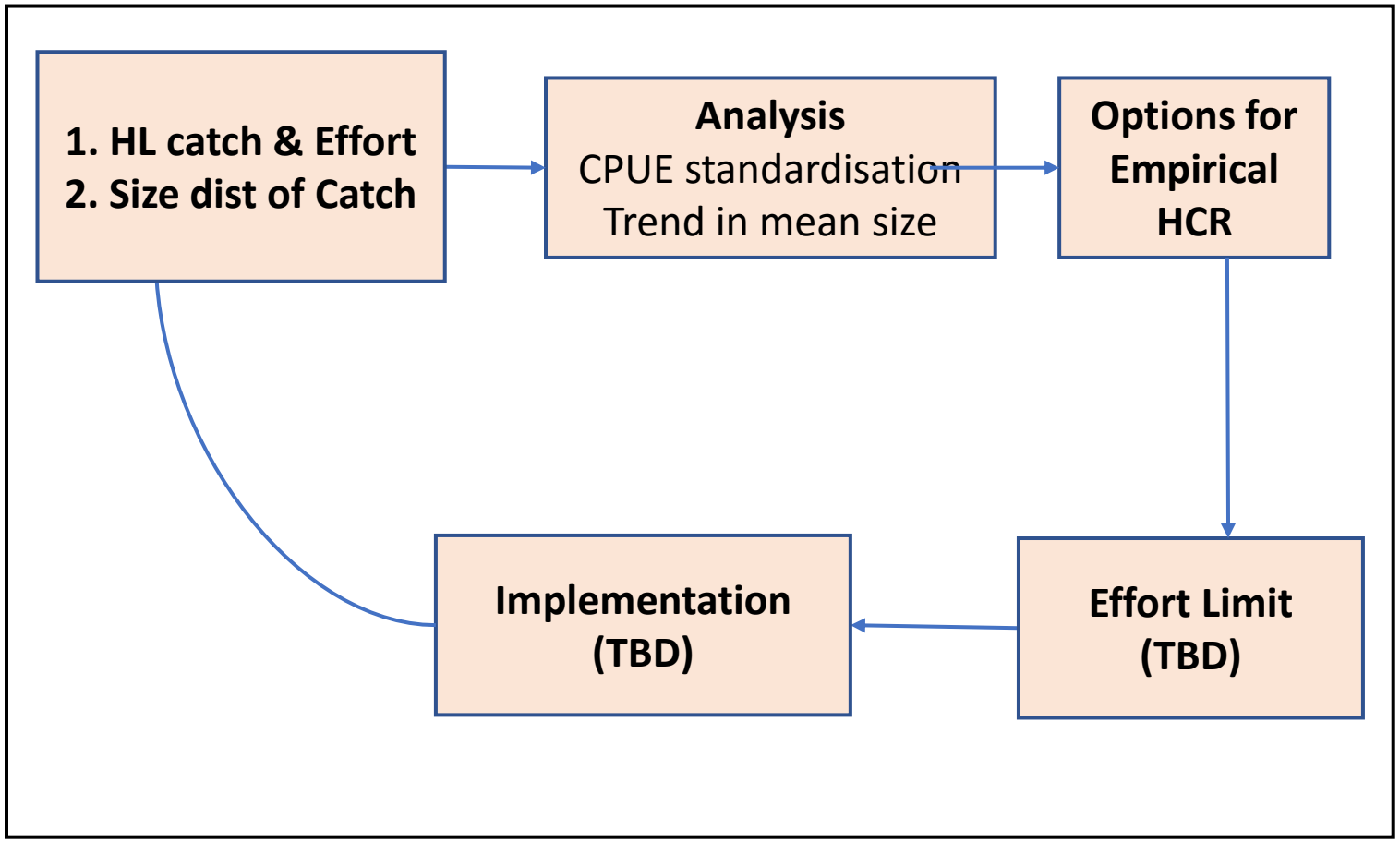
- *Management Measure*
  - Effort control measures from risk assessment and stakeholder workshops
  - Specific details of management measures and implementation will be determined through consultation and technical work plan.
  - Options for implementation of effort control for consideration include: number of licenses/sector; limit on number and distribution of FADs; fishing days/license/year; season limits, trip limits.

Skipjack framework



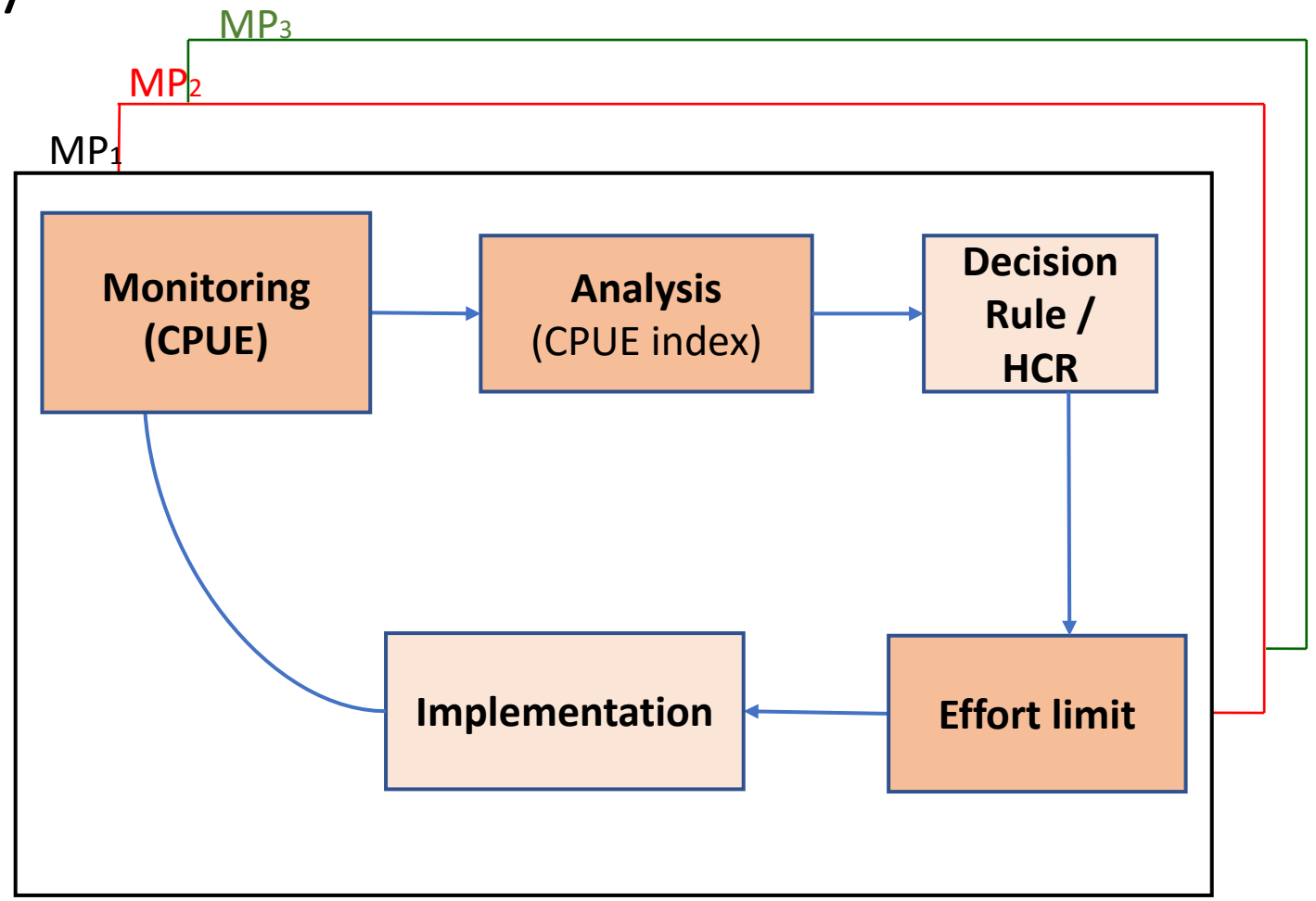
Presentation: Davies (2017)

Yellowfin framework



Presentation: Davies (2017)

Different components = different strategy



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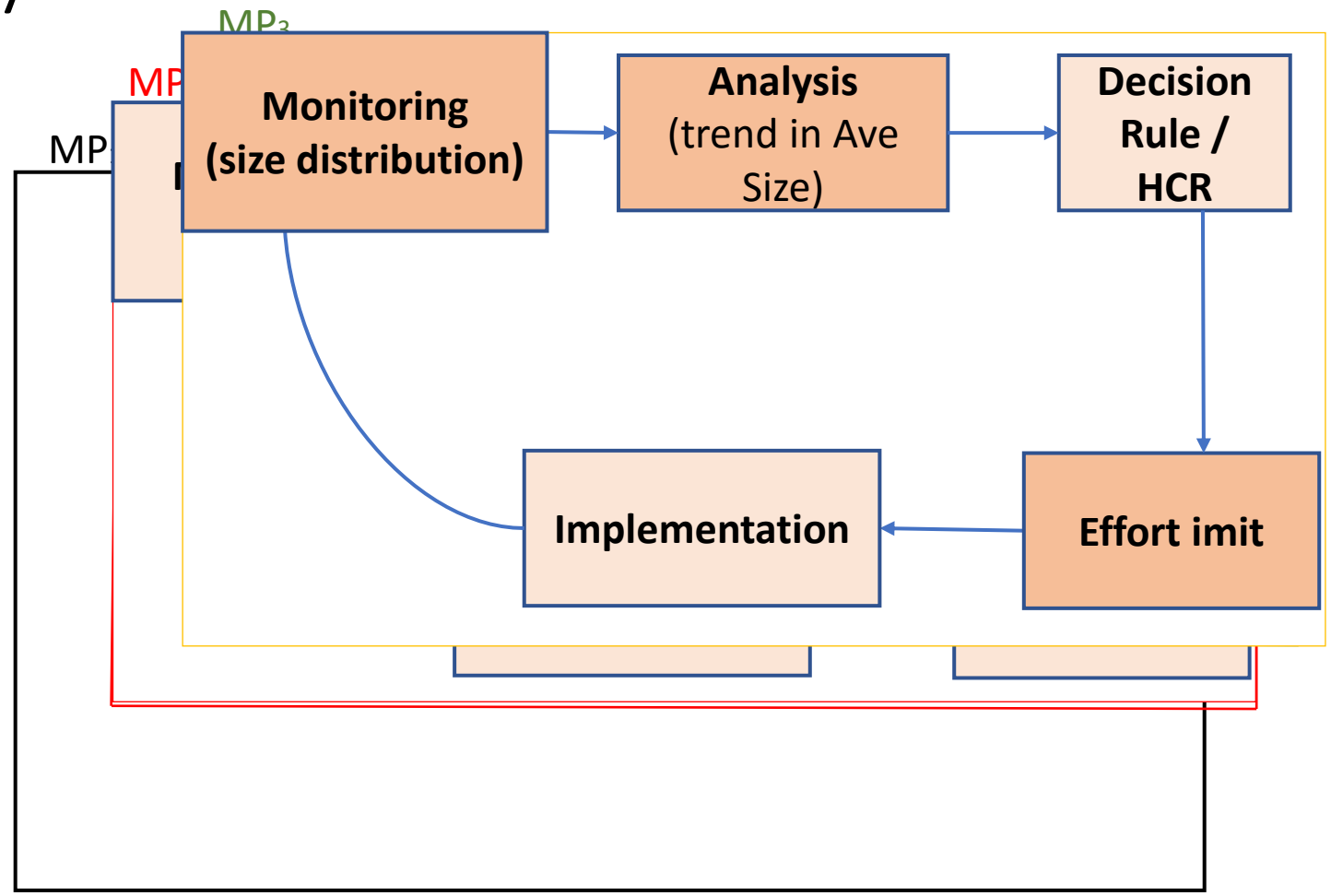


From HS framework to Implementation

1. Work program for refinement, specification of harvest strategies and Management Strategy Evaluation
2. Consultation and implementation
3. Relationship between Interim Harvest Strategy and Regional Fisheries Management Organizations.

Presentation: Davies (2017)

5 CONTOH HARVEST CONTROL RULES

IOTC Resolution 16/02
On Harverst Control Rules for skipjack in IOTC area of competence

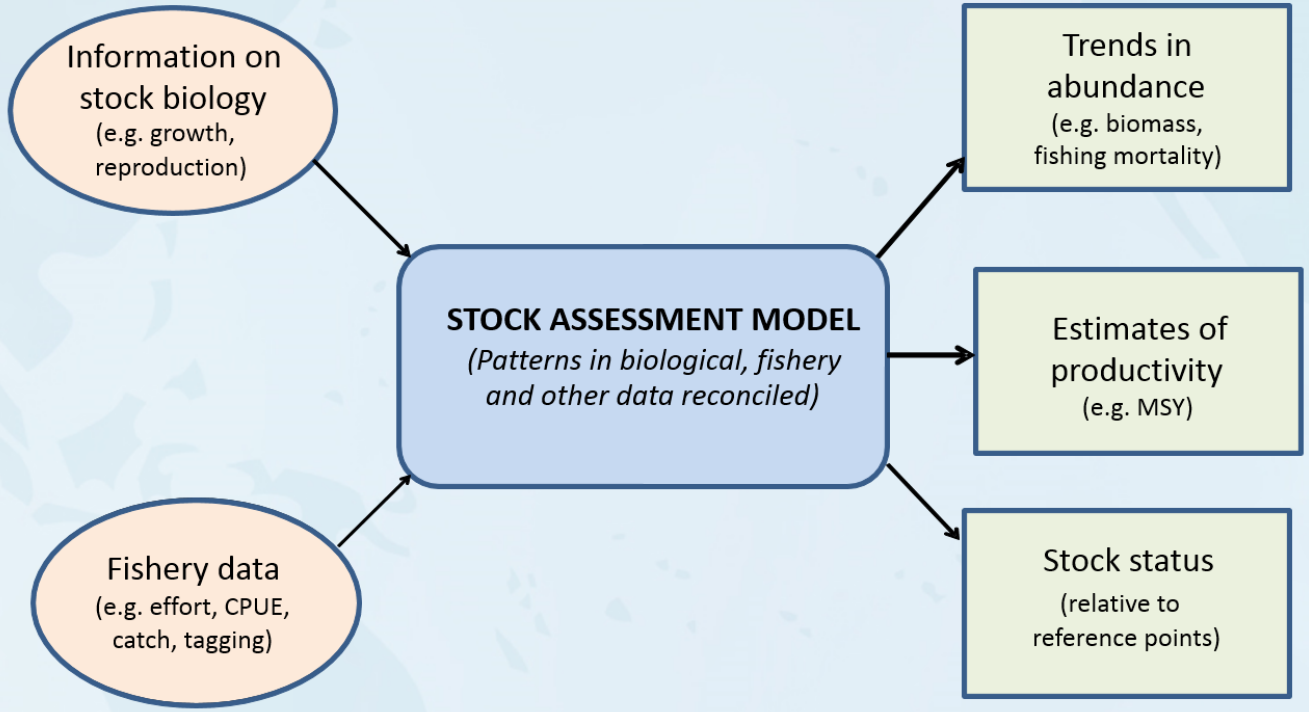
1. Limit reference point (B lim) ditetapkan 20% dari unfished spawning biomas (Bo) yaitu jumlah ikan yang dewasa (Lm = 40 Cm).
2. Target reference point (B target) ditetapkan 40% dari unfished spawning biomas (Bo) yaitu jumlah ikan yang dewasa (Lm = 40 Cm).
3. Global TAC : 900.000mt/tahun

Values of fishing intensity for alternative levels of estimated stock status (**Bcurr /Bo**) produced by the HCR for Skipjack Tuna

Stock status (B_{curr} /B_0)	Fishing Intensity (I)	Stock status (B_{curr} /B_0)	Fishing Intensity (I)
At or above 0.40	100%	0.24	46.7%
0.39	96.7%	0.23	43.3%
0.38	93.3%	0.22	40.0%
0.37	90.0%	0.21	36.7%
0.36	86.7%	0.20	33.3%
0.35	83.3%	0.19	30.0%
0.34	80.0%	0.18	26.7%
0.33	76.7%	0.17	23.3%
0.32	73.3%	0.16	20.0%
0.31	70.0%	0.15	16.7%
0.30	66.7%	0.14	13.3%
0.29	63.3%	0.13	10.0%
0.28	60.0%	0.12	6.7%
0.27	56.7%	0.11	3.3%
0.26	53.3%	0.10	0.0%
0.25	50.0%		

6 STOCK ASSESSMENT MODELLING

Stock Assessment Modelling



Presentation: Secretariat of the Pacific Committee

Stock Assessment Modelling

A stock assessment model provides a mathematical simplification of a very complex system (fish and fishery), to help us estimate population changes over time in response to fishing

Data untuk mengestimasi CPUE

1. Jumlah kapal di suatu daerah
2. Jumlah kapal yang melaut
3. Jumlah trip/kapal
4. Jumlah hari di laut/Trip
5. Jumlah hari penangkapan
6. Jumlah Hook : Pole and Line (Pemancing); Longline (hook setting)
7. Jumlah setting : Untuk Jaring

TERIMA KASIH