

**United Nations Expert Group on the Integration of
Statistical and Geospatial Information**
First Meeting
New York, 30 October - 1 November 2013

Agenda: Item 9

Geospatial Information in the Statistical Business Cycle ¹

Prepared by
UN-ESCWA

¹ This document is being produced without formal editing



UN-ESCWA

Geospatial Information in the Statistical Business Cycle

Source: UNECE / CES, Common Metadata Framework

Juraj Riecan, Director, Statistics Division
United Nations Economic and Social Commission
for Western Asia (UN-ESCWA)

GENERIC STATISTICAL BUSINESS PROCESS MODEL



UN-ESCWA



GENERIC STATISTICAL BUSINESS PROCESS MODEL

LEVEL 1 + LEVEL 2, VERSION 4.0



UN-ESCWA

Quality Management / Metadata Management

1 Specify Needs	2 Design	3 Build	4 Collect	5 Process	6 Analyse	7 Disseminate	8 Archive	9 Evaluate
1.1 Determine needs for information	2.1 Design outputs	3.1 Build data collection instrument	4.1 Select sample	5.1 Integrate data	6.1 Prepare draft outputs	7.1 Update output systems	8.1 Define archive rules	9.1 Gather evaluation inputs
1.2 Consult & confirm needs	2.2 Design variable descriptions	3.2 Build or enhance process components	4.2 Set up collection	5.2 Classify & code	6.2 Validate outputs	7.2 Produce dissemination products	8.2 Manage archive repository	9.2 Conduct evaluation
1.3 Establish output objectives	2.3 Design data collection methodology		4.3 Run collection	5.3 Review, Validate & edit				6.3 Scrutinize & explain
1.4 Identify concepts	2.4 Design frame & sample methodology	3.3 Configure workflows	4.4 Finalize collection	5.4 Impute	6.4 Apply disclosure control	7.3 Manage release of dissemination products	8.3 Preserve data and associated metadata	
1.5 Check data availability	2.5 Design statistical processing methodology	3.4 Test production system		5.5 Derive new variables & statistical units	6.5 Finalize outputs	7.4 Promote dissemination products	8.4 Dispose of data & associated metadata	
1.6 Prepare business case	2.6 Design production systems & workflow	3.5 Test statistical business process		5.6 Calculate weights		7.5 Manage user support		
		3.6 Finalize production system		5.7 Calculate aggregates				
				5.8 Finalize data files				

Source:
www.unece.org/stats

SPECIFY NEEDS

From Information needs to the business case



UN-ESCWA

- Is the phenomenon measured space dependent?
- Will data be collected from the field?
- Can data be geo-referenced?
- Will the output be presented in the form of maps?
- Is geospatial information available?



DESIGN



UN-ESCWA

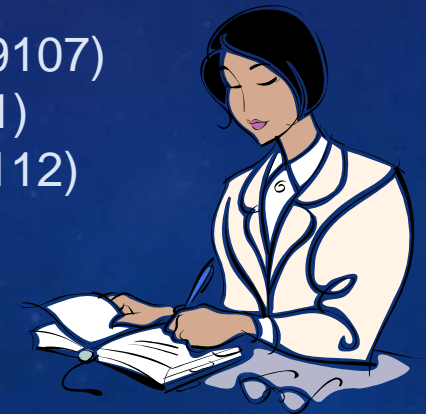
- **Formalize**
 - Data model combining geospatial and statistical information
- **Structure**
 - Geo-coding of variables/outputs
- **Organize**
 - Workflow and enumeration areas, maps, GPS,...

Statistical standards:

- SDMX (ISO 17369)
- Dublin Core (ISO 15836)
- Data Documentation Initiative
- Metadata Registries (ISO 1179)
- Corporate Metadata Repository
- Nordic Metamodel – PC-AXIS

Geospatial Standards:

- GIS (ISO 10\9115)
- Spatial Schema (ISO 19107)
- Coordinates (ISO 19111)
- Geo identifiers (ISO 19112)



BUILD



UN-ESCWA

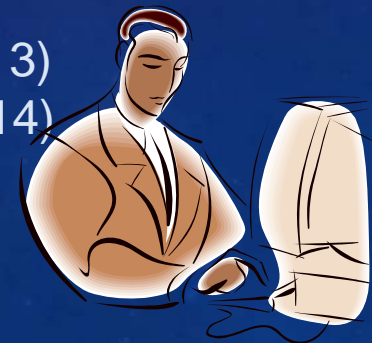
- **Applications**
 - Automated data entry (coordinates)
 - Quality control (GPS lock)
- **Hardware**
 - Handhelds, tablets – GPS enabled, maps
- **Testing**

Statistical standards:

- Common Warehouse Metamodel (ISO 19504)
- Statistical Classification
- Statistical Variables & Characteristics
 - ISO 11179
 - Neuchatel Model, Part II
 - UN Glossary of Terms

Geospatial Standards:

- Spatial Schema (ISO 19107)
- Coordinates (ISO 19111)
- Geo identifiers (ISO 19112)
- Quality principles (ISO 19113)
- Quality evaluation (ISO 19114)
- Encoding (ISO 19118)



COLLECT



UN-ESCWA

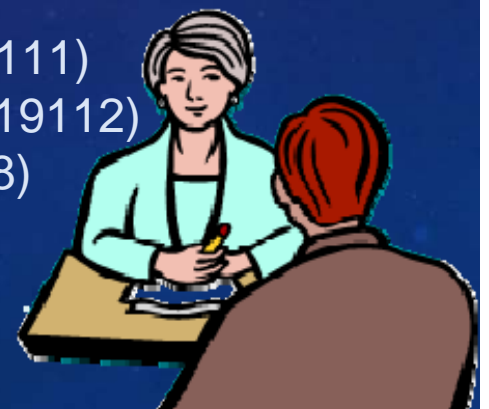
- **Basic checks**
 - Control of the enumerator's position
 - Respondent-side editing
- **Methods**
 - Remote sensing
 - Questionnaires, etc.

Statistical standards:

- Statistical Classification
- Statistical Variables & Characteristics
 - ISO 11179
 - Neuchatel Model, Part II
 - UN Glossary of Terms

Geospatial Standards:

- Coordinates (ISO 19111)
- Geo identifiers (ISO 19112)
- Encoding (ISO 19118)



PROCESS



UN-ESCWA

- **Integrate Data & Metadata**
 - Coding, classifying – statistical and geospatial viewpoint
 - Calculations, aggregations – small areas
- **Editing and imputation**
 - Avoid systematic errors
 - Hot-deck (geographic proximity)
 - Cold-deck (the same location in previous survey)

Statistical standards:

- SDMX Content Oriented Guidelines
- Statistical Variables & Characteristics
- UNECE./CES: Statistical Data Editing Methods and Techniques I and II

Geospatial Standards:

- Coordinates (ISO 19111)
- Geo identifiers (ISO 19112)
- Encoding (ISO 19118)



ANALYSE



UN-ESCWA

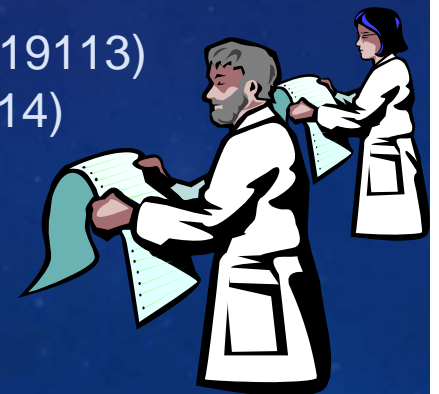
- **Analysis**
 - Spatial analysis (e.g. discrimination analysis, etc.)
- **Disclosure Control**
 - Statistical x Geospatial = Increased R\risk
- **Quality Control**
 - Statistical, Geospatial
 - To be developed: Quality framework for integrated information (Geospatial with Statistical)

Statistical standards:

- IMF: DQAF / SDDS
- ESS: Standard for Quality Reports

Geospatial Standards:

- Quality principles (ISO 19113)
- Q. evaluation (ISO 19114)



DISSEMINATE



UN-ESCWA

- **Communication**
 - Maps, cartograms, etc.
- **Management of Releases**
 - Management of data x Management of maps
- **Management of Queries**
 - Identify the caller's location

Statistical standards:

- OECD: Data and Metadata Reporting and Presentation Handbook
- UNECE: Best Practices in Designing Websites for Dissemination of Statistics
- UNECE: Guidelines for Stat. Metadata on the Internet
- Metadata Registries (ISO 11179)
- SDMX (ISO 17369)

Geospatial Standards:

- Geographic Information – Portrayal (ISO 19117)
- GIS (ISO 19115)



ARCHIVE



UN-ESCWA

- **Data with Metadata**
 - Integrated Warehouse, geo-referenced data
- **Retention Rules**
 - How long are data archived?
- **Confidentiality Protection**
 - Access permission
 - Released microdata – disclosure control
 - Macrodata – disclosure control for small areas

Statistical standards:

- Common Warehouse Metamodel (ISO 19504)
- UNECE/SDMAX: Statistical Subject-matter Domains

Geospatial Standards:

- Methodology for feature cataloguing (ISO 19110)



EVALUATE



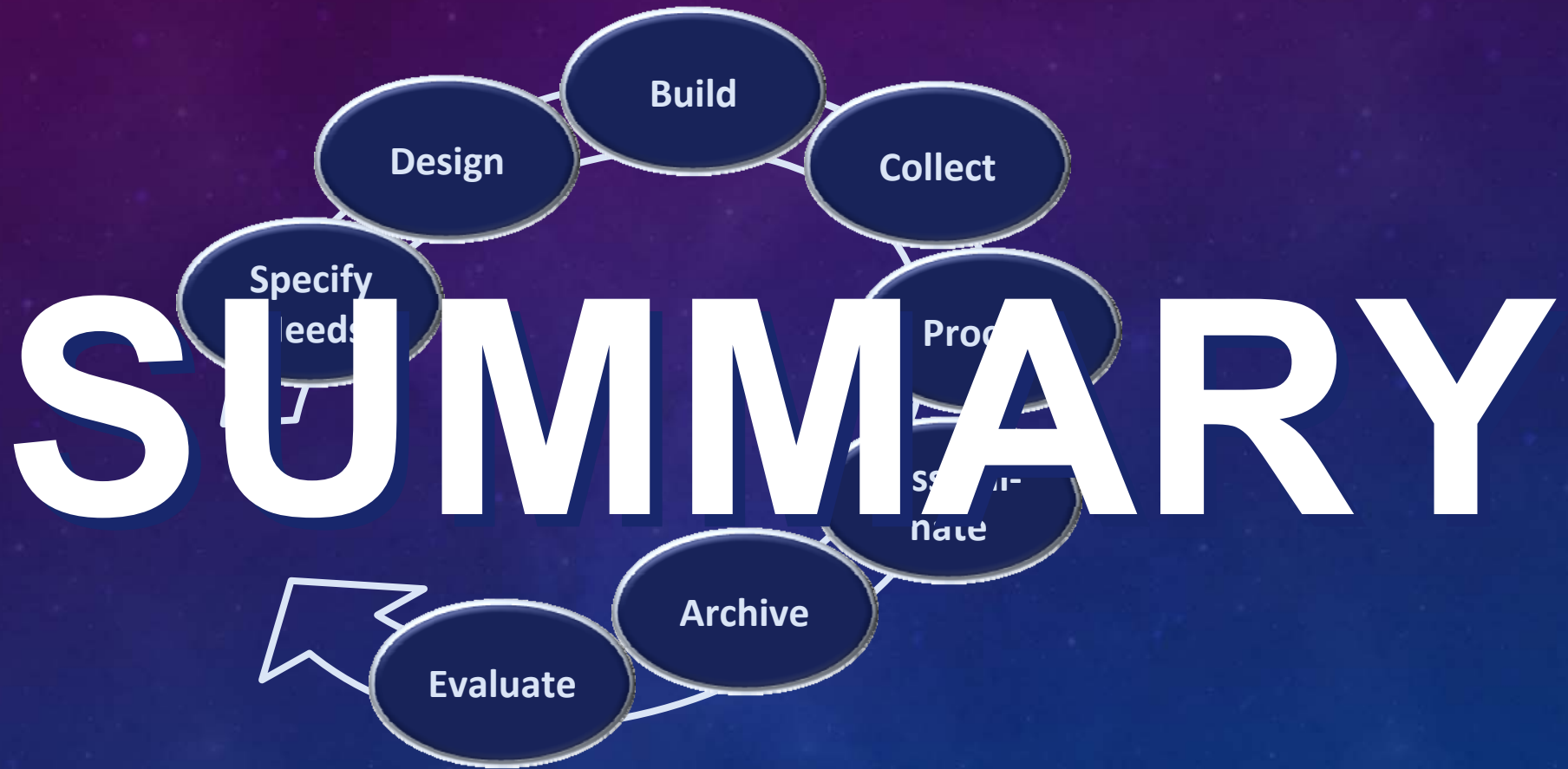
UN-ESCWA

Lesson learned
For the new survey instance





UN-ESCWA



GEOSPATIAL INFORMATION IN THE STATISTICAL BUSINESS PROCESS



UN-ESCWA

- Geographic and cartographic information used in planning
- Geo-referencing of statistical microdata (reporting units)
- Automated data entry
- Remote sensing
- Quality control, workflow control
- Geo-component of data coding, data editing, imputation
- Geo-component of disclosure control
- Spatial data analysis, small areas statistics
- Changes in administrative boundaries
- Dissemination GIS, maps, cartograms
- Queries management – identifying caller's location
- Geo-referenced data archives
- ...

APPLICABLE GEOSPATIAL STANDARDS



UN-ESCWA

- Geographic Information - Metadata (ISO 19115)
 - Profiles (ISO 19106)
 - Spatial schema (ISO 19107)
 - Temporal schema (ISO 19108)
 - Rules for application schema (ISO 19109)
 - Methodology for feature cataloguing (ISO 19110)
 - Spatial referencing by coordinates (ISO 19111)
 - Spatial referencing by geographic identifiers (ISO 19112)
 - Quality principles (ISO 19113)
 - Quality evaluation procedures (ISO 19114)
 - Portrayal (ISO 19117)
 - Encoding (ISO 19118)
- Codes for the representation of names of countries and their subdivisions (ISO 3166)

APPLICABLE STATISTICAL STANDARDS



UN-ESCWA

- Statistical Classifications
- Statistical Variables and Characteristics
- UNECE/SDMX Statistical Subject-matter Domains (UNECE / SDMX)

- Statistical Data and Metadata eXchange (SDMX) (ISO 17369)
- SDMX: Cross-domain Concepts
- SDMX: Cross-domain Code-lists

- Dublin Core (ISO 15836)
- Data Documentation Initiative (DDI)
- Metadata Registries (ISO 11179)
- Common Warehouse Metamodel (ISO 19504)
- eXtensible Business Reporting Language (XBRL)

STATISTICAL MODELS



UN-ESCWA

- Neuchâtel Model (Classifications, Variables)
- CRISTAL Model
- Generic Statistical Business Process Model (GSBPM)
- Corporate Metadata Repository (CMR)
- IMF: Data Quality Assurance Framework (DQAF)/ Special Data Dissemination Standards (SDDS)
- ESS Standard for Quality Reports
- Nordic Metamodel for PC-Axis

GOOD STATISTICAL PRACTICES



UN-ESCWA

- OECD Data and Metadata Reporting and Presentation Handbook
- UNECE Guidelines for the Modeling Statistical Data and Metadata
- UNECE Guidelines for Statistical Metadata on the Internet
- UNECE Recommendations on Formats Relevant to the Downloading of Data from the Internet
- UNECE Best Practices in Designing Websites for Dissemination of Statistics
- UN-ESCWA: Metadata handbook for Western Asia



UN-ESCWA

riecan@un.org
juraj@riecan.eu