

Preliminary results of the user survey for a Soil Atlas of Africa

Introduction

Before embarking on the production of a Soil Atlas of Africa, the Land Management and Natural Hazards Unit of the Institute for Environment and Sustainability (IES), ISRIC – World Soil Information, the European Soil Bureau Network (ESBN), the African Soil Science Society (ASSS), and FAO conducted a survey amongst potential users of the Atlas, to get insight into the needs and wishes about its content. The survey was conducted between half May and half June, 2007, by sending around a questionnaire using the email networks of ESBN, the ASSS, the alumni of Ghent University, Belgium, the World Reference Base for Soil Resources, and through the Soil Portal webpage of IES.

Sixty-seven questionnaires were returned, along with eleven email reactions supporting the idea. Forty-six questionnaires (about two-third) originated from Africa, the others coming from International Organizations, Europe, America and Asia (Figure 1). African responses arrived from Algeria, Botswana, Burkina Faso, Burundi, Cameroon, Democratic Republic of Congo, Egypt, Ethiopia, Ghana, Kenya, Malawi, Niger, Nigeria, Somalia, South Africa, Sudan, Tanzania and Zimbabwe.

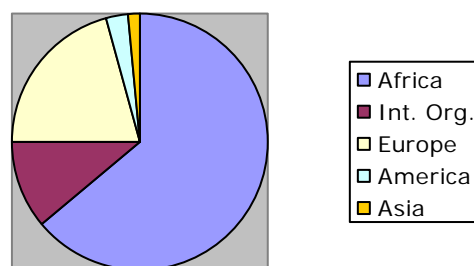


Figure 1. Geographical distribution of responses to the user survey for the Soil Atlas of Africa

The questions focus on the type of soil information potential users would like to find in the Atlas, preferred scale and language, possible contributions and presentation of the information. The results have been analyzed as totals, and as separates between African and non-African contributions. This yielded, in cases, quite remarkable results.

Question 1: Do you use soil information in your work and, if yes, what kind of soil information you use?

The response to this question is fairly uniform; about 40% of all respondents use soil attributes as their source of information, whereas between 10 and

20% indicate to use the environmental setting (physiography, climate, geology/parent material, vegetation, land use, etc.) and soil type as their source of information (Figure 2). About 10% uses soil evaluations (e.g. land degradation assessments, soil fertility evaluations) and the soil distribution; less than 5% uses other information like available metadata.

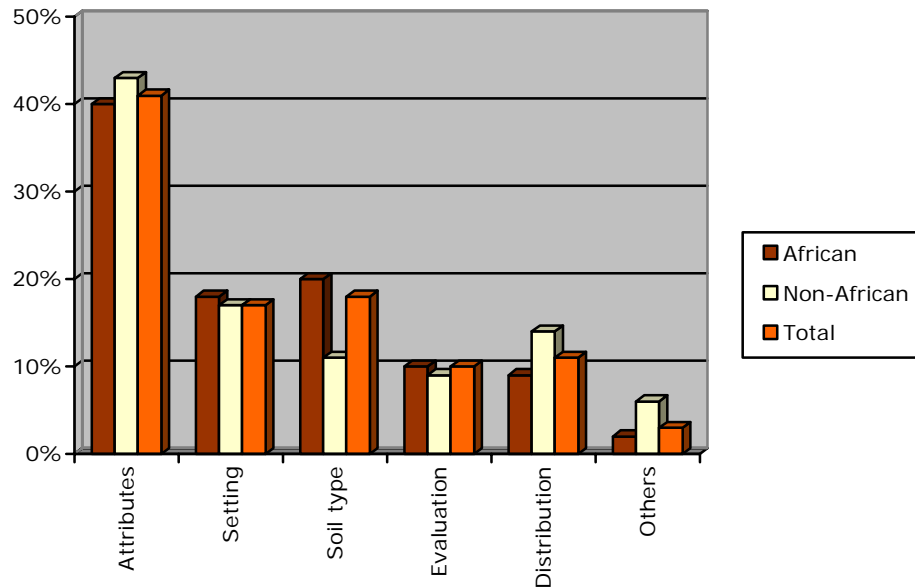


Figure 2. Type of soil information used

Soil information appears to be used for a variety of purposes. The respondents listed the following: planning, extension, research, teaching, engineering, aid programming and fund allocation, mapping, and land suitability studies and degradation assessment.

Question 2: What kind of information you would be looking for in a Soil Atlas of Africa?

Unlike the previous question, there is less harmony between the African and non-African responses. While attribute and environmental setting information still scores fairly uniform among both groups (about 25 and 10%, respectively), the expected information on soil types, evaluations and distribution of soils diverges (Figure 3). Soil type and distribution information is more important for African respondents, while evaluations are more important for the non-African group. Moreover, new topics such as soil threats and soil carbon issues can be identified as type of information potential users of the Atlas will be looking for. Amongst these, soil threats score twice as high (between 15 and 20%) among the non-African respondents compared to African respondents.

One may conclude that African respondents wish to see more comprehensive information on the soil types (attributes/properties, distribution), while non-African replies point to information more related to evaluation and degradation issues.

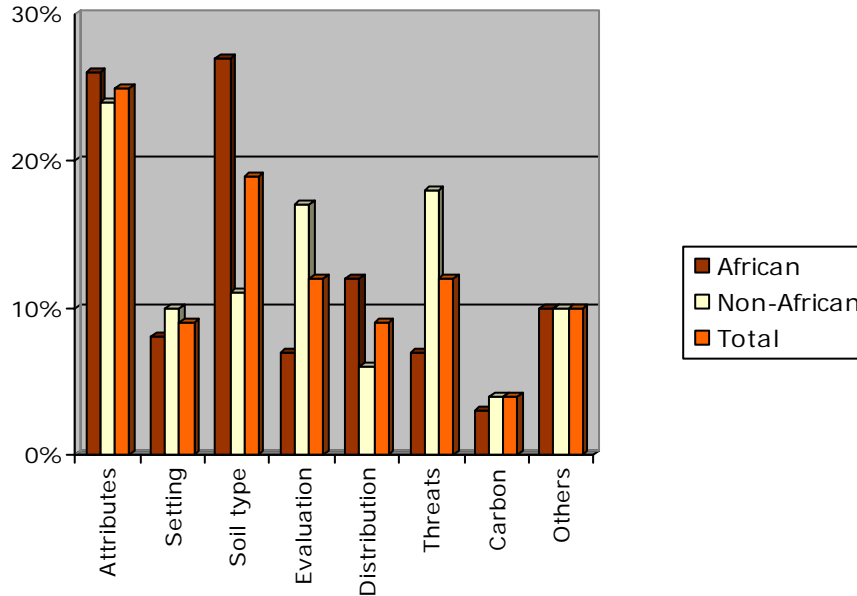


Figure 3. Type of information requested in the Atlas

Question 3: Do you have preference for a Soil Atlas of Africa by country, or as road atlas layout?

This question was asked to determine if users prefer the layout of the Soil Atlas of Europe, with overlapping sheets crossing country borders, or to have the soil distribution presented country-wise. The majority of the respondents (almost 60%) give preference to an Atlas by country (Figure 4). There is a marked difference between the African and non-African responses; three out of four African responses indicate preference for an Atlas by country, whereas almost one out of two non-African respondents give preference to a road atlas layout.

Obviously, the choice must be a Soil Atlas of Africa by country. In view of the highly variable degree of detail between countries – Rwanda, for example, has been mapped at scale 1 : 50,000, while the most detailed information for the Democratic Republic of Congo is at scale 1 : 250,000 only for part of the country – this seems logical choice as well in order not to lose valuable detail by forcing similar scales. However, this choice also requires the Atlas to have a much larger amount of map pages than the Soil Atlas of Europe, which contains 34 pages with soil maps. Some kind of balance needs to be found here!

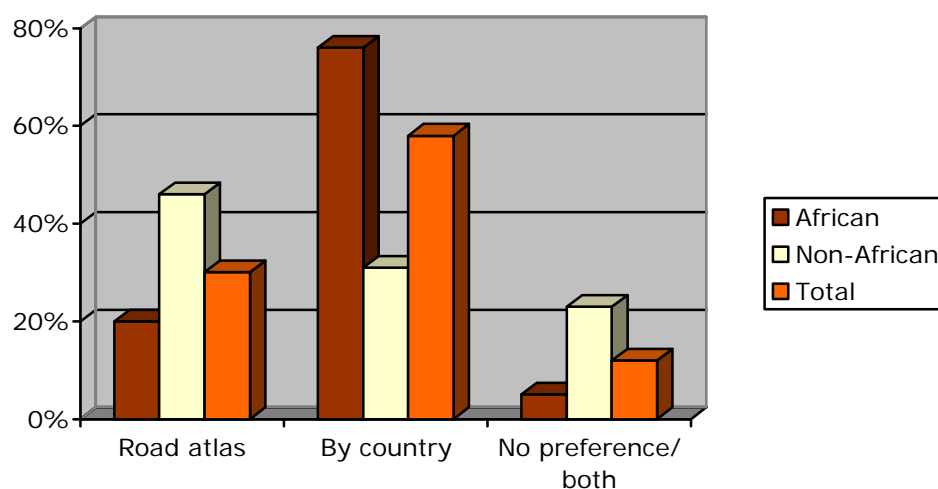


Figure 4. Preferred presentation of soil maps

Question 4: Do you have a preferred scale for the maps?

More than one-third of the respondents indicate to have no preference or prefer variable scales (Figure 5), which seems to be logical if the soil maps are presented by country. Otherwise, there seems to be a cluster around 1:500,000 to 1:2,000,000 (around 30% of the responses). The large scales, i.e. larger than 1:100,000 and 1:100,000 to 1:250,000 are obviously out of the question as these would require an enormous amount of maps.

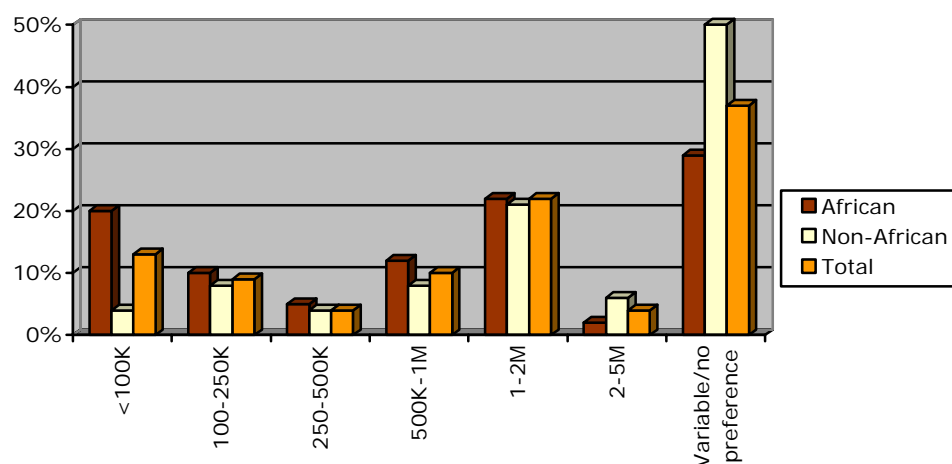


Figure 5. Preferred scales for the soil maps

Question 5: What topics or derived maps would you like to see in the Soil Atlas of Africa?

This question has yielded the largest variety of answers. They can be clustered as shown in Figure 6. Issues related to land degradation (desertification, water- and wind erosion, loss in biodiversity, salinization, nutrient mining, etc.) receive the highest score (20%). Other important topics are associated with soil types (soil depth, topsoil texture and textural contrast, water-holding capacity, derived CEC, etc.), soil suitability (including soil management) and land use/land cover (about 10%). Environmental conditions such as climate, water resources, physiography, and parent material/geology, together with soil geography (meaning dominant soil regions, relation to major soil forming factors, distribution of such typical soils as shifting sands, swelling clays, and sodic/saline soils) score more or less even (4-7%).

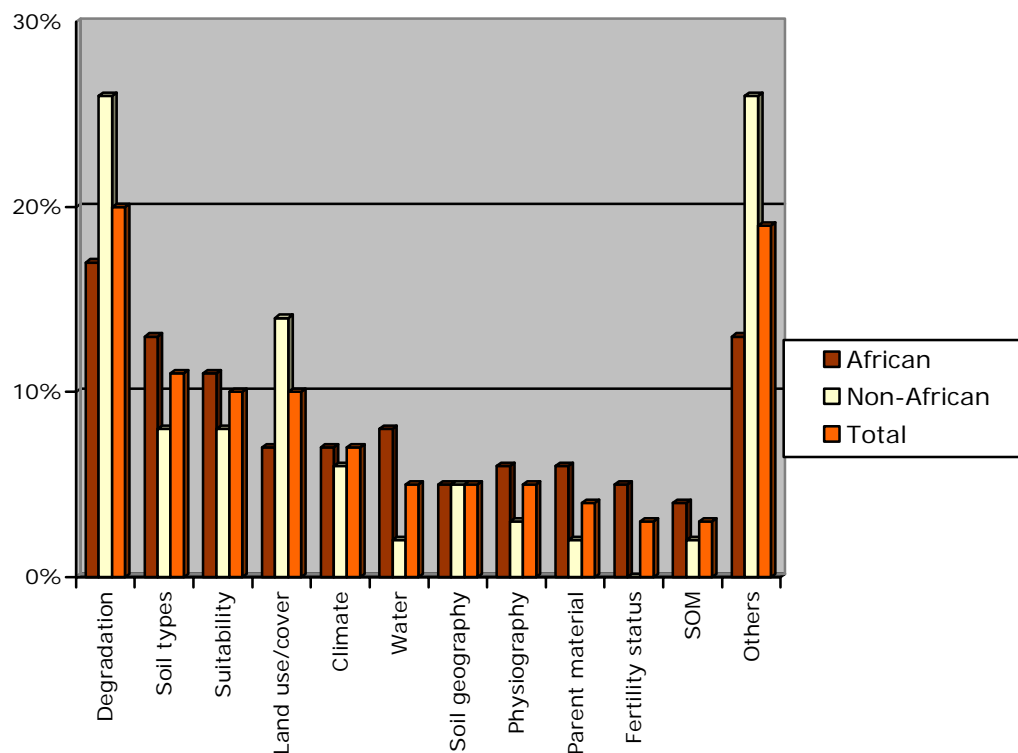


Figure 6. Soil-related topics to be included in the Atlas

Others include a large variety of single answers that cannot be clustered. They comprise such issues as soil and socio-economy, soil and sustainable development, population density, soils of national parks, soil regeneration, major crops grown, history and age of soils, soil pollution status, existing agricultural schemes, yield forecasting, hotspots of changes in soil moisture and nutrients, types of cultivation, costs of production, ecologically sustainable areas, reclaimed lands, potential areas for tropical

diseases and tse-tse fly infestation, potential areas for paddy rice, and major land resources areas.

Question 6: The Soil Atlas for Africa will be issued in two languages, English and French. Do you wish to see one, bilingual volume, or two volumes in separate languages?

This question receives a clear-cut answer; a vast majority of the respondents (almost 70%) has preference for two separate volumes, one in English and one in French (Figure 7). It is worth noting that several respondents indicating their preference for one, bilingual volume argue that it will bring Anglophone and Francophone soil scientists closer together.

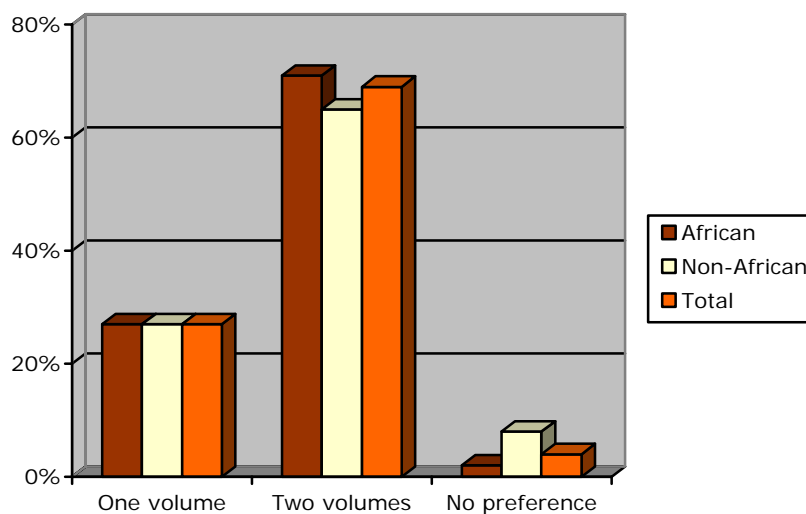


Figure 7. Preference for one or two volumes

Question 7: Are you willing to contribute and, if yes, what is your area of expertise?

Three out of four respondents are willing to contribute to the Atlas (figure 8).

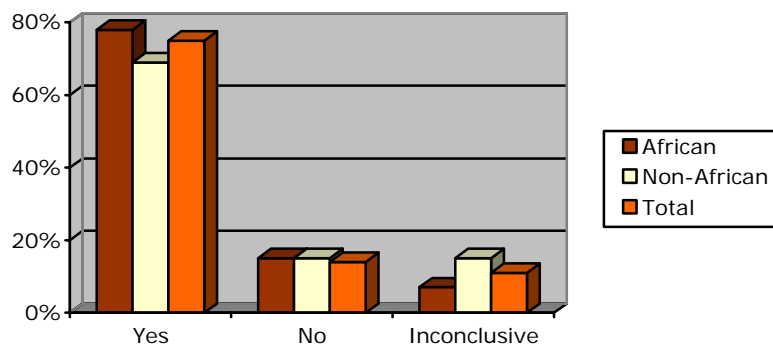


Figure 8. Willingness to contribute to the Atlas

Areas of expertise/topics offered for case studies

- Soil genesis/soil geography. Topics offered:
 - o Why do what soils occur in various corners of Africa
 - o Kalahari sands in NW Zambia
 - o Soils of North Africa
 - o Gypsiferous soils
- Soil classification. Topic offered:
 - o Ultisols/Oxisols of Cameroon
- Engineering information
- Digital soil mapping. Topic offered:
 - o SOTER - Southern and Eastern Africa
- Soil and other natural resource information SADC
- Soil mapping
- (Environmental) soil chemistry
- Degradation. Topic offered:
 - o Water erosion of ferrallitic soils in the Ethiopian Highlands of Wolega Province under different tillage systems
- Geomorphology
- Land cover/land use management. Topic offered:
 - o Egyptian New Valley Governorate, particularly Bahariya and Farafra Oases in the Egyptian Western Desert (SW Egypt)
- Land evaluation
- Soil database
- Soil/land and soil-water management
- Publicity
- Soil maps and data for Somalia
- Soil fertility
- National soil resource inventory of Tanzania
- Soil physics
- Soil conservation and soil restoration
- Agency needs such as the World Bank, the GEF, etc.
- Support to French version
- Case studies offered:
 - o Soil formation in the moist semi-deciduous forest zone in West Africa with special emphasis on the formation of pisolites. Case: Kade Research station in Ghana
 - o Nutrient input to soils due to the Harmattan dust. Case: Whole Ghana
 - o Shallot production on sandy soils in a semi-arid area. Case: Keta sand spit in Ghana
- Photographs of landscapes and profiles
- Precision agriculture
- Recommendations for decision-makers
- Ethno-pedology
- Agricultural economics

Question 8: What use would you make of a Soil Atlas of Africa?

The answers to this question are fairly across the board (Figure 9); between 15 and 20% of the respondents indicate that they will use the Atlas for research, planning and reference purposes, for creating awareness about the African soil resources, and as a teaching tool. More emphasis is placed by the non-African respondents on the latter two categories. Only 5-10% will use the Atlas for evaluation purposes. Other uses mentioned are the development of a spatial data infrastructure for Africa, and consultancy services.

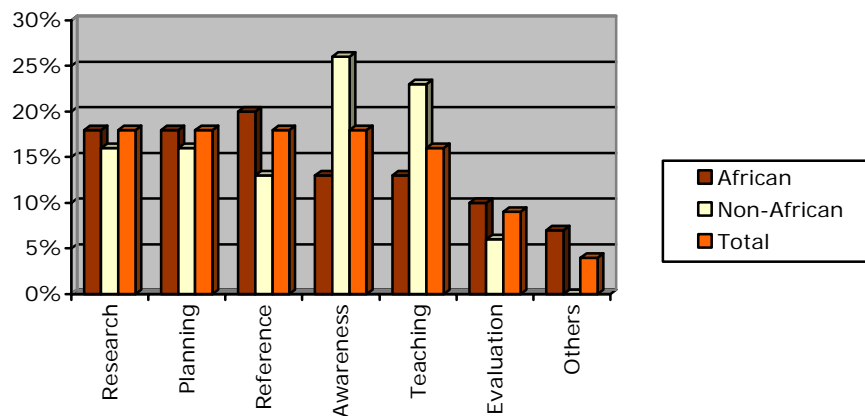


Figure 9. Potential use of the Soil Atlas of Africa

Conclusions

The following conclusions can be drawn from the user survey:

- Soil maps are to be shown country-wise
- Two volumes are to be issued, one in English and one in French
- The descriptions of the soil types must contain information on their attributes/properties and distribution
- There is a great deal of support and interest for the Soil Atlas of Africa; many respondents indicate their willingness to contribute
- Supporting information must include degradation/conservation issues, information on critical soil parameters (soil depth, soil texture, water-holding capacity) as well as an overview of the environmental conditions in Africa
- Based upon these findings a preliminary contents of the Soil Atlas of Africa which will be circulated for further comments