### *Data Set Number 133: Geomorphology map, Niger 1996*

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Identification_Information:
  Citation:
    Citation_Information:
      Originator: Pierre Hiernaux
      Publication_Date: 1996
      Title: Fakara Geomorphology map, Niger 1996
      Edition: ver1
      Geospatial_Data_Presentation_Form: vector digital data
      Publication_Information:
        Publication_Place: ILRI Niamey
        Publisher: ILRI
  Description:
    Abstract: To help the assessment of the roles of livestock in the
management of natural resources and agriculture performances, the soils
and the land use were mapped over 500km2 (latitude North  130 20' - 130
35' ; longitude East 20 35' -20 52' ) using existing aerial
photography. Land use was also mapped in 1994, 1995 and 1996 using low
altitude aerial photography done with a plain 24x36 camera from a small
aircraft flying at 1200m altitude. Land use maps was systematically
verified during the exhaustive field survey of forage resources
repeated three times a year from 1994 to 1996 and once a year in 1997
and 1998. The soil map has not been systematically checked on the
ground. However, the map was used to stratify sample field sites used
in the monitoring of resources and in which soil have been described.
Other soil data from experiments (Delabre, Rockström, Sangaré,  Gandah,
) and surveys (Tropsoil, Chapell, d'Herbes, Loireau, de Row) conducted
in the same village lands have been used to complete soil
characterisation.
    Purpose: help the assessment of the roles of livestock in the
management of natural resources and agriculture performances
  Time_Period_of_Content:
    Time_Period_Information:
      Single_Date/Time:
        Calendar_Date: 1996
    Currentness_Reference: publication date
  Status:
    Progress: Complete
    Maintenance_and_Update_Frequency: None planned
  Spatial_Domain:
    Bounding_Coordinates:
      West_Bounding_Coordinate: 2.555843
      East_Bounding_Coordinate: 2.886761
      North_Bounding_Coordinate: 13.596402
      South_Bounding_Coordinate: 13.326810
  Keywords:
    Theme:
      Theme_Keyword_Thesaurus: GCMD
      Theme_Keyword: EARTH SCIENCE > Agriculture  > Soils  > Soil
Classification
      Theme_Keyword: EARTH SCIENCE > Agriculture  > Soils  > Soil
Fertility
      Theme_Keyword: EARTH SCIENCE > Agriculture  > Soils  > Soil
Productivity
      Theme_Keyword: EARTH SCIENCE > Land Surface  > Geomorphology
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    Place:
      Place_Keyword_Thesaurus: none
      Place_Keyword: Fakara
      Place_Keyword: Niger
      Place_Keyword: West Africa
  Access_Constraints: Access on request
  Use_Constraints: Cite Pierre Hiernaux/ILRI when used
  Point_of_Contact:
    Contact_Information:
      Contact_Organization_Primary:
        Contact_Organization: Centre d'Etudes Spatiales de la
Biosphère, CESBIO
        Contact_Person: PIERRE HIERNAUX
      Contact_Position: Scientist
      Contact_Address:
        Address_Type: mailing and physical
        City: TOULOUSE
        Country: FRANCE
      Contact_Voice_Telephone: + 33 (0) 5 61 55 85 37;  + 33 (0) 5 61
55 76 24
      Contact_Electronic_Mail_Address: pierre.hiernaux@cesbio.cnes.fr;
pierre.hiernaux@wanadoo.fr
  Native_Data_Set_Environment: Microsoft Windows XP Version 5.1 (Build
2600) Service Pack 2; ESRI ArcCatalog 9.2.0.1324
Data_Quality_Information:
  Lineage:
    Process_Step:
      Process_Description: Soils have been mapped along three criteria:
the topographical position, the land form and the soil defined by the
depth and the texture of the loose soil. Four main topographical
situations have been distinguished: plateau and iron pan flats, up-
slope, mid and down slopes, valley). Some land forms such as 'fossil
dune' or 'thin sand deposits' are found in different topographic
situations, others are specific to one situation such as for the
alluvial plains, levees banks and channels only found in the valley. A
type of  texture is associated to each of these land forms allowing to
establish a correspondence with the field soil classification.
Spatial_Data_Organization_Information:
  Direct_Spatial_Reference_Method: Vector
  Point_and_Vector_Object_Information:
    SDTS_Terms_Description:
      SDTS_Point_and_Vector_Object_Type: G-polygon
      Point_and_Vector_Object_Count: 1089
Spatial_Reference_Information:
  Horizontal_Coordinate_System_Definition:
    Planar:
      Grid_Coordinate_System:
        Grid_Coordinate_System_Name: Universal Transverse Mercator
        Universal_Transverse_Mercator:
          UTM_Zone_Number: 31
          Transverse_Mercator:
            Scale_Factor_at_Central_Meridian: 0.999600
            Longitude_of_Central_Meridian: 3.000000
            Latitude_of_Projection_Origin: 0.000000
            False_Easting: 500000.000000
            False_Northing: 0.000000
      Planar_Coordinate_Information:
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        Planar_Coordinate_Encoding_Method: coordinate pair
        Coordinate_Representation:
          Abscissa_Resolution: 0.000000
          Ordinate_Resolution: 0.000000
        Planar_Distance_Units: meters
    Geodetic_Model:
      Horizontal_Datum_Name: D_WGS_1984
      Ellipsoid_Name: WGS_1984
      Semi-major_Axis: 6378137.000000
      Denominator_of_Flattening_Ratio: 298.257224
Entity_and_Attribute_Information:
  Detailed_Description:
    Entity_Type:
      Entity_Type_Label: geoutmattr
      Entity_Type_Definition_Source: Pierre Hiernaux ILRI
    Attribute:
      Attribute_Label: FID
      Attribute_Definition: Internal feature number.
      Attribute_Definition_Source: ESRI
      Attribute_Domain_Values:
    Attribute:
      Attribute_Label: Shape
      Attribute_Definition: Feature geometry.
      Attribute_Definition_Source: ESRI
      Attribute_Domain_Values:
        Unrepresentable_Domain: Coordinates defining the features.
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      Attribute_Label: AREA
      Attribute_Definition: Area
      Attribute_Definition_Source: Bruno Gerard
    Attribute:
      Attribute_Label: PERIMETER
      Attribute_Definition: Perimeter
      Attribute_Definition_Source: Bruno Gerard
    Attribute:
      Attribute_Label: GEOUTM_
      Attribute_Definition: Internal indexing
      Attribute_Definition_Source: Bruno Gerard
    Attribute:
      Attribute_Label: GEOUTM_ID
      Attribute_Definition: Internal indexing
      Attribute_Definition_Source: Bruno Gerard
    Attribute:
      Attribute_Label: GEOM_P
      Attribute_Definition: Geomorphology class
      Attribute_Definition_Source: Pierre Hiernaux
    Attribute:
      Attribute_Label: MOSAIC
      Attribute_Definition: Combination of geomorphology class per
geographic unit
      Attribute_Definition_Source: Bruno Gerard
    Attribute:
      Attribute_Label: DOMINENT
      Attribute_Definition: Dominent geomorphology class per geographic
unit
    Attribute:
      Attribute_Label: TOPO
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Attribute_Definition: Toposequence
Attribute_Definition_Source: Bruno Gerard
Attribute:
Attribute_Label: TEXTURE
Attribute_Definition: Texture
Attribute_Definition_Source: Soil texture
Attribute:
Attribute_Label: APTITUDE
Attribute_Definition: Procuctivity of the geographic unit (combination of internal drainage and
Attribute:
Attribute_Label: TOPO_1
Attribute_Definition: Place in toposequence
Attribute_Definition_Source: Bruno Gerard
Attribute:
Attribute_Label: LAND_FORM
Attribute_Definition: Land form
Attribute_Definition_Source: Bruno Gerard
Attribute:
Attribute_Label: SOIL_TEXTU
Attribute_Definition: Soil texture
Attribute_Definition_Source: Bruno Gerard
Attribute:
Attribute_Label: SOIL_TYPE
Attribute_Definition: Soil classification FAO
Attribute:
Attribute_Label: JERMA
Attribute_Definition: Classification in Jerma language
Attribute:
Attribute_Label: FULFULDE
Attribute_Definition: Classification in Fulfulde language
Overview_Description:
Entity_and_Attribute_Overview:
- Soil types: The geology, topography and geomorpholgy settings
- Internal drainage classes
- Farmers classification and perception: Soil classification in the two main languages spoken in the village studied Jerma and Fulfulde ethnic groups.

The soil agronomic aptitudes:

The soil types defined on the base of topography, land form and top soil texture are grouped by level of agronomic aptitude. For this purpose the soil types have been ranked along a soil chemical fertility gradient in considering CEC, pH and organic matter content, and a soil infiltration gradient considering depth, topographical position, texture and crusting. The two gradients are combined in a matrix (Table 10). This empirical ranking allowed the grouping of soil types into five categories of soil aptitude to crop:

The loamy sands and clayed loams in colluvial and alluvial depression (Tv, Rv, Vv) they constitute the 'rich' soil group. These soils offer the highest potential for cropping, however because of their down position these soils are susceptible to flood rich can ruin the crop and the relatively fine texture of the soil render them more difficult to till. (Hiernaux 1996).

The thick sandy soils moderately leached (Pd, Td, Rd, Vr, Vd), they constitute the 'fair' soil group. These soils are very easy to

till and offer a fair potential to crop millet and cowpea providing either manure imputs or regular fallowing.

The thick sandy soils highly leached (Rd, Vr, Vd), they constitute the 'poor' soil group. These soils are very easy to till but offer a poor potential for cropping because of the poor inherent fertility of their very sandy material.

The shallow sandy and loamy sand soils, and the highly leached alluvial sandy soils (Pl, Rl, Tr; Rr, Pe, Re, Ve), they constitute the 'marginal' soil group. These soils offer a marginal cropping potential, they are very susceptible to erosion.

The indurated and rocky soils (Pg, Pr) they constitute the 'nil' soil group. These soils are normally not arable.

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    Entity_and_Attribute_Detail_Citation: See Word Document by Pierre
Hiernaux, 1996.
Distribution_Information:
  Distributor:
    Contact_Information:
      Contact_Person_Primary:
        Contact_Organization: ICRISAT - ILRI
      Contact_Address:
        Address_Type: mailing address
        City: Niamey
        Country: Niger
      Contact_Voice_Telephone: +0022720722626
      Contact_Facsimile_Telephone: +22720734329
      Contact_Electronic_Mail_Address: icrisatsc
      Hours_of_Service: 8h00-16h00 pm z+1
      Contact_Instructions: Contact by mailing address
  Resource_Description: Fakara Geomorphology map, Niger 1996
  Distribution_Liability: Restricted data, Please contact ILRI by
icrisatsc@cgiar.org for getting authorization
  Standard_Order_Process:
    Digital_Form:
      Digital_Transfer_Information:
        Format_Name: shp
        Transfer_Size: 1.792
Metadata_Reference_Information:
  Metadata_Contact:
    Contact_Information:
      Contact_Organization_Primary:
        Contact_Organization: ICRISAT
        Contact_Person: AMADOU M.Laouali
      Contact_Address:
        Address_Type: icrisatsc@cgiar.org
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        Country: Niger
      Contact_Voice_Telephone: +22720722626
      Contact_Facsimile_Telephone: +22720734329
      Contact_Electronic_Mail_Address: a.m.laouali@cgiar.org
      Hours_of_Service: 8h00-16h00 pm z+1
      Contact_Instructions: Prefer contact by email
  Metadata_Standard_Name: FGDC Content Standards for Digital Geospatial
Metadata
  Metadata_Standard_Version: FGDC-STD-001-1998
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Metadata_Time_Convention: local time
Metadata_Security_Information:
  Metadata_Security_Classification: Unclassified
Metadata_Extensions:
  Online_Linkage: http://www.esri.com/metadata/esriprof80.html
  Profile_Name: ESRI Metadata Profile
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