Strategies for Trawl Fisheries Bycatch Management
GCP/RAS/269/GFF

REBYC-II CTI INDONESIA – LOA 1

Meeting on Information Production and Dissemination

14 November 2014

1. Background

This Project – Strategies for trawl fisheries bycatch management (REBYC-II CTI; GCP /RAS/269/GFF) – is contributing to the more sustainable use of fisheries resources and healthier marine ecosystems in the Coral Triangle and Southeast Asia waters by reducing bycatch, discards and fishing impact by trawl fisheries. It is being executed by the Southeast Asian Fisheries Development Centre (SEAFDEC), based in Bangkok, Thailand, and the governments in the participating countries Indonesia, Papua New Guinea, Philippines, Thailand and Viet Nam in partnership with the private sector and relevant national, regional and international organizations. The Food and Agriculture Organization of the United Nations (FAO) is the Global Environment Facility (GEF) agency for the project funded jointly by GEF and the implementing and executing partners. The project is structured around four interrelated components: the *policy, legal and institutional frameworks component;* the *resource management and fishing operations component;* the *information management and communication component, and* the *awareness and knowledge component*.

The Directorate General of Capture Fisheries, Ministry of Marine Affairs and Fisheries, in Indonesia is one of the Executing Agencies for this GEF-funded project where FAO is the Implementing Agency. The DGCF has primary responsibility for national project activities in Indonesia, and provides substantial co-financing to the project (estimated at close to 50,000 US$ over 5 years, as per the Project Document). The Project Regional Facilitation Unit, based at SEAFDEC TD, and FAO Operational and Technical staff, provided operational and technical support to DGCF for implementation of this LOA.

Under the First LOA between DGCF and FAO under component 4 *(Awareness and Knowledge)*, an activity entitled Production and distribution of information on bycatch management and best fishing practices in Arafura Sea is supported. Under the LOA, DGCF agreed to produce English language reports on the activity. This report covers the proceedings of the final discussion held on 5 November 2014.

2. Organization of the Meeting

The event was held at Hotel New Ayuda in Bogor on Tuesday, 5 November 2014. 18 persons from 9 institutions were invited to attend the final discussion (see Annex 1 & 2). The meeting agenda was made up of three sessions.

The first session focused on disucssion about (1) International Plan of Action for the Management of Fishing Capacity, and (2) International Guidelines on Bycatch Management and Reduction of Discards.

The second session focused on discussion about (3) Measuring and assessing capacity in fisheries/ Book 1. Basic concepts and management options. The third session focused on discussion about (4) Measuring and assessing capacity in fisheries/ Book 2. Issues and methods.

3. Minutes from the meeting

Those 4 (four) documents had been translated by consultants (translators) and had previously been discussed on 5 September 2014 in Hotel Mirah (during the NWG meeting) and on 30 September 2014 in BBPI Semarang (during NWG meeting & Regional Workshop & Training on GIS). Drafts of the documents had been distributed before the November meeting. Thus, the meeting discussed and highlighted 'topics' which were considered to be main issues of each document.

3.1. Report on Discussion about (1) International Plan of Action for the Management of Fishing Capacity, and (2) International Guidelines on Bycatch Management and Reduction of Discards.

No	Draft	Discussion
Some notes (IPOA Management of Fishing Capacity)		
1	The abstract consisted of 3 (three) International Plans of Action - *The **IPOA-SEABIRDS** is a voluntary instrument .....* - *The **IPOA-SHARKS** is a voluntary instrument...* - *The **IPOA-CAPACITY** is a voluntary instrument ...*	Only the IPOA-Capacity part has been translated. Thus, it should only cover 1 (one) "ABSTRACT" of the IPOA-Capacity. It is not necessary to cover the other 2 (two) IPOA-Seabirds & IPOA-Sharks.
2	Each paragraph of the original version (English language) was presented after each paragraph of the translated version (Indonesian language) – on a paragraph by paragraph basis	The final version was suggested to present 1 (one) page of the translated version (Indonesia language) followed by 1 (one) page of the original version (english language) –on a page by page basis
3	**PART II - OBJECTIVE AND PRINCIPLES** 7. The immediate objective was to achieve an efficient, equitable and transparent management of fishing capacity preferably by 2003, but not later than 2005,	In terms of the targetted IPOA's time frame, the document is now out of date. Yet, the principles are still relevant to consider (at least for the national level), such as: 1) Participation 2) Phased implementation 3) Holistic approach 4) Conservation 5) Priority 6) New technologies 7) Mobility 8) Transparency
4	**PART III – URGENT ACTIONS** 16. States should support FAO in the development of appropriate and compatible standards for records of fishing vessels. 17. States should develop and maintain appropriate and compatible national records of fishing vessels, further specifying conditions for access to information.	Indonesia currently has a national system for fishing vessel registration & marking (Reg. No. 27/ 2009, revised by Reg. No. 23/2013) So far, Indonesia has also actively supported the establishment of regional fishing vessels record (coordinated by SEAFDEC).

5	19. States should develop, implement and monitor national plans of action for managing fishing capacity, taking into account, inter alia, the effect of different resource management systems on fishing capacity.	Indonesia has drafted NPOA for fishing capacity management. However, the means to monitor and assess fishing capacity systematically and accurately are not yet well-developed.
6	25. When developing their national plans for the management of fishing capacity, States should assess the possible impact of all factors, including subsidies, contributing to overcapacity on the sustainable management of their fisheries, distinguishing between factors, including subsidies, which contribute to overcapacity and unsustainability and those which produce a positive effect or are neutral.	Subsidies have the potentially to offset economic disincentives. Yet, realizing the characteristics of Indonesian fisheries, subsidies are still needed under certain circumstances (such as: small-scale, public fishing facilities, etc.)
Some notes (International Guidelines on By-catch Management and Reduction of Discards)		
1	2.2. Purpose The purpose of these Guidelines is to assist States and RFMO/As in implementing the Code and an ecosystem approach to fisheries through effective management of bycatch and reduction of discards.	- No comments
2	2.3. Objective The objective of these Guidelines is to promote responsible fisheries by: (i). minimizing the capture and mortality of species and sizes which are not going to be used in a manner that is consistent with the Code; (ii). providing guidance on measures that contribute towards more effective management of bycatch and reduction of discards; and (iii). improving reporting and the accounting of all components of the catch of which bycatch and discards are subsets.	- No comments
3	2.4. Characteristics of bycatch 2.4.1. It is not possible to develop a standard international definition of bycatch because of the very diverse nature of the world's fisheries, historical differences in how bycatch has been defined nationally, ambiguities associated with bycatch related terminologies and choices of individual fishers on how different portions of their catch will be used. Also there are functional interpretations of bycatch that include catch that a fisher did not intend to catch but could not avoid, often did not want or chose not to use. There are also	Indonesia has also faced problems of defining bycatch. There is great variety of Indonesia fisheries, such as: small-scale, large industrial scale, shrimp trawl, fish trawl, etc. Indonesian guidelines on "Data & thematic information sharing for trawl fisheries management in Arafura Sea" has adopted the characteristics of bycatch.

	regulatory interpretations of bycatch in fisheries management plans and these types of interpretations may not necessarily coincide.	
4	5.1. Data collection, reporting, and assessment 5.1.4. To standardize the collection of bycatch and discard data, States and RFMO/As should: (i). establish research and management priorities on a fishery-by-fishery basis; (ii). solicit the input of fishers, scientists, industry, resources managers, IGOs, NGOs and other relevant stakeholders on standards for bycatch and discard data collection; (iii). design and test sampling protocols to provide the desired precision and accuracy of data at the lowest cost; (iv). evaluate the accuracy and precision of the data and their usefulness in estimating the magnitude and characteristics of the bycatch and discards; and (v). integrate the collection of economic and social information (e.g. operating costs, fleet size, and vessel characteristics) with the collection of oceanographic and biological information.	Indonesia's National Working Group of the REBYC-II CTI is proposing to record the top 10 or top 5 by-catch (best minimum requirement for data collection) in its "Data & thematic information sharing..." guidelines The proposal will be starndarized and printed as a "data collection form", especially for student internships on-board.
5	13. SPECIAL REQUIREMENTS OF DEVELOPING STATES 13.1. Consideration should be given by States, international financial institutions and relevant IGOs to enhance the capacity of developing States to manage bycatch and reduce discards in their fisheries through financial and technical assistance in terms of research, data collection, development of socio-economic studies on bycatch management and discard reduction, technology transfer training and scientific cooperation, in conformity with international law and the Code.	Indonesia, as a developing state, is entitled to financial and technical support

3.2. Report on Discussion about (3) Measuring and assessing capacity in fisheries/ Book 1. Basic concepts and management options.

No	Draft	Discussion
Some notes (Measuring and assessing capacity in fisheries/ Book 1. Basic concepts and management options)		
1	1.2 Capacity utilization, excess capacity, overcapitalization and overcapacity The initiative to monitor and manage capacity instigated by the FAO through the International Plan of Action (IPOA) has also resulted in some confusion regarding definitions of key terms (if only because "capacity" is not defined in the IPOA). A distinction needs to be drawn between the concepts of capacity utilization, excess capacity, overcapitalization and overcapacity – concepts that are also often confused.	Discussion onthe basic concept of: **Capacity utilization,** *the degree to which the vessel is fully utilized.* In the context of Indonesia, the actual length of head rope compared with legal length of head rope(?) is used. **Excess capacity,** *exists when the potential catch or effort level exceeds the actual catch or effort level in a given period (capacity underutilization)*. The existence of excess capacity would not be considered problematic. **Overcapitalization,** *is a longer-term problem for the fishery (exist when the fleet size is greater than that required to harvest a particular yield)*. **Overcapacity,** *can be considered the generic term for excessive levels of capacity in the longer term and relates to some long-term desirable level of capacity (the target capacity)*
2	**Capacity utilization** represents the degree to which the vessel is fully utilized. From an input based perspective, this may relate to the ratio of the number of days actually fished to the number of days the boat could potentially fish under normal working conditions. From an output based perspective, capacity utilization is the ratio of the actual catch to the potential catch (if fully utilized). This is understood, given prevailing resource conditions. Thus the two approaches will be equivalent only if one assumes that catch rates will remain the same in the short term even if effort expand.	**Pemanfaatan kapasitas** menggambarkan sejauh mana kapal sepenuhnya dimanfaatkan (untuk melakukan kegiatan penangkapan). Dari sudut pandang "input based", hal ini terkait dengan rasio **jumlah hari penangkapan sebenarnya** dengan **jumlah hari penangkapan potensial** (yang dapat dilakukan oleh kapal) di bawah kondisi kerja normal. Dari perspektif "output based", pemanfaatan kapasitas adalah rasio hasil tangkapan sebenarnya dengan hasil tangkapan potensial (jika dimanfaatkan secara maksimal). Hal ini perlu dipahami, dengan memperhatikan kondisi sumberdaya yang ada. Karenanya, kedua pendekatan tersebut akan setara hanya jika kita menganggap bahwa tingkat tangkapan akan tetap sama dalam jangka pendek meskipun upaya penangkapan ditambah.
3	**Excess capacity** exists when the potential catch or effort level exceeds the actual catch or effort level in a given period. It manifests itself in terms of capacity underutilization, and the existence of capacity underutilization implies the existence of excess capacity. Excess capacity is primarily a short-term4 phenomenon that can arise for a number of reasons. For example, lower prices or temporarily higher costs (e.g. fuel price increases) may result in boats operating on average for fewer days than expected	**Kelebihan kapasitas** terjadi ketika tingkat hasil tangkapan atau upaya penangkapan potensial melebihi hasil tangkapan atau upaya penangkapan yang sebenarnya dalam suatu periode tertentu. Hal ini memanifestasikan dirinya dalam hal kapasitas underutilization, dan adanya kapasitas underutilization menyiratkan adanya kelebihan kapasitas. Kelebihan kapasitas terutama fenomena jangka pendek yang dapat timbul karena sejumlah alasan. Misalnya, harga yang lebih rendah atau biaya sementara tinggi (misalnya kenaikan harga BBM) dapat mengakibatkan rata-rata hari operasi kapal lebih

	under more average conditions. Assuming the prices and costs return to normal levels in the future, then this form of excess capacity will be self correcting. Excess capacity can also be caused by management. For example, stock recovery programmes may impose restrictions on catch or effort that results in the vessels being underutilized during the recovery process, but allows the vessels to be fully utilized when the stocks have increased. In such circumstances, the existence of excess capacity would not be considered problematic.	sedikit dari yang diharapkan di bawah kondisi yang lebih rata. Pada saat harga dan biaya kembali ke tingkat normal di masa depan, maka bentuk kelebihan kapasitas akan menyesuaikan diri. Kelebihan kapasitas juga dapat disebabkan oleh manajemen. Misalnya, program pemulihan stok dapat mengenakan pembatasan menangkap atau usaha yang menghasilkan kapal yang kurang dimanfaatkan selama proses pemulihan, tetapi memungkinkan kapal dimanfaatkan sepenuhnya ketika stok telah meningkat. Dalam keadaan seperti itu, keberadaan kelebihan kapasitas tidak akan dianggap bermasalah.
4	***Overcapitalization*** *is a longer-term problem for the fishery. In its simplest form, overcapitalization can be considered to exist if the fleet size is greater than that required to harvest a particular yield (which in many cases may be greater than the current yield). This can be illustrated for the simple case of a single fleet exploiting a single species.*	***Overcapitalization*** adalah masalah jangka panjang untuk perikanan. Dalam bentuk yang paling sederhana, Overcapitalization lebih dapat dianggap terjadi jika ukuran armada lebih besar dari yang dibutuhkan untuk menangkap hasil tertentu (yang dalam banyak kasus mungkin lebih besar daripada hasil saat ini). Hal ini dapat diilustrasikan untuk kasus sederhana dari sebuah armada tunggal mengeksploitasi satu spesies.
5	**Overcapacity** can be considered the generic term for excessive levels of capacity in th e longer term and relates to some long-term desirable level of capacity (the target capacity). This may be either some long-term target sustainable yield, or some long-term target level of capital employed in the fishery.	**Kelebihan kapasitas** dapat dianggap sebagai istilah umum untuk tingkat yang berlebihan dari kapasitas jangka panjang dan berhubungan dengan beberapa tingkat jangka panjang diinginkan kapasitas (kapasitas target). Ini bisa dengan beberapa hasil jangka panjang sasaran berkelanjutan, atau level target jangka panjang modal yang digunakan dalam perikanan.
6	1.3 Target capacity and the objectives of management As noted above, overcapacity is a relative measure, basically indicating that capacity is greater than some desired level. Reduced stock biomass, low yields and unprofitable fleets are not in themselves problems for managers of a fishery if the objective of fisheries management is to maintain or increase employment; then these “problems” are just consequences of achieving this objective. However, when reduced stock size is incompatible with the complete set of management objectives, overcapacity exists, and managers need to address the problem.	1.3 Kapasitas Target dan tujuan pengelolaan Seperti disebutkan di atas, *overcapacity* adalah ukuran relatif, pada dasarnya menunjukkan bahwa kapasitas lebih besar dibandingkan dengan tingkat yang diinginkan. Berkurangnya stok biomassa, hasil tangkapan yang rendah dan armada penangkapan yang tidak menguntungkan adalah bukan masalah bagi pengelola perikanan jika tujuan pengelolaan perikanan adalah untuk mempertahankan atau meningkatkan tenaga kerja; maka "masalah" ini hanyalah konsekuensi dari mencapai tujuan ini. Namun, ketika berkurangnya ukuran stok tidak sesuai dengan tujuan pengelolaan, terjadi *overcapacity*, dan manajer perlu untuk menangani masalah tersebut.
7	3. ASSESSING CAPACITY Some estimate of the existing level of fishing capacity in a fleet and the corresponding level of overcapacity in the fishery. To this end, many countries have developed a range of capacity indicators, mostly based on physical attributes of the	3. PENILAIAN KAPASITAS Adalah estimasi tingkat kapasitas penangkapan pada armada yang ada dan tingkat overcapacity terkait pada suatu perikanan. Untuk tujuan ini, banyak negara telah mengembangkan berbagai indikator kapasitas, sebagian besar didasarkan pada atribut fisik armada (FAO, 2000). Indikator

	fleet (FAO, 2000). Key indicators of capacity applied in many countries are measures such as gross tonnage (a measure of the volume of the vessel), engine power and the number of boats. In some countries, engineering measures such as vessel units, generally based on a combination of characteristics, have also been developed. More recently, output based measures of capacity have been developed that relate to the potential level of output of a fleet.	kunci kapasitas yang diterapkan di banyak negara adalah langkah-langkah seperti GT (ukuran volume kapal), tenaga mesin dan jumlah kapal. Di beberapa negara, telah dikembangkan tindakan rekayasa seperti unit kapal, dimana umumnya didasarkan pada kombinasi karakteristik. Baru-baru ini, langkah-langkah berdasarkan output kapasitas telah dikembangkan yang berhubungan dengan potensi output tingkat armada.
8	3.1 Input-based capacity A single fleet harvesting from a single stock can be used to illustrate the input-based capacity approach. The intent is to find a fleet size that can harvest a targeted level of output. In most fisheries, some long-term potential yield (LTPY) can be identified based on an assessment of the fish stock. This may be the maximum sustainable level of landings (i.e. MSY) that can be produced by a fishing fleet, or alternatively some other sustainable yield that corresponds to the objectives of management. For example, a bioeconomic model can be used to find the maximum economic yield (MEY), where capital investment in the fleet and the abundance level of the fish stock are such that profits are maximized. MEY is less than the MSY and is supported by a higher stock abundance and lower effort level. The larger stock size reduces the cost per fish landed for the same level of fishing effort exerted by the fishing fleet.	3.1 Kapasitas berbasis input Sebuah armada tunggal menangkap suatu stok tunggal dapat digunakan untuk menggambarkan pendekatan kapasitas berbasis input. Tujuannya adalah untuk menemukan ukuran armada yang dapat menangkap tingkat output yang ditetapkan. Dalam kebanyakan perikanan, beberapa potensi tangkapan jangka panjang (LTPY) dapat diidentifikasi berdasarkan penilaian terhadap stok ikan. Ini mungkin tingkat pendaratan maksimum berkelanjutan (yaitu MSY) yang dapat diproduksi oleh armada penangkapan ikan, atau sebagai alternatif adalah hasil tangkapan berkelanjutan lainnya yang sesuai dengan tujuan manajemen. Sebagai contoh, model bioeconomic dapat digunakan untuk mencari hasil maksimum ekonomi (MEY), dimana penanaman modal dalam armada dan tingkat kelimpahan stok ikan sehingga keuntungan yang maksimal. MEY kurang dari MSY dan didukung oleh kelimpahan stok yang lebih tinggi dan tingkat usaha yang lebih rendah. Semakin besar ukuran stok mengurangi biaya per ikan yang didaratkan untuk tingkat yang sama dari usaha penangkapan yang diberikan oleh armada penangkapan ikan.
9	3.2 Output-based capacity Alternatively, output-based capacity measures can be estimated and used as the basis for managing a fleet of fishing firms. Output is based on the level of capital invested in the fishery, the amount of labour employed and the abundance of the fish stock. As such, it can be considered an index of capital, labour, and the stock abundance. Rather than treating a mix of inputs in the capacity measurement and management process, one output in the single species fishery can be used to determine overcapacity levels. In addition, most biological stock assessments identify the LTPY for a fishery in terms of a level of harvest that can be sustained over time.	3.2 Kapasitas berbasis keluaran Sebagai alternatif, langkah-langkah kapasitas berbasis output dapat diperkirakan dan digunakan sebagai dasar untuk mengelola armada perusahaan penangkapan ikan. Keluaran didasarkan pada tingkat modal yang diinvestasikan dalam perikanan, jumlah tenaga kerja yang dipekerjakan dan kelimpahan stok ikan. Dengan demikian, dapat dianggap indeks modal, tenaga kerja, dan kelimpahan stok. Daripada mengobati campuran masukan dalam proses pengukuran kapasitas dan manajemen, satu output dalam perikanan spesies tunggal dapat digunakan untuk menentukan tingkat kelebihan kapasitas. Selain itu, sebagian besar penilaian stok biologis mengidentifikasi LTPY untuk perikanan dalam hal tingkat tangkapan yang dapat dipertahankan dari waktu ke waktu.

	This allows comparisons of the firm and fleets' output levels with the target level of output determined to be sustainable by fishery managers.	Hal ini memungkinkan perbandingan dari perusahaan dan tingkat output armada 'dengan level target output bertekad untuk menjadi berkelanjutan dengan manajer perikanan.
10	3.3 Indicators and measures of excess and overcapacity Both qualitative and quantitative indicators of capacity exist and can be employed to determine the level of capacity in a fishery. While excess capacity may be of less importance than overcapacity to fishery managers, the ability to distinguish between the level of excess and overcapacity to determine appropriate management actions is still necessary. Several quantitative techniques exist that are available for measuring excess capacity even with limited information, but estimation of overcapacity generally requires detailed information on the fisheries that may not be readily available, including information on the target level of capacity. As a result, subjective measures and qualitative indicators of overcapacity levels may provide useful information to managers who manage fisheries as open access or regulated open access resources.	3.3 Indikator dan langkah-langkah *excess* dan *overcapacity* Kedua indikator kualitatif dan kuantitatif dari kapasitas yang ada dan dapat digunakan untuk menentukan tingkat kapasitas suatu perikanan. Sementara kelebihan kapasitas mungkin kurang penting dibandingkan kelebihan kapasitas untuk manajer perikanan, kemampuan untuk membedakan antara tingkat kelebihan dan kelebihan kapasitas untuk menentukan tindakan manajemen yang tepat masih diperlukan. Beberapa teknik kuantitatif yang tersedia untuk mengukur kelebihan kapasitas bahkan dengan informasi yang terbatas, tapi perkiraan kelebihan kapasitas biasanya membutuhkan informasi rinci tentang perikanan yang mungkin tidak tersedia, termasuk informasi mengenai tingkat target kapasitas. Akibatnya, tindakan subjektif dan indikator kualitatif tingkat kelebihan kapasitas dapat memberikan informasi yang berguna bagi para manajer yang mengelola perikanan akses terbuka atau diatur sumber daya akses terbuka.

3.3. Report on Discussion about (4) Measuring and assessing capacity in fisheries/ Book 2. Issues and methods.

No	Draft	Discussion
Some notes (Measuring and assessing capacity in fisheries/ Book 2. Issues and methods)		
1	4. METHODOLOGIES FOR MEASUREMENT OF CAPACITY UTILIZATION 4.1 Measurement of capacity output and output-based capacity utilization The methods available for deriving both output- and input-based measures of capacity and capacity utilization largely depend upon the level of existing data. (See Appendix A for a discussion of preferred methods for estimating capacity, given different levels of data.) If data are extremely limited or unavailable, surveys and rapid appraisal techniques can be used to derive measures of capacity and capacity utilization. If detailed costs and earnings information are available, it may be possible to estimate various economic, either static or dynamic, concepts of capacity and capacity utilization using a wide array of mathematical or statistical	4. METODOLOGI UNTUK PENGUKURAN KAPASITAS PEMANFAATAN 4.1 Pengukuran kapasitas output dan pemanfaatan kapasitas berbasis output Metode yang tersedia untuk menurunkan kedua ukuran kapasitas berbasis output dan input dan pemanfaatan kapasitas sangat tergantung pada tingkat data yang ada. (Lihat Lampiran A untuk diskusi metode pilihan untuk memperkirakan kapasitas, mengingat tingkat data yang berbeda.) Jika Data sangat terbatas atau tidak tersedia, survei dan teknik penilaian cepat dapat digunakan untuk mengambil ukuran kapasitas dan pemanfaatan kapasitas. Jika detail informasi tentang biaya dan pendapatan yang tersedia, dimungkinkan untuk memperkirakan berbagai konsep ekonomi, baik statis atau dinamis, konsep kapasitas dan pemanfaatan kapasitas menggunakan beragam metode matematika

	methods. The most typical situation, however, is one in which data are known only on: physical input levels, vessel characteristics, and output levels. Even in this case, it may be possible to use a wide range of mathematical or statistical techniques to estimate capacity and capacity utilization.	atau statistik. Situasi yang paling khas, bagaimanapun, adalah hanya diketahui salah satu data pada: tingkat input fisik, karakteristik kapal, dan tingkat output. Bahkan dalam kasus ini, mungkin untuk menggunakan berbagai teknik matematika atau statistik untuk memperkirakan kapasitas dan kapasitas pemanfaatan.
2	4.1.1 Rapid appraisal techniques Rapid appraisal (RA) is a participatory research technique developed to obtain data when formal data collection procedures were not practical. The technique often has been used in developing countries where records or information were not available, and the most expeditious method to obtain data was to rely upon the recall of participants in the fishery. The technique places particular emphasis on the collection of local knowledge and combining it with knowledge from outside RA is to a large extent an informal method of data collection that has characteristics of both the formal survey and the extraction of information through the use of expert knowledge. The technique is exploratory and highly interactive. It generally involves rapid and progressive learning, with information analyzed and revised in the field to allow further clarification or re-estimation. The technique largely involves informal interviews conducted with key participants in the fishery. Key participants include fishers, fisher representatives and others who have input into the production process (e.g. head fisher or person in village responsible for “managing” the fishery). The technique is consequently relatively labour-intensive, because a wide range of participants need to be questioned in the field. For the purpose of capacity measurement, questions can be asked about both current and past catch levels, as well as activity levels and potential activity levels. Where quantitative estimates are not possible, relative estimates can be derived through the use of drawings and diagrams. For example, ten dots may represent current catch while 12 dots represent bestever catch. Average catch composition can be illustrated through use of a pie chart with the participants, with each segment	4.1.1 Teknik penilaian cepat Penilaian cepat (RA) adalah teknik penelitian partisipatif dikembangkan untuk memperoleh data saat prosedur pengumpulan data formal tidak dapat dilaksanakan. Teknik ini sering digunakan pada negara-negara berkembang dimana catatan informasi tidak tersedia, dan metode yang paling cepat untuk memperoleh data adalah mengundang/ menghimpun data dari pelaku perikanan. Teknik ini menempatkan penekanan khusus pada pengumpulan pengetahuan lokal dan menggabungkan dengan pengetahuan dari luar. RA, untuk situasi tertentu, adalah metode informal pengumpulan data yang memiliki karakteristik dari kedua survei formal dan penarikan kesimpulan informasi berdasarkan penggunaan pengetahuan ahli. Teknik adalah eksplorasi dan sangat interaktif. Hal ini biasanya bersifat cepat dan progresif belajar, dengan informasi dianalisis dan direvisi di lapangan untuk memungkinkan penjelasan lebih lanjut atau penghitungan ulang. Teknik ini sebagian besar melibatkan wawancara informal yang dilakukan dengan pelaku kunci dalam perikanan. Pelaku utama meliputi nelayan, perwakilan nelayan dan lain-lain yang memiliki masukan ke dalam proses produksi (misalnya tokoh nelayan atau orang di desa yang bertanggung jawab untuk "mengelola" perikanan). Teknik ini akibatnya relatif padat karya, karena berbagai pelaku perlu diwawancara di lapangan. Untuk tujuan pengukuran kapasitas, pertanyaan dapat diajukan tentang tingkat tangkapan baik sekarang dan masa lalu, serta tingkat aktivitas dan tingkat aktivitas potensial. Ketika perkiraan kuantitatif tidak mungkin, perkiraan relatif dapat diturunkan melalui penggunaan gambar dan diagram. Misalnya, sepuluh titik dapat mewakili tangkapan saat ini sementara 12 titik mewakili tangkapan terbaik. Komposisi tangkapan rata-rata dapat digambarkan melalui penggunaan diagram pie dengan pelaku, dimana setiap segmen merupakan persepsi mereka tentang komposisi

	representing their perception of species composition. Questions also can be asked about how much fishing activity may increase, why the activity is at its current level, and potential constraints that would impose limits on fishing activity. The information is compiled in the field and quantified as much as possible. The information is supplemented with other quantitative information available (e.g. quantity of sales on a central market can be used as a benchmark). Participants are re-interviewed, and the compiled information is presented for cross-checking and validation purposes. This process may need to be repeated several times. Such repetition allows fine-tuning of estimates to provide values that are believable to the participants in the fishery. The technique is likely to enable, at the very least, qualitative estimates of capacity and capacity utilization. Depending on the level of knowledge in the fishery, it may be possible to also derive more precise estimates of capacity and capacity utilization, and on a per-species basis.	jenis. Pertanyaan juga dapat diajukan tentang berapa banyak kegiatan penangkapan dapat ditingkatkan, kenapa kegiatan penangkapan berada pada tingkat seperti saat ini, dan kendala yang mungkin akan menjadi batasan pada kegiatan penangkapan ikan. Informasi ini disusun di lapangan dan dihitung sebanyak mungkin. informasi dilengkapi dengan informasi kuantitatif lain yang tersedia (misalnya jumlah penjualan pada pasar sentral dapat digunakan sebagai patokan). Pelaku kembali diwawancarai, dan informasi yang dihimpun disajikan untuk pemeriksaan silang dan tujuan validasi. Proses ini mungkin perlu diulang beberapa kali. Pengulangan tersebut memungkinkan penyesuaian dari perkiraan untuk memberikan nilai-nilai yang dipercaya kepada para pelaku dalam perikanan. Teknik ini akan memungkinkan, setidaknya, perkiraan kualitatif kapasitas dan pemanfaatan kapasitas. Tergantung pada tingkat pengetahuan di perikanan, dimungkinkan untuk juga memperoleh perkiraan yang lebih tepat pemanfaatan kapasitas dan kapasitas, dan berbasis pada spesies per spesies.
3	4.1.2 Surveys and expert opinion Surveys can be undertaken to collect subjective but quantitative estimates of capacity. Such surveys are often conducted to assess capacity output in other industries. For example, in the United States, surveys are employed by the Federal Reserve and the United States Census Bureau to estimate capacity and capacity utilization in a number of industries to supplement more directly quantified estimates. Like RA, this is particularly useful if data are limited or non-existent. Participants can be surveyed to determine their current catch and activity (e.g. days fished) as well as provide subjective estimates of their potential activity and corresponding potential catch. A survey may require less labour than a RA, but it also provides less possibility for feedback and clarification of the analysis with the industry. Several separate surveys may be required to estimate capacity and potential overcapacity, each directed at different groups in the industry. Individual participants (i.e. fishers) can be asked to estimate their catch, effort and potential	4.1.2 Survei dan pendapat ahli Survei dapat dilakukan untuk mengumpulkan perkiraan kapasitas subjektif tetapi kuantitatif. Survei semacam ini sering dilakukan untuk menilai kapasitas output di industri lain. Misalnya, di Amerika Serikat, survei dikerjakan oleh Federal Reserve and the United States Census Bureau untuk memperkirakan kapasitas dan pemanfaatan kapasitas di sejumlah industri untuk melengkapi penghitungan estimasi yang lebih langsung. Seperti RA, metode ini sangat berguna ketika data yang tersedia terbatas atau tidak ada. Peserta dapat disurvei untuk menentukan tangkapan dan kegiatan penangkapan mereka saat ini (misalnya jumlah hari menangkap) serta memberikan perkiraan subjektif dari kegiatan penangkapan potensial dan tangkapan potensial yang sesuai. Suatu survei mungkin memerlukan tenaga kerja lebih sedikit dibandingkan dari RA, tetapi berpotensi menyebabkan kurangnya umpan balik dan klarifikasi analisis dengan industri. Beberapa survei yang terpisah mungkin diperlukan untuk memperkirakan kapasitas dan potensi kelebihan kapasitas, masing-masing diarahkan pada kelompok-kelompok yang berbeda dalam industri. Peserta individu (yaitu

	effort. From this, an estimate of potential catch (i.e. output capacity) of each individual can be derived (assuming a linear relationship between potential effort and potential catch). In some cases, it may be possible to derive estimates of catch by species. The more disaggregated the data request, the greater the potential for errors to compound, particularly if most of the information provided by the interviewee is being recalled from memory. Ideally, if detailed information is to be collected on a species basis, then some form of logbook programme should be established and fishers record their catches as they occur. The reliability of survey estimates will vary depending on the degree to which records of current and recent activity are readily available. If the information is based solely on memory (i.e. the fishers do not keep any records), the potential to overestimate (or underestimate) the average catch and potential effort is considerable. As a result, the estimate of capacity output is most likely to be unreliable or highly imprecise. Data collected by such a survey should be regarded as indicative rather than accurate. When fishers maintain good records, potential bias will decrease, and more comprehensive data construction and development are possible. The reliability of survey estimates will depend also on the size and representativeness of the sample. Ensuring that a wide cross-section of fishers is surveyed will help improve reliability of the estimates. Reliability also will improve with increased sample size, although there is a trade-off between reliability and survey cost. Doubling the sample size will not double the reliability of the results but will smooth potential errors. Additional information also can be collected from fishers at the same time as the minimum information requirements for capacity estimation. This may include more information on the fishing activity, the boat (e.g. size, engine power if mechanized) and the gear used. Full surveys of fishing activity, including costs and earnings, also can be undertaken. The level of data collected through the survey will depend on the ultimate use of these	nelayan) dapat diminta untuk memperkirakan hasil tangkapannya, upaya dan usaha potensial. Dari sini, perkiraan potensi catch (yaitu kapasitas output) dari masing-masing individu dapat diturunkan (dengan asumsi hubungan linear antara upaya potensial dan tangkapan potensial). Dalam beberapa kasus, dimungkinkan untuk menurunkan estimasi tangkapan berdasarkan spesies. Semakin terpilah permintaan data, semakin besar potensi kesalahan untuk keseluruhan, terutama jika sebagian besar informasi yang disediakan oleh pihak yang diwawancarai bersumber dari ingatan yang bersangkutan. Idealnya, jika informasi rinci dikumpulkan berdasarkan spesies, maka beberapa bentuk program logbook harus ditetapkan dan nelayan mencatat hasil tangkapan mereka saat terjadi. Kehandalan estimasi survei akan bervariasi tergantung pada sejauh mana ketersediaan catatan dari kegiatan penangkapan saat ini dan baru-baru ini. Jika informasi hanya didasarkan pada ingatan (yaitu nelayan tidak menyimpan catatan), ada kemungkinan rata-rata hasil tangkapan dan potensial upaya terlalu berlebih (atau terlalu rendah) yang cukup besar. Akibatnya, perkiraan output kapasitas kemungkinan tidak dapat diandalkan atau sangat tidak tepat. Data yang dikumpulkan oleh survei tersebut harus dianggap sebagai indikasi bukan penilaian akurat. Ketika nelayan menyimpan catatan yang baik, potensi bias akan berkurang, dan memungkinkan untuk menyusun dan mengembangkan data secara lebih komprehensif. Kehandalan perkiraan survei akan tergantung juga pada ukuran dan keterwakilan sampel. Memastikan bahwa bermacam-macam nelayan yang disurvei akan membantu meningkatkan keandalan estimasi. Keandalan juga akan membutuhkan jumlah sampel yang lebih banyak, dan terdapat konsekuensi *(trade-off)* antara kehandalan dan biaya survei. Menggandakan ukuran sampel tidak akan menggandakan keandalan hasil tetapi akan memperkecil potensi kesalahan. Informasi tambahan juga dapat dikumpulkan dari nelayan pada saat yang bersamaan dengan pendugaan kapasitas dengan informasi (yang tersedia) minimum. Hal ini mungkin akan membutuhkan informasi lebih lanjut tentang kegiatan penangkapan ikan, kapal (misalnya, ukuran kekuatan mesin) dan roda gigi yang digunakan. Survei menyeluruh terhadap kegiatan penangkapan ikan juga dapat dilakukan, termasuk biaya dan pendapatan.

	data, and the cost of acquiring it.	Tingkat data yang dikumpulkan melalui survei akan tergantung pada penggunaan akhir dari data ini, dan biaya untuk memperolehnya. . ...
4	4.1.3 Peak-to-peak analysis The peak-to-peak approach assumes a direct relationship between the level of inputs and the level of output. An index of catch-per-unit input (e.g. catch per day or catch per boat) is derived from the data. An assumption is made that peak levels of catch-per-unit input equate to complete capacity utilization. The peaks are assumed to represent years that the fishery was achieving the maximum output in the short run, given harvesting technology and capital stock. Hence, lower catch rates are assumed to indicate underutilization of capacity. Further details on the method, including an example of its application, are presented in Appendix B. The technique also allows for technological change over time, such that the difference in catch rates between two peak years is assumed to be the result of changes in technology. “Capacity” catch rates in the years between the peaks are estimated as a function of the estimated change in technology between the peaks, which is assumed to be a linear trend. (In recent years, however, researchers have developed quite sophisticated analytical methods to better determine trends in technical progress.) Capacity utilization is then estimated as the ratio of the observed catch rate to the derived “capacity” catch rate. Capacity output is estimated as the product of the level of inputs and the “capacity” catch rate. An advantage of this technique is that it only requires information about one input and one output. Consequently, it represents the most widely applicable and least demanding of data in all mathematical methods for estimating capacity and capacity utilization (Kirkley and Squires 1999).	4.1.3 Puncak-ke puncak analisis Pendekatan puncak ke puncak mengasumsikan hubungan langsung antara tingkat input dan tingkat output. Indeks tangkapan per unit input (misalnya catch per hari atau tangkapan per kapal) adalah berasal dari data. Sebuah asumsi yang dibuat bahwa tingkat puncak tangkapan-per-unit input setara dengan pemanfaatan kapasitas secara penuh. Puncaknya diasumsikan untuk mewakili tahun dimana mencapai output maksimum dalam jangka pendek, berdasarkan teknologi penangkapan dan ketersediaan modal yang digunakan. Oleh karena itu, tingkat tangkapan yang lebih rendah diasumsikan untuk menunjukkan kapasitas yang underutilization. Rincian lebih detail tentang metode, termasuk contoh penerapannya, disajikan dalam Lampiran B. Teknik ini juga memungkinkan untuk perubahan teknologi dari waktu ke waktu, sehingga perbedaan tingkat tangkapan antara dua tahun puncak diasumsikan hasil dari perubahan teknologi. "Kapasitas" tingkat tangkapan di tahun-tahun antara puncak diperkirakan sebagai fungsi dari perubahan teknologi antara puncak, yang dianggap sebagai tren linear. (Akhir-akhir ini, bagaimanapun, peneliti telah mengembangkan metode analisis yang cukup canggih untuk menentukan tren dalam kemajuan teknis secara lebi baik.) Selanjutnya, pemanfaatan kapasitas diperkirakan sebagai rasio tingkat tangkapan yang diamati dengan turunan "kapasitas" tingkat tangkapan. Output Kapasitas diperkirakan sebagai produk dari tingkat input dan "kapasitas" tingkat tangkapan. Keuntungan dari teknik ini adalah bahwa ia hanya membutuhkan informasi tentang satu input dan satu output. Akibatnya, itu merupakan yang paling banyak diterapkan dan menuntut data paling minim dibandingkan dengan semua metode matematika untuk memperkirakan kapasitas dan pemanfaatan kapasitas (Kirkley dan Squires 1999). ....
5	4.1.4 Stochastic production frontiers (SPF) Stochastic production frontiers indicate the maximum expected output for a given set of inputs. They are derived from production theory and are based on the	4.1.4 batas produksi Stochastic (SPF) Batas produksi Stochastic menunjukkan output maksimum yang diharapkan untuk himpunan input. Mereka berasal dari teori produksi dan didasarkan pada asumsi bahwa output adalah

	assumption that output is a function of the level of inputs and the efficiency of the producer in using those inputs. Explicit representation of this relationship as a production frontier allows a detailed characterization of input and output relationships and returns that facilitates quantification of the diagrams and equations presented in Section 2. A function is statistically estimated that defines the output associated with the best practice use of the inputs, while also recognizing the stochastic nature of the data arising from mis- or un-measured determinants of production. The difference between actual output and the potential output is generally attributed to a combination of inefficiency and random error (i.e. the stochastic element in production). Methods have been developed to separate out the random component from the efficiency component, so that a more realistic assessment of potential output can be achieved. That is, large levels of output that may have occurred through chance rather than as a consequence of normal practice do not overly influence the estimates. As a result, derived measures of capacity output are consistent with the earlier definition that measures output under normal working conditions. Further details of the underlying theory and an example of its use are provided in Appendix C. SPF methods have been used for the assessment of technical efficiency in a wide range of industries (including fishing). While derived from efficiency theory, these techniques can be readily modified to produce estimates of capacity utilization. This is achieved through incorporating only fixed inputs in the production function, such as boat numbers (in aggregated analyses) or engine power, boat size, or some measure of capital inputs when vessel level data are available. By excluding variable factors of production (e.g. days or hours fished), the frontier output for a given size (for example) of boat is essentially determined by the boats of that size that produced the greatest output, taking into account fluctuations in output levels that might be	fungsi dari tingkat input dan efisiensi produsen dalam menggunakan input-input tersebut. Representasi eksplisit dari hubungan ini sebagai perbatasan produksi memungkinkan rinci karakterisasi input dan output hubungan dan pengembalian yang memfasilitasi kuantifikasi diagram dan persamaan yang disajikan dalam Bagian 2. Suatu fungsi statistik diperkirakan yang mendefinisikan output yang terkait dengan praktek terbaik penggunaan input, sementara juga mengakui sifat stochastic data yang timbul dari mis- atau faktor-faktor penentu produksi un-diukur. Perbedaan antara output aktual dan output potensial umumnya dikaitkan dengan kombinasi inefisiensi dan kesalahan acak (yaitu elemen stochastic produksi). Metode telah dikembangkan untuk memisahkan komponen acak dari komponen efisiensi, sehingga penilaian yang lebih realistis output potensial dapat dicapai. Artinya, tingkat besar output yang mungkin terjadi melalui kesempatan bukan sebagai konsekuensi dari praktek yang normal tidak terlalu mempengaruhi memperkirakan. Akibatnya, langkah-langkah yang berasal dari keluaran kapasitas konsisten dengan sebelumnya Definisi yang mengukur keluaran di bawah kondisi kerja normal. Rincian lebih lanjut dari teori dasar dan contoh penggunaannya disajikan dalam Lampiran C. Metode SPF telah digunakan untuk penilaian efisiensi teknis di berbagai industri (termasuk perikanan). Sementara berasal dari teori efisiensi, teknik ini dapat mudah dimodifikasi untuk menghasilkan perkiraan utilisasi kapasitas. Hal ini dicapai melalui menggabungkan input hanya tetap dalam fungsi produksi, seperti nomor perahu (di analisis agregat) atau tenaga mesin, ukuran kapal, atau beberapa ukuran input modal saat Data tingkat kapal yang tersedia. Dengan termasuk faktor variabel produksi (misalnya hari atau jam memancing), output perbatasan untuk ukuran tertentu (misalnya) perahu pada dasarnya ditentukan oleh perahu sebesar itu yang menghasilkan output terbesar, dengan fluktuasi rekening di tingkat output yang mungkin dianggap disebabkan "keberuntungan". Tingkat lebih rendah dari output yang akan menunjukkan kombinasi penggunaan input tidak efisien dan kapasitas underutilization Salah satu keuntungan dari teknik SPF lebih dari analisis puncak ke puncak adalah bahwa

	considered attributable to “luck”. Lower levels of output would indicate a combination of inefficient input use and capacity underutilization. One advantage of the SPF technique over peak-to-peak analysis is that several inputs in the production process can be incorporated into the analysis. While it is possible to use the technique with a single input and output, it also allows recognition of other available information on the level of fishing inputs or other production determinants. Hence, all available input data can be used in the same analysis to produce a single measure of capacity utilization. This can include information on biomass stock (where available), so that the effects of stock changes can be directly incorporated into the analysis. As a result, low levels of output in some years resulting from low levels of the resource stock will not mistakenly be attributed to underutilization of capacity.	beberapa masukan dalam proses produksi dapat dimasukkan ke dalam analisis. Meskipun dimungkinkan untuk menggunakan teknik dengan input dan output, juga memungkinkan pengakuan lain yang tersedia informasi pada tingkat input memancing atau penentu produksi lainnya. Oleh karena itu, semua Data input yang tersedia dapat digunakan dalam analisis yang sama untuk menghasilkan ukuran tunggal kapasitas pemanfaatan. Hal ini dapat mencakup informasi tentang saham biomassa (jika tersedia), sehingga pengaruh perubahan saham dapat langsung dimasukkan ke dalam analisis. Akibatnya, tingkat rendah output dalam beberapa tahun akibat rendahnya tingkat stok sumber daya tidak akan keliru menjadi dikaitkan dengan underutilization kapasitas. ....
6	4.1.5 Data Envelopment Analysis (DEA) Data Envelopment Analysis (DEA) is a mathematical programming technique for estimating technical efficiency and capacity utilization. It is similar to SFP in that it estimates a frontier level of production and measures inefficiency and capacity utilization as deviations from the frontier. Unlike SPF, however, it does not require imposing any particular functional form of the production frontier on the data, and it is able to analyse both single and multiple outputs. Further details on the methodology and an example are presented in Appendix D. The fact that species-specific measures can be derived allows aggregation of capacity measures across different fleet segments and fisheries for a given species. As a result, capacity estimates can be directly compared to the target capacity measures. Capacity utilization measures at the fleet level also provide additional guidance for managers as to where capacity management may be most required.	4.1.5 Data Envelopment Analysis (DEA) Data Envelopment Analysis (DEA) adalah teknik pemrograman matematika untuk memperkirakan efisiensi teknis dan pemanfaatan kapasitas. Hal ini mirip dengan SFP dalam hal itu memperkirakan perbatasan yang tingkat utilisasi produksi dan langkah-langkah inefisiensi dan kapasitas sebagai penyimpangan dari perbatasan. Tidak seperti SPF, bagaimanapun, tidak memerlukan memaksakan bentuk fungsional tertentu perbatasan produksi pada data, dan mampu menganalisis secara single dan multiple output. Rincian lebih lanjut tentang metodologi dan contoh disajikan dalam Lampiran D. Fakta bahwa langkah-langkah spesifik spesies dapat diturunkan memungkinkan agregasi kapasitas langkah-langkah di segmen armada yang berbeda dan perikanan untuk spesies tertentu. Akibatnya, estimasi kapasitas dapat langsung dibandingkan dengan langkah-langkah kapasitas sasaran. Langkah-langkah pemanfaatan kapasitas di tingkat armada juga memberikan bimbingan tambahan bagi manajer untuk di mana kapasitas manajemen mungkin yang paling diperlukan. ....

4. Recommendations and follow up actions

- General comments apply to all the translated documents
- More detail improvement must be based on those comments. When necessary, further clarification (by phones or any other means of communication) are welcome

Annex 1. List of Organizations invited to the Meeting

No	Instansi	Jumlah
1	Dekan FPIK IPB	3
2	Dekan FPIK Undip	2
3	Ketua STP Jakarta	2
4	Ketua HPPI	2
5	Kepala P4KSI	5
6	Direktur SDI	2
7	Kepala BBPI Semarang	3
8	Kasubdit. lingkup Dit. KAPI	6
T O T A L		**25**

Annex 2. List of Participants at 'Information Production and Dissemination' Meeting, November 5th 2014

No	Name	Institution	Gender
1	Endroyono	Dit. KAPI/ NPC	M
2	Ronny Irawan Wahju	IPB	M
3	Tri Antoro	PT. Dwi Bina Utama	M
4	Agustinus Anung Widodo	P4KSI	M
5	Chandra Nainggolan	STP	M
6	Bagus Oktori Sutrisno	Dit. KAPI	M
7	Imron Rosyidi	Dit. KAPI/ NTO	M
8	Mahiswara	P4KSI	M
9	Erfind Nurdin	P4KSI	M
10	Wudiyanto	P4KSI	M
11	Suhariyanto	BBPI	M
12	Diding Sudira effendi	Dit. SDI	M
13	Fachruddin	BBPI	M
14	I Gst Ngr Mertahwibawa	HPPI	M
15	Aristi Dian PF	Undip	F
16	Dwi Arioga Gautama	WWF	M
17	Diniah Sobari	IPB	F
18	Mas Umamah	Dit. KAPI/ Secretariate	F
19	Andi Sardy S	Dit. KAPI	M

Photos from meeting