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Simen Mountains – Ethiopia  
Volume I

# Cartography and its Application for Geographical and Ecological Problems

Edited by B. Messerli and K. Aerni

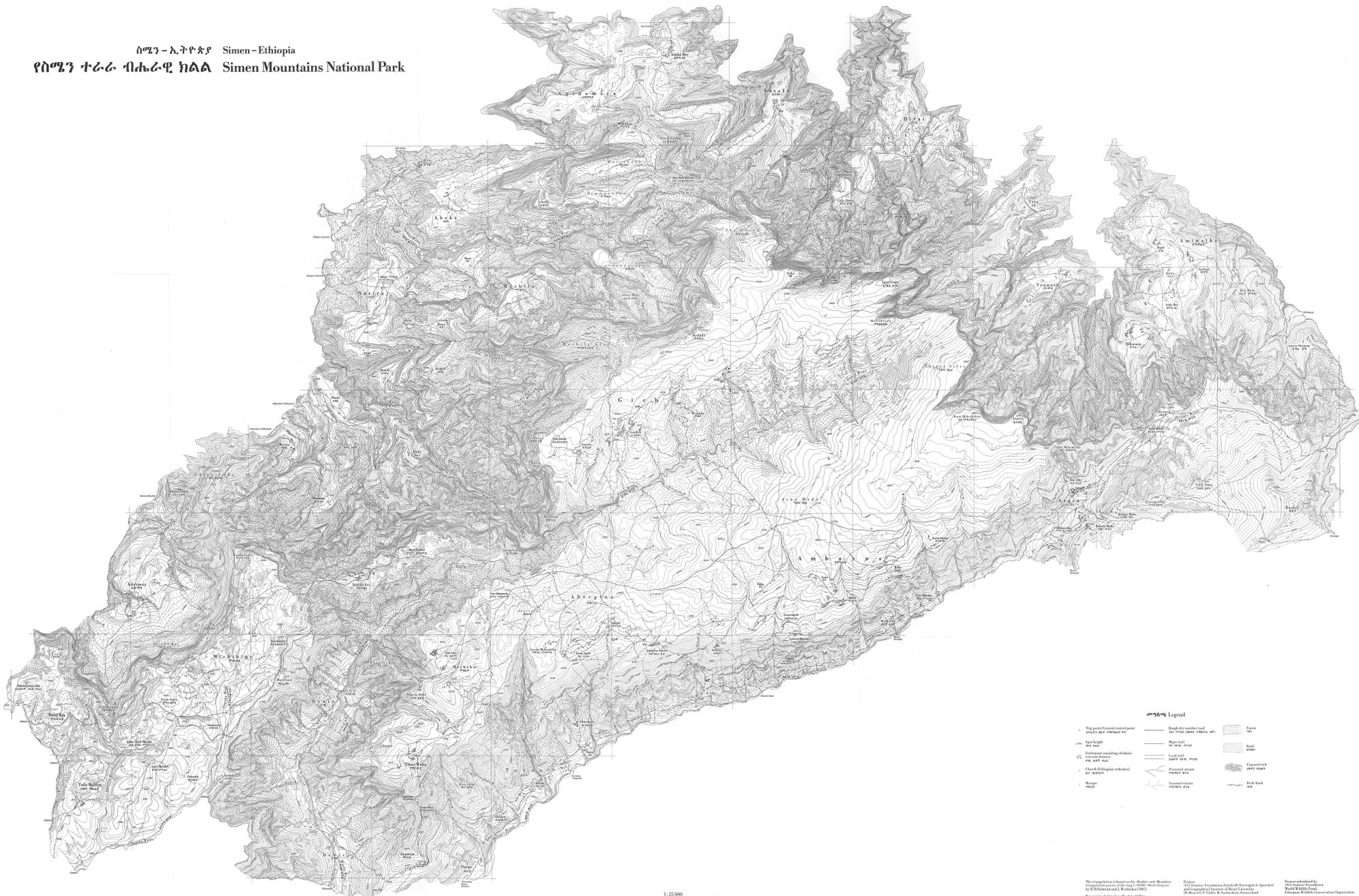
Maps

- P. Stähli and M. Zurbuchen: Two Topographic Maps 1:25 000  
“Simen Mountains National Park”, Ed. 1977  
“Debark”, Ed. 1977
- P. Stähli: “Changes in Settlement and Land Use in Simen,  
Ethiopia, from 1954 to 1975”, 1:17 500
- R. Nägeli: “Debark – Functional Structure of an Ethiopian  
Market Town”, 1:2000  
“Debark – Growth of Settlement and Forest  
between 1964 and 1976”, 1:5000
- H. Hurni: “Soil Erosion, Upper Jinbar Valley, Simen-Ethiopia”,  
1:25 000
- K. Aerni: “Simen (Ethiopia) – Panorama Imet Gogo 3926m”

Contribution of the Commission on Mountain  
Geocology (International Geographical Union)



ሰሜን - ኢትዮጵያ Simen - Ethiopia  
 የሰሜን ተራራ ብሔራዊ ክልል Simen Mountains National Park



ሰነድ ለግልጽ Legend

- |  |                                  |                |
|--|----------------------------------|----------------|
| ▲ The point of the mountain peak               | — Road (with or without asphalt) | ▨ Forest       |
| — Spot height                                  | — Waterfall                      | ▩ Rock         |
| — Surface contouring of fields (contour lines) | — Low wall                       | ▧ Exposed rock |
| — Check (ከግዳግዳ)                                | — Fenced areas                   | ▧ Rock hard    |
| — Range  | — Unfenced areas                 |                |

Scale: 1:25,000  
 Contours at 20m vertical interval  
 Elevation in metres  
 0 100 200

Photoregulation based on the Study and Mapping of the Simen Mountains National Park by the Ministry of Natural Resources and Environmental Conservation, Addis Ababa, Ethiopia, 1975. The map is a reproduction of the original map of the Simen Mountains National Park, Ethiopia, 1975. The map is a reproduction of the original map of the Simen Mountains National Park, Ethiopia, 1975. The map is a reproduction of the original map of the Simen Mountains National Park, Ethiopia, 1975.

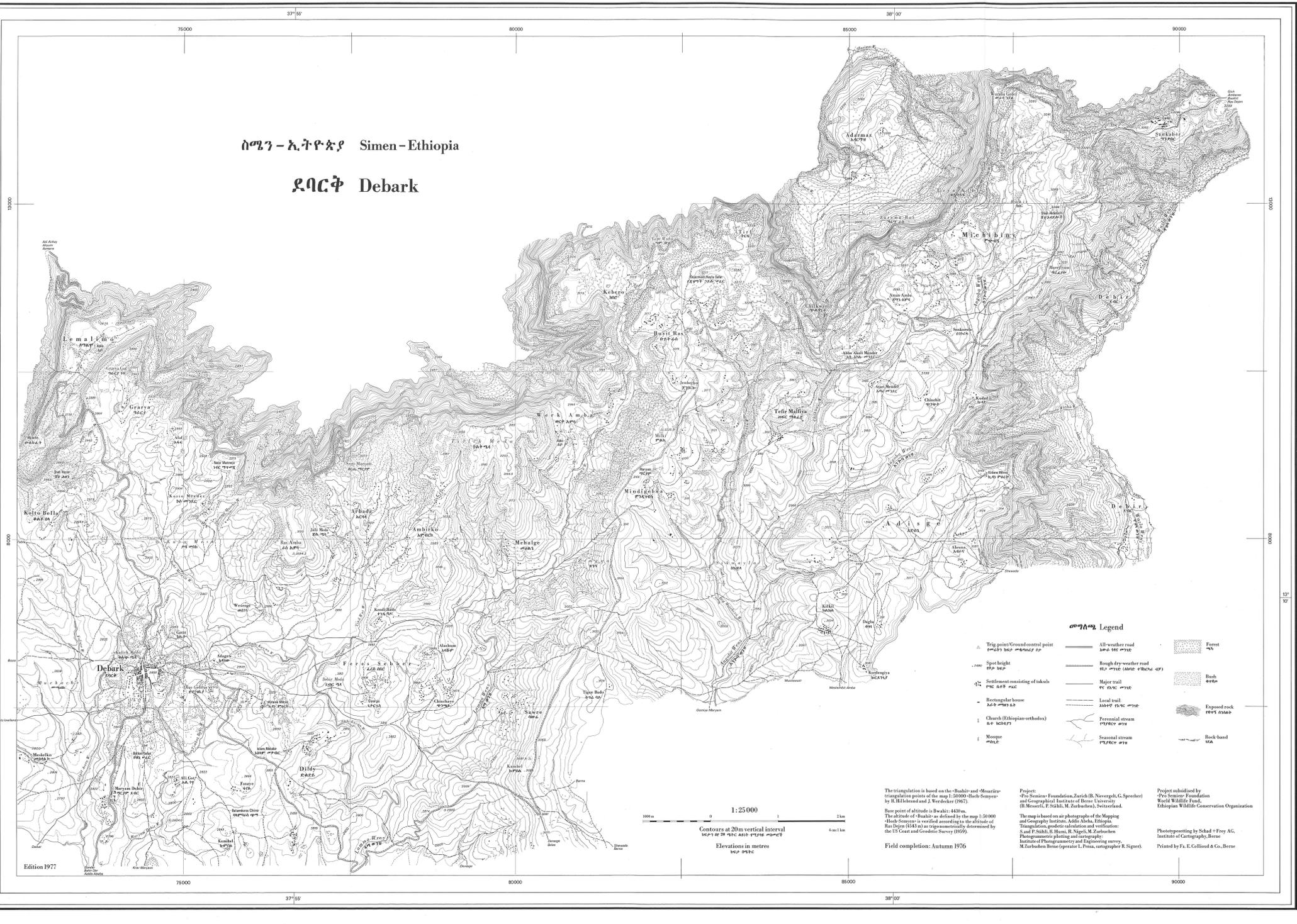
Field compilation: Spring 1975

Project: The Simen Mountains National Park, Ethiopia, 1975. The map is a reproduction of the original map of the Simen Mountains National Park, Ethiopia, 1975. The map is a reproduction of the original map of the Simen Mountains National Park, Ethiopia, 1975. The map is a reproduction of the original map of the Simen Mountains National Park, Ethiopia, 1975.

Prepared by: Simen - Ethiopia  
 Ministry of Natural Resources and Environmental Conservation  
 Addis Ababa, Ethiopia

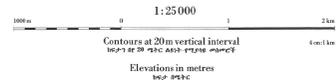
ሰሜን - ኢትዮጵያ Simen - Ethiopia

ደባርቅ Debarq



መግለጫ Legend

- |   |  |                        |
|---|--|------------------------|
| ▲ Trip point/Ground control point<br>የጥቅም ነጥብ/የምስረታ ነጥብ | — All-weather road<br>የሙሉ ዓመት መገንጠያ መገንጠያ      | ▨ Forest<br>የግራም       |
| • Spot height<br>የቦታ ከተማ                                | — Rough dry-weather road<br>የሰላማ ጊዜ ደብዳቤ መገንጠያ | ▨ Bush<br>የግራም         |
| — Settlement consisting of tukulu<br>የግራም የግራም          | — Major trail<br>የታላቅ መገንጠያ                    | ▨ Exposed rock<br>የግራም |
| — Rectangular house<br>የግራም የግራም                        | — Local trail<br>የቦታ መገንጠያ                     | ▨ Rock-band<br>የግራም    |
| — Church (Ethiopian-orthodox)<br>የግራም የግራም              | — Perennial stream<br>የሙሉ ዓመት ድንጋይ             |                        |
| — Mosque<br>የግራም  | — Seasonal stream<br>የሰላማ ጊዜ ድንጋይ              |                        |



The triangulation is based on the 'Buhiti and Mesarira' triangulation points of the map 1:50,000 'Debe-Simena' by H. Heiland and J. Werdicker (1967).  
 Base point of altitude is Buhiti: 4430 m.  
 The altitude of 'Buhiti' as defined by the map 1:50,000 'Debe-Simena' is verified according to the altitude of Ras Dejen (5443 m) as trigonometrically determined by the US Coast and Geodetic Survey (1950).  
 Field completion: Autumn 1976

Project:  
 'Fes Semien' Foundation, Zurich (H. Novergitt, G. Sprecher) and Geographical Institute, Adliswil, Zurich (H. Messerli, F. Stahli, M. Zurbuchen), Switzerland.  
 The map is based on an photograph of the Mapping and Geography Institute, Adliswil, Zurich, Ethiopia. Triangulation, geodetic calculation and verification: Land F. Stahli, H. Haas, R. Sigari, M. Zurbuchen. Photogrammetric plotting and cartography: Institute of Photogrammetry and Engineering survey, M. Zurbuchen Berne (operator L. Pons, cartographer R. Sigari).

Project subsidized by  
 'Fes Semien' Foundation  
 World Wildlife Fund,  
 Ethiopian Wildlife Conservation Organization  
 Photoprinting by Schud + Frey AG,  
 Institute of Cartography, Berne  
 Printed by F. E. Collard & Co., Berne

# CHANGES IN SETTLEMENT AND LAND USE IN SIMEN, ETHIOPIA, FROM 1954 TO 1975

**Buildings**

- built
- removed
- removed
- built

**Cultivated Land**

- cultivated - before 1954 in the eastern part of the map (Argin, Amiwalk, Dihwara, Truwata, Tija) - before 1954 in the western part of the map (Gich, Abergina, Ambaras)
- Increase
- built
- built

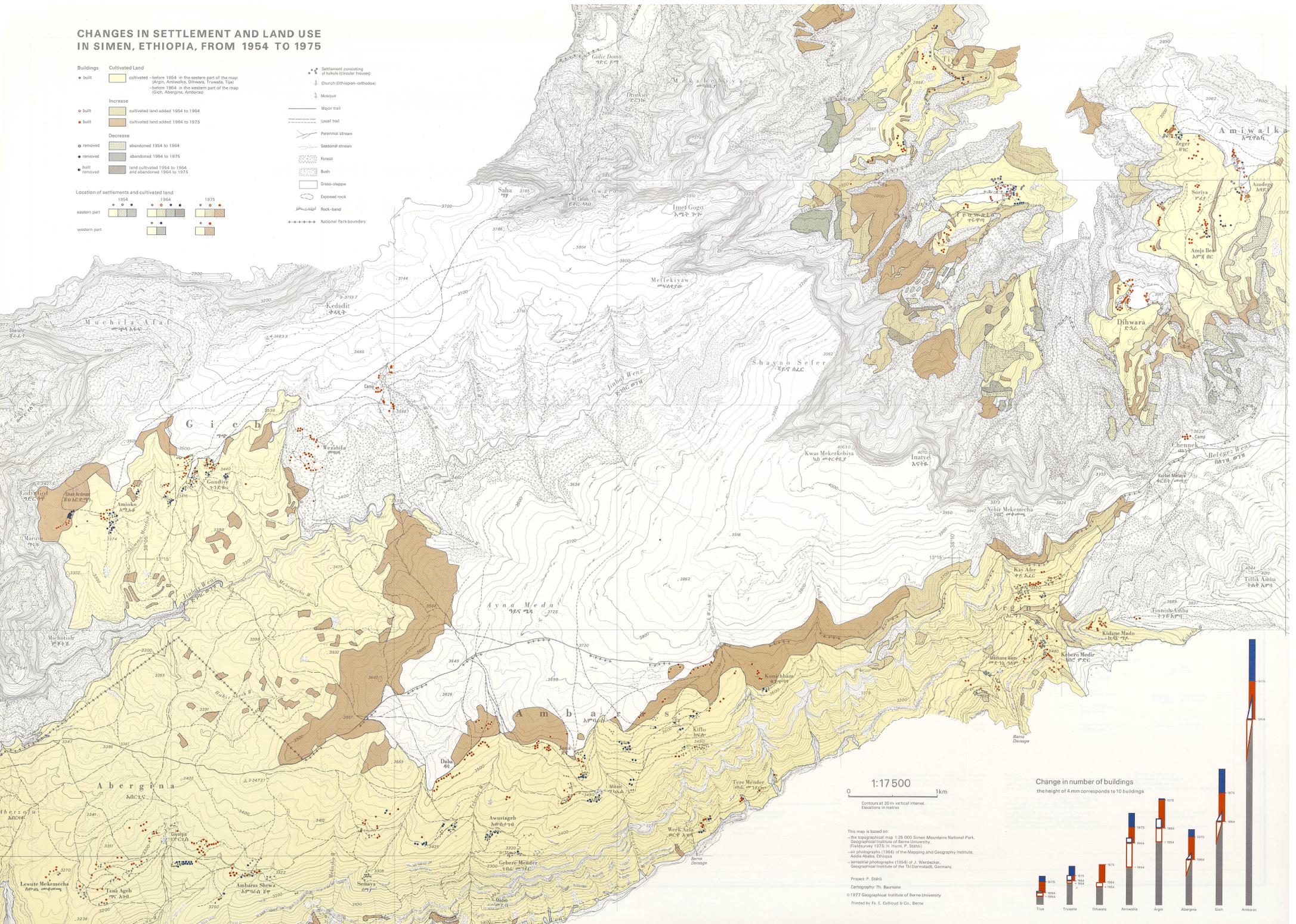
**Decrease**

- removed
- removed
- built

**Location of settlements and cultivated land**

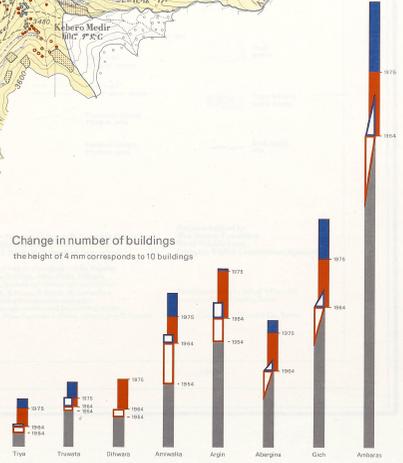
- 1954
- 1964
- 1975

eastern part      western part



1:17500  
Contours at 20 m vertical interval. Elevations in metres.

**Change in number of buildings**  
the height of 4 mm corresponds to 10 buildings



The map is based on:  
- the topographical map 1:25 000 Simen Mountains National Park, Geographical Institute of Berne University, Switzerland, 1975 (1:100 000 scale);  
- air photographs (1964) of the Mapping and Geography Institute, Addis Ababa, Ethiopia;  
- terrestrial photographs (1954) of J. Werdeck, Geographical Institute of the TH Darmstadt, Germany.

Project: P. Sahli  
Cartography: Th. Burmann  
© 1977 Geographical Institute of Berne University  
Printed by H. E. Dilloud & Co., Berne

**KEY FOR TOPOGRAPHIC SITUATION**

-  Fence of brushwood or tin
-  Minor Road or Path (schematically surveyed, no classification)
-  Perennial Stream
-  Seasonal Stream
-  Eucalyptus-Forest
-  Contour, Interval 10 metres

**SIMEN-DISTRICT (AWRAJA) – ETHIOPIA**

**DEBARK – Growth of Settlement  
and Forest between 1964 and 1976**

1 : 5000

Ruedi Nägeli · Institute of Geography · University of Berne · Switzerland



**KEY FOR VARIATIONS OF SETTLEMENT  
AND FOREST**

-   Rectangular or round Houses existing in 1964
-   Houses constructed between 1964 and 1976
-   Houses broken down between 1964 and 1976
-  Eucalyptus-Forest existing in 1964 and 1976
-  Eucalyptus-Forest cleared between 1964 and 1976
-  Eucalyptus-Forest afforested between 1964 and 1976

Scale 1 : 5000



**SOURCE MATERIALS**

Topographic situation after an aerial photograph of The Mapping and Geography Institute (Addis Ababa, 1964), based on a triangulation by P. and S. Stähli and H. Hurni, a photogrammetric interpretation by The Institute of Photogrammetry and Engineering Survey M. Zurbuchen, and a complete verification and revision in the field at the scale 1:2000 in 1976 by R. Nägeli.

Variations of settlement and forest after a comparison of the aerial photograph of 1964 and the field survey of 1976.

Cartography by R. Nägeli and M. Zurbuchen

Phototypesetting by Schad + Frey AG, Institute of Cartography (Berne)  
Printed by Fa. E. Colloud & Co. (Berne)

The field work has been supported by The Theodor-Schenk-Foundation (University of Berne) and The Popularis Travelling Agency (Berne).

N. B. Because of the dense covering through forest in several parts of the aerial photograph, probably some houses have not been identified for the situation of 1964.

SIMEN-DISTRICT (AWRAJA) – ETHIOPIA  
**DEBARK – Functional Structure  
of an Ethiopian Market Town**

1:2000 – Field work 1976

Ruedi Nägeli · Institute of Geography · University of Berne · Switzerland



**KEY FOR TOPOGRAPHIC SITUATION**

- Fence of brushwood or tin
- Mirror Flood or Path (schematically surveyed, no classification)
- Perennial Stream
- Seasonal Stream
- Eucalyptus-Forest
- Contour, Interval 10 metres

**SOURCE MATERIALS**

Topographic situation after an aerial photograph of The Mapping and Geography Institute (Addis Ababa, 1964), based on a triangulation by F. and S. Sjöström and H. Hurni, a photogrammetric interpretation by The Institute of Photogrammetry and Engineering Survey (M. Zschalig), and a complete verification and revision in the field at the scale 1:2000 in 1976 by R. Nägeli. Construction and function of houses surveyed by R. Nägeli. Cartography by R. Nägeli and M. Zschalig.

Photoreproducing by Schöndt-Frey AG, Institute of Cartography (Bern)

Printed by F. E. Colliard & Co. (Geneva)

The field work has been supported by The Theodor Schenk Foundation (University of Berne) and the Prochaska Traveling Agency (Geneva).

N.B. The distribution of buildings and the different functions change over short periods of time, so that the situation shown here for 1976 does not necessarily prevail today.

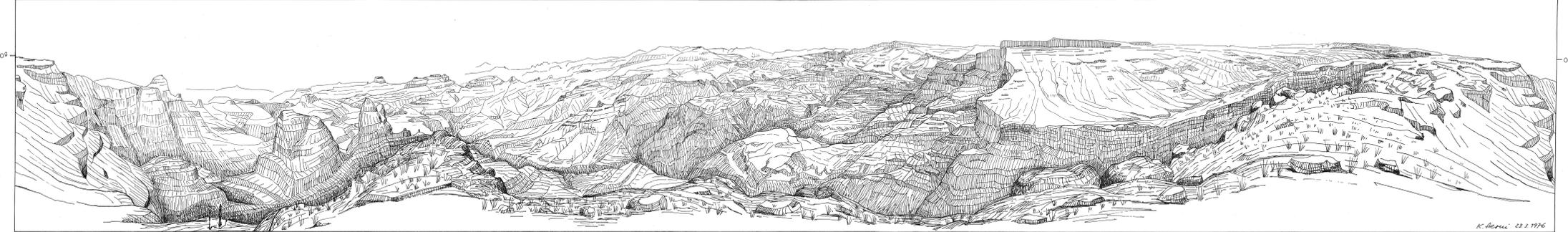


Scale 1:2000

**KEY FOR FORMAL AND FUNCTIONAL IDENTIFICATION OF HOUSES**

- Construction**
- Brick-House, single or serial. Sometimes with foundation of stones, faced with tin or painted. Comparted iron roof.
  - Gimbi-House, roof of stones, bricks or cement.
  - House under construction.
  - Tukul, made of wood and clay, Grass-roof.
  - Empty house.
- Functional Classification**
- Trade and Market**
- Retail-Shop or Kiosk
  - Store of Wholesaler
  - Periodic Weekly Market
  - Daily Market
- Crafts**
- Tailor
  - Weaver
  - Smith
  - Butcher
  - Barber
  - Laundry
  - Grinding-Mill
- Hotels and Taverns**
- Hotel
  - Lodging
  - Eating-House
  - Tea-House
  - Bar or Araki-House
  - Far-House
  - Tulla-house
- Public Services and Supply**
- Public-School
  - Health-School
  - Preparatory-School
  - Post-Office
  - Telecommunications
  - Health-Station
  - Mosque
  - Power-Station
  - Gasoline-Station
  - Public Well in use, out of use
- Administration**
- Administration-Office
  - Ministry of Education
  - Ministry of Agriculture
  - Ministry of Finance
  - Ministry of Land-Reform
  - Veterinary-Department
  - District-Governor
  - District-Police
  - Sub-district-Governor
  - Sub-district-Court
  - Eastern-Local-Community
  - Western-Local-Community
  - Weaver-Association
  - Ethiopian Wildlife Conservation Organization (EWC)
- Living and Various**
- Living-House, usually with kitchen. These units may include some functions which cannot be surveyed correctly, such as basket-making, spinning, temporary shops, temporary stable etc.

Imet Gogo 3910 m    Set Derek 3591 m    Amba Sara 3739 m    Mekakebiya 3718 m    Amba Toloka 2676 m    Amba Ton 2873 m    Ansiya    Weynabar 4466 m    Ras Dejen 4543 m    Bwahit 4430 m    Inatye 4074 m    Kwas Mekerkebiya 4063 m    Ayrsa Meda    Wekin Terara 3037 m    Imet Gogo 3910 m  
 Siki 4420 m    Walya Kend 4249 m    Kids Yared 4453 m    Arkwazye 3640 m    Amiwalka    Truwata    Dhwara    Channek 3555 m  
 Tiya    Amiwalka    Truwata    Dhwara    Channek 3555 m  
 W    NW    N    NE    E    SE    S    SW    W



SEMIEN (Äthiopien) – PANORAMA VOM IMET GOGO 3926 m  
 Standort: 38° 9' Ostl. Länge, 13° 17' nördl. Breite

SIMEN (Ethiopia) – PANORAMA IMET GOGO 3926 m

# Soil Erosion

1:25000

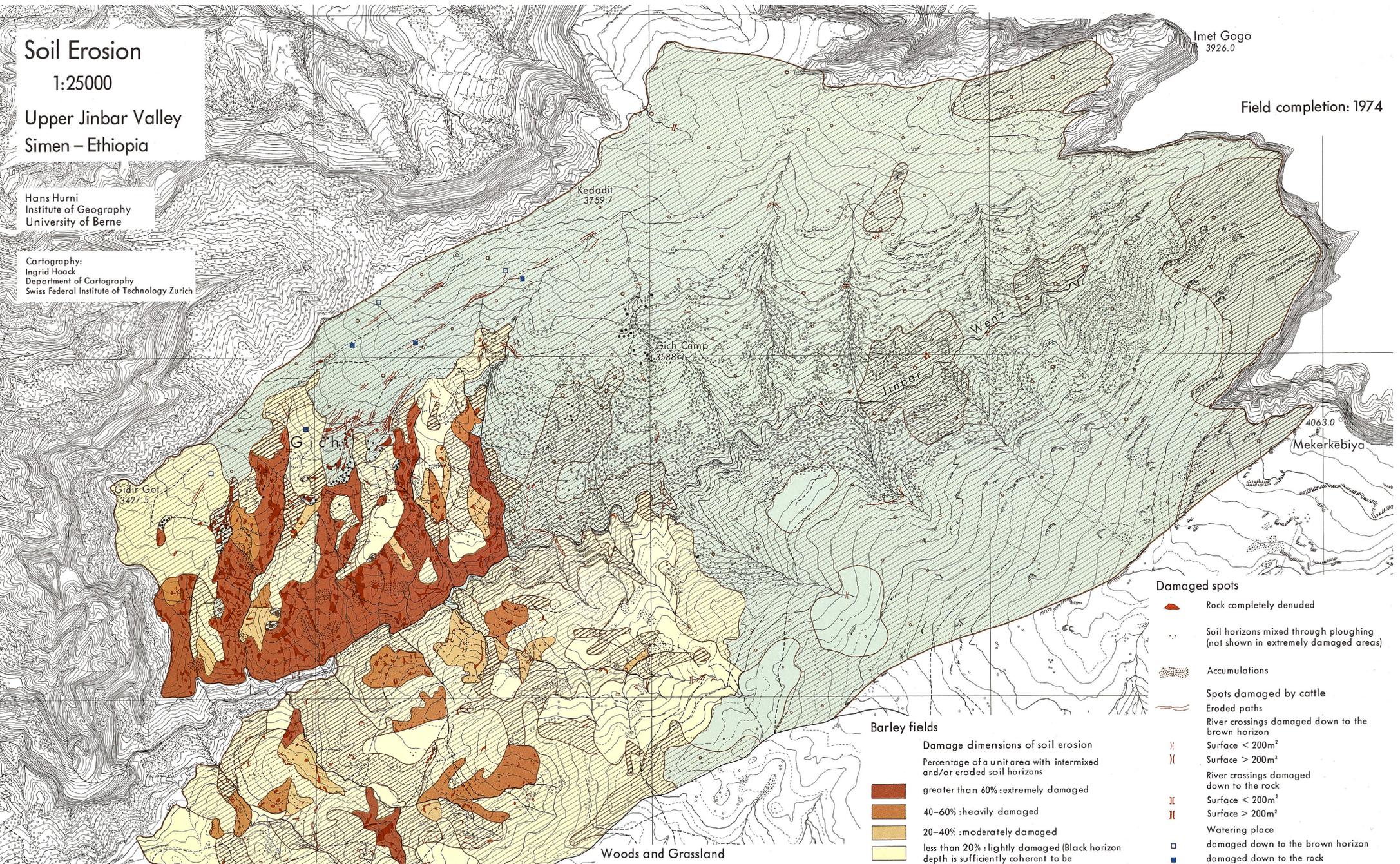
Upper Jinbar Valley  
Simen – Ethiopia

Hans Hurni  
Institute of Geography  
University of Berne

Cartography:  
Ingrid Haack  
Department of Cartography  
Swiss Federal Institute of Technology Zurich

Imet Gogo  
3926.0

Field completion: 1974



### Damaged spots

- Rock completely denuded
- Soil horizons mixed through ploughing (not shown in extremely damaged areas)
- Accumulations
- Spots damaged by cattle
- Eroded paths
- River crossings damaged down to the brown horizon
- Surface < 200m<sup>2</sup>
- Surface > 200m<sup>2</sup>
- River crossings damaged down to the rock
- Surface < 200m<sup>2</sup>
- Surface > 200m<sup>2</sup>
- Watering place
- damaged down to the brown horizon
- damaged down to the rock

### Barley fields

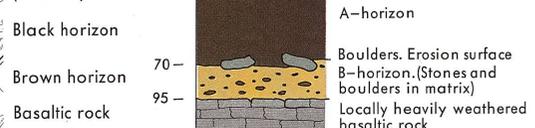
- Damage dimensions of soil erosion  
Percentage of a unit area with intermixed and/or eroded soil horizons
- greater than 60%: extremely damaged
  - 40–60%: heavily damaged
  - 20–40%: moderately damaged
  - less than 20%: lightly damaged (Black horizon depth is sufficiently coherent to be presented areawise)

- Depth of the black horizon in woods and grassland and in lightly damaged barley fields
- < 40 cm
  - 40–60 cm
  - 60–80 cm
  - > 80 cm

### Woods and Grassland

- Uncultivated areas (without severe soil erosion)  
Black horizon depth at sample points (soil in natural equilibrium)
- < 40 cm
  - 40–60 cm
  - 60–80 cm
  - > 80 cm

### Ideal profile (Andosol)



- Gullies
- Gullies on convex or straight slope forms
- into black horizon
- to rock
- Gullies on concave slope forms
- into black horizon
- to rock