IMPLEMENTATION OF BEST SCIENCE IN THE SCRS

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SUMMARY

Resolution [Res. 11-17] covers aspects related to Quality Assurance (QA) including areas in the sphere of collection of data, research, participation and capacity building, dialog with the SCRS and, very particularly, quality control of the stock assessments and advice. The majority of the specific matters of the Resolution have been in the debates of the SCRS since more than one decade and some initiatives have been put in place since then but without a clear systematic development. It is proposed the elaboration of the 2015-2020 SCRS Science Strategic Plan (including QA and Code of Conduct aspects).

RÉSUMÉ

La Résolution [Res. 11-17] couvre des aspects relatifs à l'assurance de la qualité (QA), notamment des domaines se rapportant à la collecte des données, la recherche, la participation et le renforcement des capacités, le dialogue avec le SCRS et, en particulier, le contrôle de la qualité des évaluations de stocks et des avis fournis à cet égard. La majorité des questions spécifiques contenues dans la Résolution sont débattues au sein du SCRS depuis plus d'une décennie et quelques initiatives ont vu le jour depuis lors, mais sans un développement systématique clair. Il est proposé d'élaborer le plan stratégique pour la science du SCRS 2015-2020 (comprenant des aspects relatifs à l'assurance de la qualité et au code de conduite).

RESUMEN

La Resolución [Res. 11-17] cubre aspectos relacionados con la garantía de calidad, lo que incluye campos dentro del ámbito de la recopilación de datos, la investigación, la participación y creación de capacidad, el diálogo con el SCRS y, muy especialmente, el control de calidad de las evaluaciones de stock y del asesoramiento. La mayoría de los temas específicos de la Resolución han estado presentes en los debates del SCRS más de una década y se han llevado a cabo algunas iniciativas desde entonces, pero sin un desarrollo sistemático claro. Se propone la elaboración del Plan estratégico de ciencia del SCRS 2015-2020 (incluidos los aspectos relacionados con la garantía de calidad y con el código de conducta).

KEYWORDS

Quality Assurance, Best Science

1. Resolution by ICCAT on Best Available Science [Res. 2011-17]

During the 2011 ICCAT COM meeting in Istanbul, reaffirming the necessity that any conservation and management measure is based on the best possible scientific advice, the Commission adopted the Resolution on Best Available Science [Res. 2011-17][4]. The Commission recognizes the high quality work of the SCRS, and with this Resolution intends to reinforce the role of the Committee.

Most of the subjects covered by the Resolution are related to Quality Assurance (QA) including aspects in the sphere of collection of data, research, participation and capacity building, dialog with the SCRS and, very

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[4] http://www.iccat.int/Documents/Recs/compendiopdf-e/2011-17-e.pdf

particularly, quality control of the stock assessments and advice. And the actions proposed affect to the different links in the chain of the development of the scientific advice (**Figure 1**).

In this way, the priorities identified during the 2011 meeting of the Working Group on the Organization of the SCRS (Anon., 2012a) can be framed now in this resolution: Research & Development (R&D) investments, participation of CPC national scientists and capacity building and QA and transparency. Therefore the SCRS welcomes this initiative which is in line with its reiterated demands.

The majority of the specific matters of the Resolution have been previously identified by the SCRS [items 1 (i to v), 2 (i, iv), 3 and 5 (I, ii)] or are implicit within the logic of the work conducted by the Committee [2 (ii, v, vi, vii) and 4]. Only two items are really new: items 2 ii ("Adopting, publishing and implementing SCRS rules, including a code of conduct for scientists and for observers") and 6 ("The next independent performance review of ICCAT should include an assessment of the functioning of the SCRS and its working groups through a total quality management process, including an evaluation of the potential role of external reviews").´

The implementation of the initiatives identified in [Res. 2011-17] for the benefit of the work of the SCRS requires not only the involvement of the Committee but also the decisive involvement of the CPCs and the Commission. Questions like data collection, support research, participation,… are clearly in hands of the CPCs; others like the will of conducting the assessment of the functioning of the SCRS corresponds clearly to the Commission; and others are shared responsibilities, for example, the improvement of communication corresponds to CPCs, SCRS and the Commission. **Table 1** indicates the holders of responsibility for the implementation of the different aspects of the Resolution.

The following paragraphs will refer to those aspects of the Resolution, directly related to QA, which requires the direct involvement of the SCRS; that is, items 2, 3 and 4.

2. QA in the SCRS

QA has been in the debates of the SCRS since more than one decade and some initiatives have been put in place since then but without a clear systematic development. In 1999, the chairman of the Working Group of Stock Assessment Methods (WGSAM) elaborated a well-structured proposal including the different levels of assessment QA providing specific recommendations for implementation at ICCAT (Restrepo, 2001). The levels of action identified went from the collection of raw data to the formulation of advice and it was clear that any robust QA Policy aimed at management advice should be implemented at all levels and not for any of the items in isolation.

The proposal identified several steps that should be taken for QA in stock assessments; some of them have been already adopted and others are still pending or under development.

- Adoption of standards: for data formats and diagnostics. Apart from the definition of standards, most of the QA that relates to data can only be implemented at the national level (see below).

- Approval of methods. The SCRS has developed a catalog of stock assessment applications, the so-called "software catalogue". The aim of the catalogue is to document the procedures taken to validate some of the stock assessment programs that are commonly used by the various working groups. Its purpose is not to evaluate the relative merits of various assessment methods, but rather whether the software implementing the method works as intended and is adequately documented. Since 2000, 10 different applications have been catalogued; others are currently in process. However there have been difficulties in the process of validation of some software and the SCRS has recently suggested that common protocols be developed with other organizations' catalogues, e.g. ICES and NOAA toolbox (Anon., 2012b).

- Control of preparatory analysis. Most of the preparatory analysis is carried out by national scientists (standardization of CPUEs, analyses of biological data…). The SCRS permanently reiterates the necessity of documenting the QA steps that have been taken and to implement the standard diagnostic tests. The WGSAM continues working in improving the QA of this type of information; for example, the 2012 WGSAM agenda includes a specific item on the development of generic protocols for the inclusion or use of CPUE series.

- Control of assessment analysis. The SCRS (Anon., 2012a) has recommended the development of a checklist for stock assessment documentation to improve the current situation and allow easy location of the model inputs, software, and outputs (including the underlying data supporting tables and figures). As the complexity of stock assessment workshops has increased, the amount of documentation needed to support the management advice provided to the Commission has increased. According to the SCRS, there should be someone, perhaps on the Secretariat staff, tasked to ensure that this is done, and that all files are provided for the meeting backup.

- Sequential review of assessment analysis. The SCRS wants and needs to make sure that the advice derived from assessments is based on the highest quality scientific data and analyses, and it is developed in a transparent way. For this reason the Committee has always identified the importance of the peer review system. And the Resolution [Res. 2011-17][4] emphasizes the special relevance that the Commission also gives to this instrument of QA. Due to this relevance we will enter into more details of its application in the SCRS in the next section.

Apart from these steps of the process, Restrepo (2001) also referred to the importance of data issues when defining QA procedures for the scientific advice. However, most of the quality controls that relate to data can only be implemented at the national level. The SCRS has recommended taking steps to initiate an inventory of QA procedures taken by the various nations and entities in order to determine if there are areas in particular need of attention; and this work was initiated by the Sub-Committee of Statistics. However, due to other priorities (reviewing compliance with data submission requirements) had resulted in drifting the role of the Sub-Committee from a scientific endeavor toward a role more related to a compliance committee. The SCRS thinks that the Sub-Committee should be more involved on reviewing the submitted data for its scientific value for stock assessment purposes instead of only focusing on submission deadlines. And has agreed on the need to develop a system to better characterize the quality of the submitted data beyond if they were submitted by the deadline or not and has recommended that future work of the Sub-Committee be oriented more toward data quality evaluations (ANON., 2012c).

Implementation of QA in the SCRS goes well beyond this brief description. The information provided has been focused on QA in stock assessments. But there are other aspects in the Resolution [Res. 2011-17][4] that are related to the way the advice is given to the Commission which we will refer to briefly.

- "*2 v) Providing clear, transparent, and standardized scientific findings and advice to the Commission*". The SCRS is permanently trying to improve the format of its advice to fit the necessities of the Commission and considers that stricter guidelines streamlining reports (both detailed and executive summaries) need to be implemented in order to improve the quality of the documentation and advice provided (Anon., 2012a). The adoption of the Resolution to Standardize the Presentation of Scientific Information in the SCRS Annual Report and in Working Group Detailed Reports [Rec. 2011-14][5] will definitely facilitate the SCRS the alignment of their formats to the requirements of the Commission.

- "*2 vii) Reflecting different opinions in the scientific reports and during the endorsement process of SCRS' scientific advice to foster transparency of the scientific advisory process*". The SCRS carries out stock assessments and advises the Commission on the need for specific conservation and management measures, under the premise of consensus. However it is not uncommon to have different positions on the assumptions, inputs, models, interpretation of outputs, etc. during the different steps of the elaboration of the scientific advice; controversies are sometimes inevitable. And in those circumstances these different views are normally reflected in the corresponding report.

In many cases these circumstances of lack of consensus derive in their consideration as part of a sensitivity analysis; and this allows the evaluation of the effect of the different views in the perception of the status of the stock and future projections.

3. Peer Review Mechanisms in ICCAT Stock Assessments

The SCRS has been discussing peer review mechanisms as a component of its science QA program for stock assessments and development of scientific advice for the Commission for more than a decade. While there has

[5] http://www.iccat.int/Documents/Recs/compendiopdf-e/2011-14-e.pdf

been a history within SCRS of involving scientists who have been supported by interested groups (including NGOs and fishing industry concerns), in SCRS stock assessments, largely through including such scientists in CPC scientific delegations or as observers, there has also been a long-standing interest in a regularized external peer review process to further promote transparency of process and quality of the scientific product. Unfortunately, a regularized funding mechanism for such a process has yet to be incorporated within the overall budget of ICCAT. With adoption of [Res 11-17][4], such a regularized external peer review process may become a reality.

3.1 Evolution of peer review in the SCRS

This is a brief summary of the evolution of the discussion, so far:

- ✓ 1998-1999: The SCRS reiterates the importance of external peer review and the stress the need to formalize operationally the process. A scientist from SPC provides advice on the BET Year Program.
- ✓ 2000: The SCRS discuss development of a proposal for different types of review mechanisms, including budgetary implications (Restrepo, 2001). The Working Group on Assessment Methods (WGSAM) is established; the overall mandate includes the implementation of QA management program for stock assessment methods.
- ✓ 2001: The SCRS presents a concrete proposal on external peer review at the Commission meeting as one component of the QA program, requiring a moderate amount of funding.
- ✓ 2002-2003: External peer review for WHM (2002), ALB (2003) and the WGSAM (2003). The SCRS is very pleased with the progress of the peer review system, especially with having the reviewers participating actively in the meeting (as opposed to conducting a review of a report after the meeting has taken place). Funds: $20,000 in 2003.
- ✓ 2004: The SCRS recommends that the external peer review funds be used in 2005 to bring an independent scientist to chair the BFT stock assessment meeting. However during the Commission meeting some delegations expressed concern about the involvement of external/independent scientists in these tasks, noting that “they felt it diminished the credibility of the SCRS scientists who are in fact highly qualified”. Other opinions expressed that “although the contributions of independent scientists are important, they did not feel it ICCAT´s responsibility to finance their participation”.
- ✓ 2005: The SCRS recommends that external experts be called to participate as peer reviewers in the three stock assessment meetings in 2006 and that funding be provided for this purpose. Of the recommendations made by the SCRS, the convenience of maintaining external peer reviews of the stock assessments carried out within the SCRS was highlighted. It was pointed out that regularizing this component of the SCRS QA program was impeded due to the fact that the Committee’s recommendations reach the Commission after the budget has been prepared, and thus the funds needed to carry out this work are limited. It was suggested that the release of funds, within the budget, was a possible solution to this problem.
- ✓ 2006-2009: No funding available. The SCRS emphasizes that the participation of external experts in stock assessment meetings is an important mechanism for QA of stock assessment advice developed by the Committee. The Committee recommends that the Commission make available funding to invite external experts to participate in stock assessment meetings.
- ✓ 2010: Joint Tuna RFMOs Meeting of Experts to Share Best Practices on the Provision of Scientific Advice (Kobe II – Science). Rec 12: Tuna RFMOs should promote peer reviews of their stock assessment works.
- ✓ 2011:

  The SCRS recommends that collaboration between tRFMOs scientific committees should be further enhanced as such collaboration provides a good basis for QA through regularized peer review and exchange of expertise and experience.

  SCRS reiterated that that regularizing this component of the SCRS QA program was impeded due to the fact that the Committee’s recommendations reach the Commission after the budget has been prepared, and thus the funds needed to carry out this (or other) work is limited. SCRS recommended consultation between SCRS Chair and Executive Secretary on developing mechanisms to more fully reflect SCRS recommendations with financial implications in the budget preparation process.

Commission adopts the Resolution on Best Available Science [Res 11-17], which, among other elements, calls upon CPCs to undertake to "Strengthen peer review mechanisms within the SCRS by participation of outside experts (e.g., from other RFMOs or from academia) in the SCRS activities, particularly for stock assessments."

3.2 Peer review procedure currently in place in the SCRS

The peer review mechanisms currently in place are those adopted by the SCRS in 2002 [Appendix 4 of the 2002 SCRS Report, (Anon., 2003)] following the recommendations of the SCRS in 2001 [2001 Report of the Ad Hoc Working Group on SCRS Organization (Anon., 2002) and 2001 SCRS Report (Anon., 2002)] after discussing the proposed methods of conducting peer review detailed in Restrepo (2000)[3].

The SCRS recommended proceed with the conduct of at least 2 in situ reviews per year. The purpose of the reviews is to provide additional scientific peer advice to the SCRS and its species groups for improvements in their conduct of stock assessments. Conduct of in situ review, wherein the reviewer may provide working papers in advance of the session, actively participates in analysis and in report drafting, permits an immediate feedback to the working group and SCRS and permits suggestions for future research, and thus, in the short-run, is the method of peer review viewed most practical.

It was further suggested that these reviews be conducted for species groups implementing new assessment methods as a first priority. Species group conveners should plan to hold a review of this nature within the next 5 year period and additional reviews at intervals of about every 2-3 assessments, thereafter.

The process of selection of the reviewers was defined as follows:

(1) Two stocks will be identify for reviews

(2) A pool of potential reviewers will be identified

(3) The Secretariat will determine the availability of reviewers

(4) From the available pool, the SCRS Chairman, the Species Group Rapporteur and the Secretariat will select the reviewers

(5) Heads of national scientific delegations and Species Group rapporteurs will be advised of the outcome of this process

The qualifications of the reviewers will be evaluated by the small selection group, and a brief curriculum vitae made available for information. The final selections will be made on the basis of both the availability and qualifications of candidates.

3.3 Peer review procedures in place in other t-RFMO

Last November IOTC Secretariat prepared a review-document to provide the Scientific Committee (SC) with information regarding peer review of stock assessments in the different tRFMO's (IOTC–2011–SC14–44)[6]. In summary the situation is as follows:

- IATTC: commenced a peer review process in 2010 and plans to carry out peer review of their stock assessments every second year focusing on a different species each time (BET in 2010; YFT in 2012). The peer review is of the assessment methodology and not the assessment results and is conducted through a 5-day review meeting (review panel consisting of three reviewers and a Chair), open to interested parties.
- WCPFC: had intended on undertaking a review of the YFT stock assessment in 2010, without success; plans for BET in 2012 when a panel of three independent reviewers (not directly involved with current WCPFC BET assessments) will review the 2011 BET SA and provide advice for future assessment work.
- CCSBT: After a recommendation of a Peer Review Panel in 1998 the CCSBT established an Advisory Panel [an Independent Chair of the SC and four (three in 2012) Independent Scientific Advisory Panel Member) to provide external input to its stock assessment and scientific processes.

[6] http://www.iotc.org/files/proceedings/2011/sc/IOTC-2011-SC14-44[E].pdf

- IOTC: The SC agreed in 2011 that it did not feel that there was a need to undertake a peer review of IOTC stock assessments and deferred this discussion to its next meeting in 2013.

4. Code of Conduct for Scientists and Observers

A number of attempts at defining codes of conduct for scientists have been initiated, and in some cases, broadly adopted. For example, the principles and responsibilities set out in the Singapore Statement on Research Integrity ([7]) represent the first international effort to encourage the development of unified policies, guidelines and codes of conduct, with the long-range goal of fostering greater integrity in research worldwide. The Statement is the product of the collective effort and insights of the 340 individuals from 51 countries who participated in the 2nd World Conference on Research Integrity in Singapore in 2010. The next World Conference on Research Integrity will be held in Montreal (Canada, May 5-8, 2013) and it will be a good opportunity for the SCRS to evaluate mechanisms to determine the best approach for the definition of a code of conduct adapted to its specific labor.

As another example, recently, in 2011, the European Science Foundation (ESF) Member Organizations which are 78 national funding bodies, research-performing agencies, academies and learned societies from 30 countries worked in close collaboration with the All European Academies (ALLEA) to develop a code of conduct for guiding natural, social and humanitarian scientific enterprises in Europe ([8]). The code is not intended to replace existing national or academic guidelines, but it sets out a list of principles that these national guidelines should consider, including:

- ✓ Honesty in communication;
- ✓ Reliability in performing research;
- ✓ Objectivity;
- ✓ Impartiality and independence;
- ✓ Openness and accessibility;
- ✓ Duty of care;
- ✓ Fairness in providing references and giving credit;
- ✓ Responsibility for the scientists and researchers of the future.

Development of greater familiarity with this or other similar codes could provide a greater awareness of global concerns over scientific conduct and mechanisms to further this debate within SCRS should be pursued.

5. Recommendation

Definition during 2013 of 2015-2020 SCRS Science Strategic Plan (including QA and Code of Conduct aspects):

- First draft to be elaborated by SCRS (rapporteurs, conveners and chair) & Secretariat & external experts.
- SCRS ad hoc meeting.
- Approval by the SCRS
- External peer review
- Adoption by the Commission.

[7] http://www.singaporestatement.org/index.html
[8] http://www.allea.org/Pages/ALL/19/228.bGFuZz1FTkc.html

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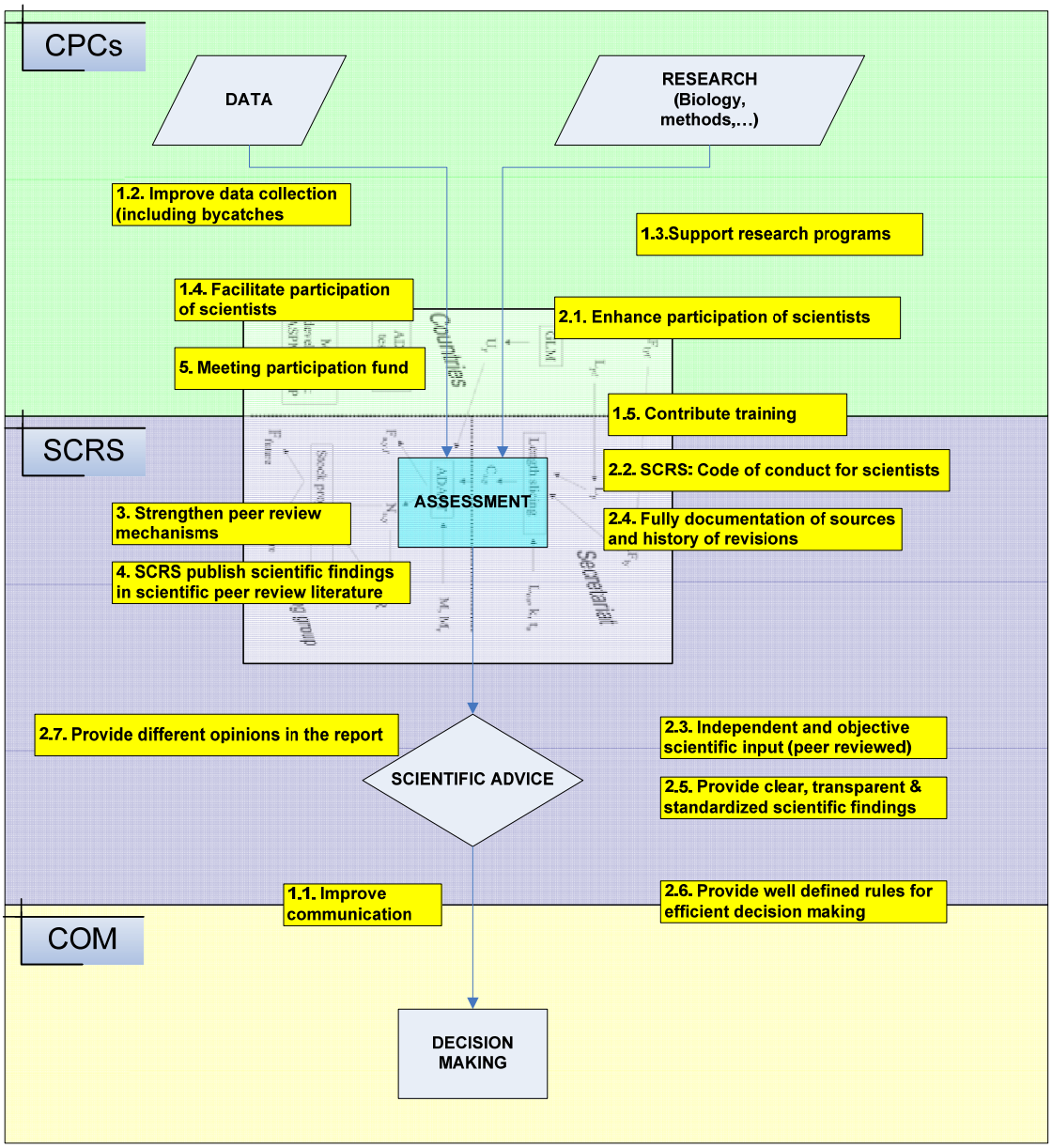
Table 1. Terms of Resolution by ICCAT on Best Available Science [Res. 11-17] with indication of the bodies which have the main responsibility for their implementation.

Terms of [RES. 2011-17]	CPCs	SCRS	COM
1. Take all measures to...			
1.i) improve communication CPCs-COM-SCRS	■	■	■
1.ii improve data collection and provision to the SCRS, including on by-catches	■		
1.iii) support research programs and projects supporting the work of the SCRS	■		
1.iv) facilitate participation of scientists from all CPCs, as well as other relevant scientific bodies	■		
1.v) contribute to the training of scientists, including young scientists	■	■	
2. Preserve and promote the independence and excellence of the SCRS and its WG			
2.i) participation of scientists, including scientists involved in other tunas' RFMOs	■		
2.ii) code of conduct for scientists and for observers.		■	
2.iii) independent and objective scientific input, based on the best available and peer-reviewed scientific deliverables, is presented by the SCRS to the Commission		■	
2.iv) sources and history of revisions are fully documented		■	
2.v) clear, transparent, and standardized scientific findings and advice to the Commission		■	
2.vi) well-defined rules for efficient decision-making to arrive at scientific advice		■	
2.vii) different opinions in the scientific reports		■	
3. Strengthen peer review mechanisms within the SCRS		■	■
4. Publish its scientific findings in peer-reviewed literature.	■	■	
5. Broadening financial support:	■		■
5.i) capacity building & participation of the developing CPCs	■		■
5.ii) resources for the SCRS	■		■
6. Assessment of the functioning of the SCRS through a total quality management process			■

[Res. 2011-17] Resolution by ICCAT on Best Available Science



6. The **next independent performance review** of ICCAT should include an **assessment of the functioning of the SCRS** and its WG through a **total quality management process,** including an evaluation of the potential role of **external reviews**.

Figure 1. Diagram of the main aspects of Resolution by ICCAT on Best Available Science [Res. 11-17] and how they relate to the different links in the chain of the development of the scientific advice.