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NAMIBIA STATISTICS AGENCY

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METADATA STANDARD ON THE MANNER FOR THE CAPTURING AND PUBLISHING OF METADATA FOR SPATIAL DATA AND SERVICES IN NAMIBIA

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1.   INTRODUCTION

Metadata defines the schema required for describing geographic information, services or any data. Metadata allows users to locate and evaluate data without each person having to discover it anew with every use. Its basic elements are a structured format and a controlled vocabulary, which together

allow for a precise and comprehensible description of content, location and value. For users of geospatial data and services to be well informed as to whether such meet their requirements, it is important for organisations to describe their services and data holdings. Metadata aids in answering questions such as:

- Who owns or is responsible for the particular data?
- Who or what is responsible for the origin of the data?
- When was the geospatial data or service created?
- Who has rights to access the geospatial data or service?
- Who owns or developed the data or service?
- When was the geospatial data or service last updated?
- What quality control was performed on the geospatial data?

2.   SCOPE

The objective of the metadata standard for Namibia is to provide a structure for describing digital geographic data and services. It must strive to be in alignment with the ISO 19157:2013, ISO 19115-1:2014 and ISO 19119:2016 standards. The metadata should be distributed in GML, Text, or XML compatible formats. Four (4) categories of metadata elements form the scope of this document.

- *Mandatory* elements are described as per ISO and Namibia requirements. These elements must be supplied.
- *Conditional* metadata elements are those elements which are required for specific datasets while not required on others. For instance some datasets might require statements on generalisations done on the data such as data classifications. Most further processed and classified datasets will required these element e.g. flood maps.
- *Optional* metadata element are those elements which are not required but can provide more insight to a dataset.
- *Namibia required only* metadata elements are elements specific for evaluating metadata in Namibia. These elements are mandatory but may not be ISO required.

Metadata for Namibia are used primarily for discovery and evaluation of spatial datasets to determine their fitness for use. In this context, the full spectrum of the purpose of metadata as provided in Table 1 shall be considered.

TABLE 1: SPECTRUM OF METADATA

Metadata Element	Discover	Evaluation	Access	Use
Title, Citation, Abstract	x	x	x	x
Publication Date	x	x	x	x
Place	x	x	x	x
Keywords	x	x	x	x
Contacts		x	x	x
Quality		x	x	x
Format			x	x
Feature Types			x	x
Spat Ref. System			x	x
URL				x

3.   CONFORMANCE

A spatial dataset, product or service claiming conformance to the Namibia National Spatial Data Infrastructure (NSDI) standard on metadata shall fulfil the requirements described in Tables 3 and 4. The Namibia Statistics Agency (NSA) shall validate the metadata from a data custodian or producer

to assess conformance. Note that a validation procedure may be adapted and incorporated in the metadata practical hand book to be developed by the Agency.

3.　　METADATA PROFILE

This standard defines two metadata profiles based on the scope of the resource being described.

3.2　　Metadata profile for geospatial data in Namibia

The metadata describing geospatial data in Namibia provides a benchmark for discovering, evaluating and utilising geospatial datasets. Data custodians are required to document all government geospatial datasets in their custodianship using this profile. The private sector and individuals are encouraged to also follow the provisions of this standard.

3.2　　Metadata profile for geospatial services in Namibia

This profile is for geospatial services rendered by an organisation. These services can be offering data download facilities, web maps, data visualisation, metadata or data transformation, etc. Notice that it is important to distinguish the two profiles because ISO assumes the metadata is for a dataset unless otherwise specified. A comprehensive description of each metadata element is provided in the two tables.

4.　　METADATA DATA TYPES

There two main data types used in the two metadata standard. Free text data types allows free entry of text to describe a resource. Users shall study the descriptions provided for each element and evaluate if such data meet their requirements. It is important that custodians are required to be precise in their detailing.

A date data type is written in a format starting with the YYYY-MM-DD in accordance with ISO 8601. Also notice that you can provide date ranges or series of dates. Dates can be publication, creation, completion, revision, etc. In addition URL data type provides a link to an online resource when available. It is advisable that the URL must point directly to a resource. To minimise categorisation errors, a predefined code-set are created for some elements including dates.

5.　　TOPIC CATEGORISATION FOR NAMIBIA

The topic category in metadata ensures correct classification of datasets thus making it easier to develop web services that enable timely access to the resource. The Namibia metadata editor tool to be developed by the NSA shall enforce correct categorisation of data in the generated metadata files. A total of 25 themes or categories have been identified. Each category is assigned a unique code. The category code is of text data type and must have a maximum length of 5 characters.

It is highly recommended to the data custodians to affix the topic category code to each dataset or metadata file submitted to the NSA *e.g. BDR_National_Boundary. xml.* Data custodians can also adopt the same naming conversion where possible in their databases. Table 2 lists all the categories as identified. The categories are not exclusive and can be amended by the Committee for Spatial Data.

TABLE 2: GEOSPATIAL DATA CLASSIFICATION /TOPIC CATEGORY FOR NAMIBIA

TOPIC CATEGORY	CATEGORY CODE	EXAMPLE DATASETS
Addresses	**ADR**	*E.g. street address, building address, etc.*
Administrative Boundaries	**ADMIN**	*E.g. national boundaries, regional boundaries, constituency boundaries, townlands, etc.*
Agriculture and Aquaculture	**AGR**	*E.g. Farms, irrigation schemes, fish farms, etc.*
Business and Economy	**BUS**	*E.g. banks, ATMs, manufacturing industries, retail, SME's, etc.*

Cadastral	**CAD**	*E.g. Cadastral parcels*
Climate and Weather	**CLM**	*E.g. average rainfall, average temperature, humidity, etc.*
Demography	**POP**	*E.g. Population, dwelling units, EA's, statistical units/frames, etc.*
Disaster Risk Management	**DRM**	*E.g. Time series flood maps, drought maps, food security maps, etc.*
Education	**EDU**	*E.g. Schools, clusters, circuits, etc.*
Elevation	**DTM**	*E.g. contours, spot heights, DEM, etc.*
Environment and Conservation	**ENV**	*E.g. parks, protected sites, environmental sensitive areas, waste management sites, etc.*
Geographic Names	**GNAM**	*E.g. localities*
Geoscientific Information	**GEO**	*E.g. geophysics, geology, geotechnical, EPLs, mines, soils, etc.*
Health	**HLTH**	*E.g. clinics, centres, hospitals, etc.*
Hydrology and Inland Water	**HYDRO**	*E.g. aquifers, rivers, dams, boreholes, water points, etc.*
Imagery	**IMG**	*E.g. ortho photos, satellite imagery, etc.*
Land Cover	**LDC**	*E.g. vegetation, land cover maps, land degradation, bush encroachment, etc.*
Oceanography and Marine	**MRN**	*E.g. coastline, tidal, sea temperature, bathymetry, etc.*
Society, Culture, Art and Heritage	**SCAH**	*E.g. museum, historical sites, attraction sites, churches, digitized buildings, settlements, towns, cities, etc.*
Spatial Plans	**SPL**	*E.g. electricity distribution national master plan, land use plans, etc.*
Tourism	**TOUR**	*E.g. accommodation, bays, canyons, dunes, mountain ranges, etc.*
Transportation Networks	**TRANS**	*E.g. roads, railway, airports, etc.*
Urban Plans	**URB**	*E.g. town zoning maps*
Utilities	**UTL**	*E.g. water pipe lines, electricity, drainage, telecommunication, etc.*
Topographic Maps / National Maps	**TOP**	*E.g. Base maps e.g. scanned 1:50,000, 1:1,000,000*

TABLE 3: METADATA PROFILE FOR DESCRIBING GEOSPATIAL DATA IN NAMIBIA

Legend:

STATUS	DESCRIPTION
M	**Mandatory** These metadata elements are either required by Namibia or ISO.
C	**Conditional** These metadata might not be relevant on some datasets, but they are required on other data. For example, pixel information is required on gridded data only.
O	**Optional** These metadata elements are neither mandatory nor conditional. In order for users to understand the provided spatial data in more detail, producers are encouraged to provide more description of their datasets.
N	**Namibia Required** These metadata elements are specific for evaluating metadata in Namibia.

METADATA ELEMENT	DATA TYPE	DESCRIPTION	STATUS
Title	Free Text	Provide a descriptive, unique name to convey the nature of the geo spatial data. At a minimum, address the "what" and "where" questions. Avoid acronyms and abbreviations that are not commonly understood. Example 1: *Agricultural Carrying Capacity in Namibia in 2015 (AGR_Carrying_capacity_Namibia)* Example 2: *Hydrological Productivity of Aquifers in Namibia (HYDRO_Productivity_of_aquifers_ Namibia)*.	N
Publication Date	Date	Provide the date that the data was published or otherwise finalised. *Date Type Code* described below: Format = YYYY-MM-DD. If the day is not known, use YYYY-MM. If the month is not known, use YYYY. If the date is not known, use 'UNKNOWN' Do not specify a range of dates for the publication date, e.g. YYYY-YYYY. Note that the "–" between the character sets are mandatory.	N
Date Type	<u>Date Type Code</u>= 'Publication'	Used to designate the type of each Date listed A 'publication' date is required	M
Purpose	Free text	Provide an explanation as to why the data was created. This element can provide critical context for data that was created for a specific use and may not be appropriate for other, or more general use.	M
Status	<u>Progress Code:</u> 'Completed' 'Ongoing' 'Planned' 'historicalArchive' 'obsolete' 'Undetermined'	Provide the status of the data, e.g. completed, ongoing, planned as specified by the *Progress Code List* Indicate 'completed if the data is finalized not continually updated. Indicate 'ongoing' if the data is being actively and continuously updated.	M
Maintenance and Update Frequency	<u>Maintenance Frequency Code List:</u> Periodic 1 – 3 years 3 – 5 years 5 – 10 years AsNeeded	Indicate the value in the code list that best describes how often the data is updated. If the status of the data is 'Undetermined': - Indicate 'AsNeeded' and provide justification to the NSDI Secretariat. If the status of the data is "Ongoing": - Indicate the most applicable value to describe the known frequency of planned updates - If the frequency of updates is not amongst the code-set values, e.g. every two months, indicate 'Periodic'	M
Theme Keywords	Free text	Provide robust set of descriptive theme-related keywords Include broad and specific-terms, e.g. "wetland", "rivers", "Oshana" Select terms from relevant standardised vocabularies/thesauri when possible	N

Place Keyword	Free text	Provide a robust set of descriptive place-related keywords Include broad and specific-terms, e.g. "Mukwe", "Divundu" Include relevant regional references, e.g. "Kavango East"	N
Access and Use Constraints	Free text	Indicate any restrictions and legal prerequisite for accessing the data, e.g. environment sensitive information, personal data, intellectual property Indicate any restrictions associated with using the data	M
Dataset Language	Language Code = default "EN"	"EN" = default/template value unless other Default for Namibia	M
Character Encoding	Character Set Code = "utf8"	"utf8" = default/template value Default for Namibia	M
Topic Category	Topic Category Code	Give one or more high-level subjects, as specified by the *Topic Category Code* list provided by the NSDI Secretariat	M
Geographic Extent: Easternmost coordinate	< degrees longitude	Format = decimal degrees, longitude If using the Namibia Modified Transverse Merca-tor Projection : Format = metres	M
Geographic Extent: Westernmost coordinate	*(confirm coastal extent)* > degrees longitude	Format = decimal degrees, longitude If using the Namibia Modified Transverse Merca-tor Projection: Format = metres	M
Geographic Extent: Northernmost coordinate	< degrees latitude	Format = decimal degrees, latitude If using the Namibia Modified Transverse Merca-tor Projection: Format = metres	M
Geographic Extent: Southernmost coordinate	> degrees latitude	Format = decimal degrees, latitude If using the Namibia Modified Transverse Merca-tor Projection: Format = metres	M
Temporal Extent of Data Content	Date	Indicate the date(s) for the content of the data. **Temporal extent** primarily refers to the **data** col-lection period. **Example 1:** If a data resource refers to a historical period, such as the geological period, then temporal extent refers to the moment when data were found or collected. Temporal extent is defined by the **start** and **end dates of data**, or either of these. If the start date is not known, it is dropped and only the **end date** is used. If data is still added to the data resource, the end date is dropped, while the **start date** is indicated, which is also reflected in **data sta-tus**, as being "on-going". This may be a: - Single date, e.g. YYYY-MM-DD, YYYY-MM, or YYYY) - Range of dates, e.g. YYYY-YYYY	M
Entity/Attribute Description	Free text	At a minimum, provide a detailed text description of the features and attributes included within the data including definitions of feature and attribute labels	M

Completeness	Free Text	Provide a description of the omissions and selection criteria used to develop or generalize the data examples: "Municipalities are defined as having populations >30,000". Describe any presence or absence of features, their attributes and relationships	
* Commission *Omission		Excess data present in dataset (sub element of completeness)	M
		Data absent from a dataset (sub element of completeness)	M
Logical consistency	Free Text	Degree of achieved reliability of logical rules and connections in data structures that indicates structural integrity of such data.	
*Conceptual consistency *Domain consistency *Format consistency *Topological consistency		Adherence to rules of the conceptual scheme (sub element of logical consistency)	O
		Adherence of values to the value domains (sub element of logical consistency)	O
		Degree to which data is stored in accordance with the physical structure of the dataset (sub element of logical consistency)	M
		Correctness of the explicitly encoded topological characteristics of a dataset (sub element of logical consistency)	M
Positional accuracy	Free Text	Accuracy of the position of features.	
*Absolute accuracy		Mandatory for all vector datasets (see the spatial data quality specification)	C
*Relative accuracy		Optional for all vectors	C
*Gridded raw data position accuracy		Closeness of gridded data position values to values accepted	M
*Gridded raw data spatial resolution		Provide the ground dimensions of the picture elements (pixel) making up the digital image	M
Temporal quality	Free Text	Accuracy of the temporal attributes and temporal relationships of features	
*Temporal measurement		Correctness of reported time measurements in the data (provide percentage of correctness)	M
*Temporal consistency		For ordered events, report percentage of correctness of the order of events in dataset e.g. what occurred first, second, etc.	C
*Temporal validity		Check if data was captured on the date specified in the lineage. Report the number or percentage of items failing the check.	M
Thematic accuracy	Free Text	Accuracy of thematic attributes and correctness of quantitative and non-quantitative attributes and of the classifications of features and their relationships. This includes gridded classified dataset e.g. national land cover maps.	M
*Non-quantitative attribute accuracy		Accuracy of categorical attributes in percentage. Compulsory for main theme attributes	C
*Quantitative attribute accuracy		Accuracy of quantitative attributes in percentage. Compulsory for main theme attributes	C
Lineage	Free Text	Describe the history of the dataset including any analytical processing conducted on the dataset	M

Process Description	Free text	Provide a description of how the data were created and indicate source data used, where applicable This is a repeatable element so can be used to provide a single, compiled description or a series of process step descriptions	M
Distribution format	Free text	Specify the format in which the dataset is distributed e.g. shapefile, geoTIFF, etc.	M
Logical Consistency Report	Free text	Provide a description of any assessment performed to test the fidelity of the data attributes (database QA/QC) or the data structure (topological checks, i.e. RMS error)	O
Spatial Reference Information	*SRS Code: (see spatial data quality specification for accepted SRS)*	Provide a Spatial Reference System as specified in the SRS code list. More information at *http://spatialreference.org/* E.g. GCS_WGS 1984	M
Metadata Creation Date	YYYY-MM-DD	Indicate the date that the metadata record was created	M
Metadata Date Type	Date Type Code = 'creation'	Used to designate the type of each date listed The metadata record 'creation' date is required	M
Metadata Contact: Name	Free text	Provide the Organization Name of the agency that serves as the point of contact for the metadata record.	M
Metadata Contact Role: Code	Role Code = 'pointOfContact'	Used to designate the specific role of each responsible party listed A metadata contact 'pointOfContact' is required.	M
Metadata Contact: Person	Free Text	Provide the name of a more specific staff, position that serves as a point of contact for questions about the metadata	N
Metadata Contact: Address Postal Code	Free text	Indicate the postal address of the agency in which the metadata contact is located	M
Metadata Contact: Telephone	Free text	Indicate the phone number at which the metadata contact can be reached.	M
Metadata Standard Name	Free text	Indicate the metadata specification to which the metadata record is in compliance. Examples: "ISO 19115", 'ISO 19115-1', or "ISO 19115-2"	M
Metadata Standard Version	Free text	Indicate the version of the metadata specification used examples: "2014/NAMS-1:2016 Version	M
Metadata Format	Format Code = 'gml' or 'text' or 'xml'	Specify the metadata format for distribution. GML format is preferred for Namibia.	N

TABLE 4: METADATA PROFILE FOR DESCRIBING GEOSPATIAL SERVICES IN NAMIBIA

METADATA ELEMENT	DATA TYPE	DESCRIPTION	STATUS
Title	Free text	Provide a descriptive, unique, name to convey the nature of the data. At a minimum, address: what, where, and when. Avoid acronyms and abbreviations that are not commonly understood though a filename can be included in addition to descriptive content.	N

Publication Date	Date	Provide the date that the geospatial service was published or otherwise finalized. Additional, optional, dates can be included to specify the date when the geospatial service was first created, a revision date or the other *date type code* described below. Format = YYYY-MM-DD "-" separator is mandatory between characters	N
Date Type	Date Type Code = publication	Do not specify a range of dates for the publication date, e.g. YYYY-YYYY. Do not use YYYYMM, which because it is indistinguishable from the incorrect, but still used, YYMMDD. Used to designate the type of each date listed A 'publication' date is required	M
Responsible Party / Originator	Free text	Provide the Organization Name of the agency that serves as legal custodian of the geospatial service Additional, optional, Responsible Parties can be included to specify: - a secondary or more specific office or staff position that serves as a point of contact for questions about the geospatial service - collaborating organizations/agencies, vendors who created the geospatial service , entities that distribute the geospatial service, individuals, agencies or any other responsible parties. Spell out acronyms and include sufficient information, e.g. parent organizations or region, to uniquely identify the responsible party.	M
Responsible Party Role	Role Code = "custodian or PointOfContact"	Used to designate the specific role of each responsible party listed A 'custodian' or 'pointOfContact' is responsible party required.	M
Online Linkage	URL	Provide a URL address that provides access, preferably direct access, to the service Geoportal_Namibia requires an online linkage to the data	M
Abstract	Free text	Provide a description of the geospatial service content and features including application, geographic coverage of content, audience and special data characteristics, limitations or other information that will aid service users in determining if the service is relevant to their intended application. List most important information first as some applications will display only first 150 – 200 characters of the abstract.	M

Purpose	Free text	Explain why the geospatial service was created. This element can provide critical context for service that was created for a specific use and may not be appropriate for other or more general, use.	M
Theme Keywords	Free text	Provide a robust set of descriptive theme-related keywords Include broad and specific-terms, e.g. 'marine', 'bathymetry'	N
Access Constraints	Free text	Indicate any restrictions and legal prerequisites for accessing the data, e.g. environmentally sensitive information, personal data, intellectual property	M
Use constraints	Free text	Indicate any restrictions associated with using the data. **Examples:** 'Building structure data in this service were roughly digitized and should not be referenced for legal purposes' users are required to read the complete metadata for a specific data element of interest contained in this service' 'Some data cannot be accessed or downloaded and users must contact the responsible data custodians or point of contact'	M
Geographic Extent: Easternmost Coordinate	< degrees longitude	Format = decimal degrees, longitude If using the new Namibia Transverse Mercator Projection: Format = metres	M
Geographic Extent: Westernmost Coordinate	*(confirm coastal extent)* > degrees longitude	Format = decimal degrees, longitude If using the new Namibia Transverse Mercator Projection: Format = metres	M
Geographic Extent: Northernmost Coordinate	< degrees latitude	Format = decimal degrees, latitude If using the new Namibia Transverse Mercator Projection: Format = metres	M

Geographic Extent: Southernmost Coordinate	> degrees latitude	· Format = decimal degrees, latitude · If using the new Namibia Transverse Mercator Projection: Format = metres	M
Metadata Creation Date	MMMMYYDD	Indicate the date that the metadata record was created	M
Metadata Date Type	Date Type Code = 'creation'	Used to designate the type of each date listed The metadata record *'creation'* date is required	M
Metadata Contact Name	Free text	Provide the organization name of the agency that serves as the point of contact for the metadata record.	M
Metadata Scope (Add to	Scope Code ='Service' or 'GeospatialData'	Indicate that the metadata record applies to a 'service' (ISO assumes the metadata is for a dataset unless otherwise specified)	M
Service Type	Free text	The type of service that is being documented, e.g. data catalogue, web map, data download, data visualization/exploration, metadata transformation, metadata creation and edit	M
Distribution format	Free text	Specify the format in which the geospatial service disseminate the products e.g. web maps, images, tables, etc.	M
Metadata Contact Role: Code	Free text	Used to designate the specific role of each responsible party listed A metadata Contact 'pointOfContact' is required.	M
Metadata Contact Address: Postal Code	Free text	Indicate the zip code in which the metadata contact is located	M
Metadata Contact: Telephone	Free text	Indicate the ten digit code in which the metadata contact can be reached	M
Metadata Standard Name	Free text	Indicate the metadata specification to which the metadata record is in compliance. **Examples:** "ISO 19115", 'ISO 19115-1', or "ISO 19115-2"	M
Metadata Standard Version	Free text	Indicate the version of the metadata specification used **Examples:** "2014/NAMS.1:2016	M
Metadata Format	Format Code = 'gml' or 'text' or 'xml'	Specify the metadata format for distribution. GML or XML formats is preferred for Namibia.	N

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