

# Production and presentation of official statistics: strategies for managing quality

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## 1 Introduction

1 The main uses of economic and social statistics produced by official statistical offices have specific and quite demanding quality requirements. Regular revisions, inconsistencies or other persistent data quality problems can result in loss of confidence in the information produced by an organisation. Other aspects of quality such as coherency of presentation with other related data, whether adjustments have been made for say seasonality or compositional differences, and the accessibility of information on methods and quality are also important for maintaining user confidence. The quality of official statistics therefore needs to be managed as a key organisational strategy. Its many aspects need to be well understood and its management needs to be deliberate and pervasive across all aspects of production and delivery.

2 Quality, however, is just one part of the trilogy managers constantly balance:- budgets, time constraints and quality. To ensure quality receives due priority in this balancing, Statistics New Zealand has introduced several corporate-wide initiatives. They build on the many strategies and practices that are being followed in Statistics New Zealand to achieve quality in the day to day production of statistics (eg sound statistical methodologies, use of standards, peer reviews, training, validation of results etc). The end goal is to raise the profile of management of quality and to establish it as a focus in the planning and ongoing production of outputs.

3 The two initiatives described in the paper are directed at a) assessing the quality of statistical outputs for the various subject fields, and b) managing quality in the ongoing production of statistics. They are supported by various policies, tools etc which are also listed.

## 2 Assessing the quality of statistical outputs

4 Statistical products and services provided by Statistics New Zealand are produced by ‘output’ areas (which cover subject fields of statistics eg national accounts, business statistics, labour etc). These output areas take statistics from ongoing and ad hoc collections (including administrative records), and present the results in statistical products and services (ie outputs). Sometimes the data are presented on their own as the results of a survey, but more likely they are either presented along with other related statistics for the period concerned (eg quarterly national accounts), or along with the results for previous periods (eg economic indicators).

5 Generally the statistics are presented in accordance with a conceptual framework. This framework might be relatively narrow or as comprehensive as the system of national accounts or balance of payments. In many cases, outputs are simply the results of ongoing collections presented as the latest measures in time series. Various degrees of analysis will be undertaken and reported on.

6 The quality of the various outputs is judged by users on a variety of aspects relating to their use of the statistics. To help an output area to judge its collective efforts at meeting user quality requirements across all the different quality aspects, and to determine areas of risk of performance, a framework for assessing the quality of outputs for a field of statistics has been developed. The results are also being used in corporate planning to point to where there is a need for additional investment in statistical or IT infrastructure to reduce quality risk or improve performance in areas of corporate concern.

7 The framework has about 100 indicators grouped under the following aspects of quality:-  
1. relevance

2. expertise
3. adaptability and responsiveness
4. accuracy
5. coherence
6. interpretability (analysis, presentation)
7. timeliness
8. accessibility of data and metadata
9. client service
10. efficiency
11. respondent management
12. management of risk and performance

The last 3 aspects relate to performance aspects that can indirectly impact on the other aspects of quality (eg efficiency influences costs and timeliness, poor respondent relations can result in less than satisfactory response rates).

8 An important premise underlying the framework is that the environment in which we operate and user needs are constantly changing. Hence, some emphasis is placed on the importance of having a sense of direction, being adaptive and having the right skills, infrastructure and practices to enable an output area to meet expectations into the future as well as now. There is also some emphasis on the extent of corporate fit through achievement of corporate goals and adherence to policies such as the use of statistical standards to facilitate integration of data, setting release dates in advance and meeting them, and responsiveness to the statistical needs of the Maori population.

9 The framework has been prepared to allow for self-assessment by an output manager, and the results are to be used to underpin the regular reporting of the position and strategic direction of the various statistical programs used for planning purposes by Statistics New Zealand. After the initial assessment, subsequent reports are expected to show where progress has been made to alleviate the risks arising from areas of underachievement of quality expectations and performance identified by the framework.

10 Initial use has indicated that, at the very least, it provides a useful and comprehensive list of the many aspects relating to quality and performance that managers are expected to achieve for their outputs. The requirement to include the assessment along with the strategic program reports provides an opportunity for senior management to discuss with program managers areas of quality risk and areas where priorities and funding limitations are putting at risk any aspect of quality. Such considerations are feeding into priority setting and resource allocation for the annual planning round. The initial results have also led to questioning of whether self-review has been critical enough or the assessments need to be done by an independent assessor.

### **3 Managing quality in the production of statistics**

11 The focus of the above framework is on the quality of the statistical products and services collectively provided for a subject field, with a very broad view taken of quality as it relates to a user perspective. In particular, there is an emphasis on providing the right information and presenting it in ways which readily supports informed use. A key determinant of the quality of a statistical output product is, of course, the quality of the underlying data source(s). The aspects of quality that are most important for source data relate to those of measurement (ie the right measures, accuracy, coherence, and timeliness).

12 In Statistics New Zealand, the different stages of data collection (from design through to respondent management, data collection and output production) are usually undertaken by different work areas, which are often in different offices. To manage the quality of what is produced requires a total system approach, with attention paid to each of the components, how they interact and how they come together as a whole.

13 Overall responsibility for what is produced from a collection and its quality is vested in an output manager in a subject area. So that an output area can meet the standards required for their output products and services they need to specify the standards required of their source data (eg standard error of movements, response rates, time between reference period and release, use of standard

classifications). The source data collections should be designed and developed to meet these standards. The output manager also needs assurance that the required quality is being achieved and that consistent decisions are being made at all stages with regard to achieving the specified quality standards. This is being managed in SNZ by the implementation of a Quality Management Model, the essential elements of which are:-

- . quality standards specified and known to all process managers and staff
- . processes and rules documented and the information readily accessible
- . owners of the outcomes of each stage identified along with their responsibilities
- . ‘outputs’ at each stage defined along with standards and tolerances
- . the production and monitoring of indicators to ensure the standards are met and users can be informed of the quality achieved
- . a system for registering process problems and managing action taken
- . a system for change management.

14 The quality management model is based on a simple but essential premise viz “how can you manage something if you do not know what standard you are aiming at and what you are achieving?” The quality management model demands all collections to have statements of the quality standards required to meet the key uses of the data and the indicators to be produced for various processes of production. It also requires monitoring of the indicators against the standards, with managers expected to take action when there are unacceptable variances. Key indicators will also be included in regular reporting to senior managers as done with budgets and other aspects of performance.

15 Design is usually an area of strength for official statistical offices, arising from a history of statistical professionalism founded on the use of sound mathematical statistical techniques in the design of a sample survey, and the use of standards such as frameworks and classifications, robust computer systems and training. The designs, however, are based on assumptions, the validity of which need to be checked regularly to ensure that they remain valid. This includes assumptions about coverage of frames, representativeness of respondents, imputation rules, understanding by respondents of concepts underlying questions and relevance of classifications to name some of the areas. These assumptions are required to be spelt out in the quality standard statement, as they point to some of the indicators of quality to be monitored.

16 Examples of indicators to be monitored are:-

- . sample errors
- . response rates (by key strata/groups)
- . proportion of proxy interviews
- . special treatments
- . impact of births, deaths & rotation
- . units out of strata selection boundaries (size, industry etc)
- . value of outliers & imputation made
- . scope & coverage adjustments
- . population change
- . irregularity in time series
- . respondent load

17 Production systems are being modified so that such indicators are produced as a by-product of production and available for monitoring the quality of the processes and the resulting statistics. The indicators are to be stored in one central location for access by all interested areas. Key information on quality should also be stored in the Survey Information Manager (SIM – a corporate repository of metadata), so that an historical record is kept and readily available to users of the data.

#### **4 Support**

18 The management of quality of ongoing collections needs the support of tools and infrastructure. The key tools and infrastructure which have been developed by Statistics New Zealand for assisting the management of outputs to quality standards include:-

- . expert service areas with a focus on standards and understanding of techniques for reducing error (eg sampling methodologists, questionnaire designers, time series analysts, subject experts)

- . the Statistical Project Management (SPM) methodology, which is used to manage the development of collections
- . Protocols for Official Statistics, with associated standards and guidelines for graphs, tables, time series presentation, revisions, releasing data with error, form design, etc
- . standard frames, frameworks, definitions, questions, classifications, codefiles, coders
- . the Classifications and Related Standards system (CARS), which is used to manage classifications
- . Survey Information Manager (SIM) and other Lotus Notes databases for easy access to documentation
- . peer reviews of the design of various aspects of a collection
- . registers for logging problems and tracking their resolution

19 Frames such as the Business Frame which service many projects have their own quality standards to ensure they can support the needs of particular collections as regard to coverage of units, up-to-dateness of design information etc. The challenge with such infrastructure, and with expert service areas, is to ensure they do not get a life of their own and avoid striving for quality beyond what is needed by the collections.

20 Sound designs require a good understanding of the many sources of non-sample error and their relative contribution to overall error in the absence of quantification of the errors. To assist survey designers, as well as operational managers, a framework is being developed which sets out the strategies and work done within Statistics New Zealand to minimise each of the components of non-sample error, and the likely end impact on output statistics.

21 High level management support and leadership is also needed, particularly as quality measurement and improvement are often done alongside the more demanding operational aspects of production according to a time schedule. The main principles are:-

- . output managers actively taking responsibility for the quality for their products, and encouraging continuous improvement based on team work
- . efficiency and budget management should be applied within the context of quality management
- . encourage statistical thinking through analysis of data and information on performance
- . information on quality regularly collected and used in decisions on developments, production etc
- . customer/end user orientation
- . quality is stressed in plans and communications
- . documentation is encouraged
- . good practices sought out and promoted
- . regular reviews of performance of systems
- . interest taken in how well systems are working
- . extension of solutions/innovations to other processes
- . staff development and support.

22 Finally, no matter how carefully managed are the above quality initiatives and strategies, there are quality problems which arise, often during tight production schedules, that need to be investigated and resolved. The key to success here is staff with the right skills able to take a broad perspective and willing to step back and question assumptions made in designs etc. Often experience learnt from past problems provides the key to quick resolution.

## RESUME

*Afin de maintenir la confiance des usagers vis-à-vis des statistiques officielles, la qualité des produits et services divers fournis par une agence des statistiques doit être gérée comme une stratégie clef de l'organisation. "Statistics New Zealand" a introduit plusieurs initiatives générales afin d'assurer que l'excellence soit une priorité pour équilibrer les budgets, les délais à respecter et la qualité pour les administrateurs.*

*Les initiatives sont menées pour : a) évaluer la qualité des rendements statistiques dans les différents domaines, et b) gérer la qualité de rendement de la production régulière des statistiques. Celles-ci sont soutenues par divers mesures, instruments, etc. Le document décrit les initiatives et l'appui fourni.*