



COMPARISON OF VEGETATION INDEX WITH LAST YEAR (SPOT-VEGETATION)

1. OUTLINE

• Information of spatial data product specification			
Title	Specifications for the relative difference of an index, calculated between the actual image and the image of the same period but from the previous year. The difference is derived from data originating from the SPOT-VEGETATION sensor		
Date	22/10/2008		
Implementer	ENDELEO project VITO, Dr. Else Swinnen		
Language	English		
Engineering field	Environmental monitoring		
Document data format	PDF		
• Purpose			
<p>The relative difference of an index with respect to the previous year is used to assess the difference between the vegetation condition at a certain time and the vegetation condition at the same time but from the previous year. The relative difference is calculated as the percentage difference of the actual condition relative to the one of the previous year.</p> <p>It is calculated as : $\text{relative difference} = (\text{present year} - \text{previous year}) / \text{previous year}$</p> <p>It can be calculated on any index. In the frame of the ENDELEO project, the difference is calculated based on the NDVI and on the DMP.</p> <p>Based on the NDVI, it expresses the relative difference in vegetation health and density compared to the same period the year before. Based on the DMP, it expresses the relative difference in vegetation growth rate compared to the same period the year before.</p>			
• Spatial extent			
ULX	-113550m	LRX	834381m
ULY	10556023m	LRY	9444577m
Kenya			
• Temporal extent			
April 1998 – present; update each 10 days.			
• Reference standards			
• Terminology and definitions			
The following technical terms and definitions are used with this data product specification: Kenya profile for geographic standards (KPGIS) ver. 1			
• Abbreviations			
DMP: Dry Matter Productivity NDVI: Normalized Difference Vegetation Index ULX: Upper left X coordinate ULY: Upper left Y coordinate LRX: lower right X coordinate LRY: lower right Y coordinate			

2. DOMAIN OF VALIDITY



<ul style="list-style-type: none"> • Domain of validity identification
Data product specification of the relative difference to the previous year of NDVI or DMP for the territory of Kenya
<ul style="list-style-type: none"> • Hierarchical level
Dataset

3. DATA PRODUCT IDENTIFICATION

<ul style="list-style-type: none"> • Name of spatial data product
The relative difference to the previous year of NDVI or DMP derived from SPOT-VEGETATION
<ul style="list-style-type: none"> • Date
Produced each 10 days since April 1998, update still ongoing
<ul style="list-style-type: none"> • Contact Information
Ir. Josefien Delrue VITO Boeretang 200 B-2400 Mol Belgium e-mail: josefien.delrue@vito.be
<ul style="list-style-type: none"> • Geographical description
The territory of Kenya

4. DATA CONTENTS AND STRUCTURE

<ul style="list-style-type: none"> • Application schema class diagram
Not applicable

<ul style="list-style-type: none"> • Application schema class document 			
Feature	Image		
Definition	The relative difference to the previous year of NDVI or DMP		
Parent class	None		
Abstract/Concrete	Abstract		
Attributes			
Name	Definition	Collection condition	Domain
	-	-	Within geographical extent

Feature	Image		
Definition	The relative difference to the previous year of NDVI or DMP		
Parent class	-		
Abstract/Concrete	Concrete		
Attributes			
Name	Definition	Collection condition	Domain
Data format: GeoTiff	-	-	Within Geographical extent

5. REFERENCE SYSTEM

<ul style="list-style-type: none"> • Spatial reference system



Compound coordinates reference system	
Identical name	Clarke 1880, Mean sea level (Mombasa), UTM zone 37
Coordinates reference system 1 (Horizontal component)	
Identical name	Clarke 1880, UTM zone 37
Domain of validity	Nairobi
Datum	
Identical name	New (1960) Arc
Type	Geodetic
Fixed origin	500,000m Easting, 10,000,000m Northing
Ellipsoid	
Identical name	Clarke 1880, (Modified)
Semi major axis	6378249.145
Inverse flattening	1 / 293.465
Prime meridian	
Identical name	Greenwich meridian
Greenwich longitude	39deg 00min East of Greenwich
Coordinate system	
Identical name	UTM zone 37
Type	Projected
Number of dimensions	2
Coordinate axis	
Name	Northing
Direction	Positive to true north at origin
Unit identifier	Meter
Coordinate axis	
Name	Easting
Direction	Positive to true east at origin
Unit identifier	Meter

<ul style="list-style-type: none"> • Temporal reference system <p>A new image is produced on the 2nd, the 12th and the 22nd of each month. Each image represents the maximum value of the relative difference to the previous year of NDVI or DMP within the periods 1-10, 11-20 and 21-end of the month.</p>
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6. DATA QUALITY

<ul style="list-style-type: none"> • Quality requirements and quality evaluation procedure 		
COMPLETENESS: not applicable		
LOGICAL CONSISTENCY		
(1) Formal consistency		
Domain of validity	Data quality evaluation index	
All imagery	Name	Omission percentage
	Definition	Data can be opened by ArcGIS as GeoTiff format with no opening error
	Quality conformity level	Error: 0%
(2) Domain consistency		
Domain of validity	Data quality evaluation index	
All imagery	Name	Geographical extent error percentage
	Definition	Check dataset is only inside map sheet border



	Quality conformity level	Geographical extent error: 0%
POSITIONAL ACCURACY		
(1) Gridded data positional accuracy		
Domain of validity	Data quality evaluation index	
	Name	Gridded data positional accuracy
	Definition	
	Quality conformity level	300m
Quality evaluation procedure		
The SPOT-VEGETATION image quality center (QIV) ensures the data quality of the input data for the relative difference to the previous year of NDVI or DMP.		
TEMPORAL ACCURACY: not adopted		
THEMATIC ACCURACY: not applicable		

7. DATA PRODUCT DISTRIBUTION

Distribution format information
• Format name
GeoTiff
• Encoding rules
http://trac.osgeo.org/geotiff/
• Language encoding method
UTF-8
• Language
English
Distribution media information
• Unit of product
Image of the relative difference to the previous year of NDVI or DMP derived from SPOT-VEGETATION for Kenya
• Media name
FTP

8. METADATA

• Direction of metadata creation
Metadata must be produced together with spatial data
• Format of metadata
KSISO19115 metadata is adopted
• Indication of metadata elements
• Direction of unit of metadata creation
Metadata is provided for each spatial data product dataset unit.

9. OTHERS

• Spatial resolution
1km x 1km
• Values



Physical values of the relative difference to the previous year of NDVI or DMP range between -1.0 and 1.0. The indicator is unitless; when multiplied by 100 it expresses percentages (%).

Scaling of the values

The relative difference to the previous year of NDVI or DMP values are rescaled such that they only occupy a byte. The physical range -1.0 to 1.0 is rescaled to the range 0 – 250, using the following formula:

$$\text{Image value} = (\text{physical value} + 1.25) * 100$$

To convert the image values back to physical values, the following formula is used:

$$\text{Physical value} = \text{image value} * 0.01 - 1.25$$

• Flags

The image value 255 corresponds to a flag.

This can indicate missing data, cloud observations, or water body. The status map that is delivered with the SPOT-VEGETATION data is used to identify the missing data and clouds. These pixels are then flagged directly in the VPI image.

• Interpretation

The relative difference to the previous year of NDVI or DMP is used to qualitatively compare the vegetation development in a certain period of the year with the same period the previous year. If the relative difference is based on the NDVI, it is possibly linked to a difference in vegetation health and density between years. If the relative difference is based on the DMP, it is possibly linked to a difference in vegetation growth rate as compared to the same period during the previous year.

The values vary between -1.0 and 1.0. If the value 0 is obtained, then there is no difference between the NDVI or DMP of the two years. If a negative value is obtained, then the vegetation health and density or growth rate was higher during the previous year. If a positive value is obtained, then the vegetation health and density or growth rate is higher during the current year.

• Example

NDVI relative difference to previous year

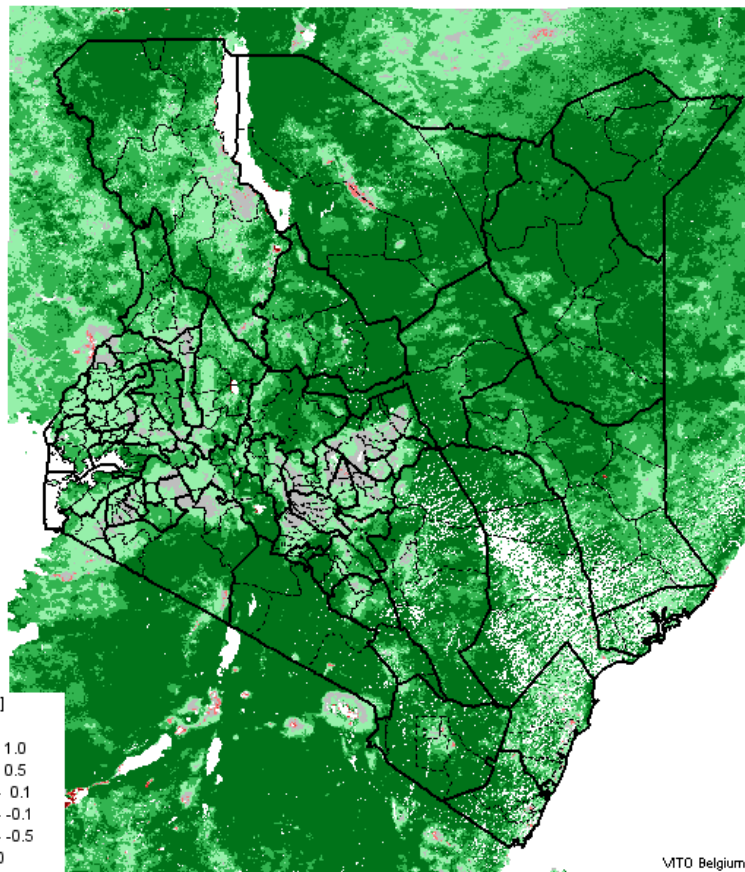
Kenya

Normalised Difference Vegetation Index (NDVI)

from: 01 January 2007

SPOT-VEGETATION

Projection: UTM 37S (Arc 1960)



Created on 29 October 2008 by VITO, Belgium, in the frame of the ENDELEO project funded by the Belgian Science Policy Office

• *More information*

SPOT-VEGETATION mission

<http://www.spot-vegetation.com>

<http://www.vgt.vito.be>

SPOT-VEGETATION data for Africa

<http://www.vgt4africa.org>

ENDELEO project

<http://dfwm.ugent.be/endeleo>

<http://endeleo.vgt.vito.be>

Related projects

<http://www.gmfs.info>

<http://www.marsop.info/>