

The African Dams Database

Notes and References

General notes

A. Quality of data

The references used for the database were: i) International Commission on Large Dams (ICOLD). 1985. *The World Register of Dams*; ii) National Reports; iii) Information obtained from national experts through AQUASTAT national surveys; iv) The Internet.

The database, in its present format, is neither complete nor can be considered error-free. It corresponds to the best available information at the time of the study.

B. Coordinates

The degree of precision of the coordinates is as follows: if the coordinates are available in the reference, these figures are reported in the database. If the dam was located from maps from the World Aeronautical Operational Navigation Charts (ONC) (scale 1 : 1 000 000), the degree of precision is ten seconds. When more detailed maps were available (1 : 250 000 or more detailed), the degree of precision is one second. Figure 1 and 2 show the dams by basin and by country.

The reliability of the information is coded as a, b, c and d (see Figure 3), according to the presence or absence of a reference and to the presence of surveyed or not surveyed benchmark (city, river branch, etc.).

C. Year of completion

When Reference 2 (ICOLD, 1985) was used (column 1 or 2) and had indicated 'in construction' and when no more recent information was available, the value '1988' was indicated for the year of completion (column 15) and a 'x' was put in column 16 to indicate that it was under construction in 1985 (year of the reference).

D. Large dam

According to ICOLD, a large dam is a dam with a height of 15 metres or more from the foundation. If dams are between 5-15 metres high and have a reservoir volume of more than 3 million m³, they are also classified as large by ICOLD.

While the database concentrates on large dams, if information on other dams was available, it has also been put, since AQUASTAT considers it to be a pity not to share this additional information, when available.

E. Height of dam

All heights are given in metres (column 17), with a precision of two decimals (cm), although most of the available figures are given with a precision of 1 metre.

F. Reservoir capacity and level of sedimentation

The reservoir capacity (column 18) refers to the initial capacity, not taking into consideration the reduction in volume due to sedimentation. The level of sedimentation refers to the percentage of initial capacity lost due to sedimentation. This should be linked to a year, but not always the year is available.

G. The Kariba Dam

The Kariba Dam (row 1161, FID 1156 and row 1209, FID 1204) is located at the border between Zambia and Zimbabwe on the Zambezi River. Its total capacity is 188 km³, but in order to be able to have the correct total of dam capacity when adding up all dam capacities in Africa, 94 km³ has been put under Zambia and 94 km³ under Zimbabwe.

Figure 1:
Major river basins with sub-basins and dams in Africa

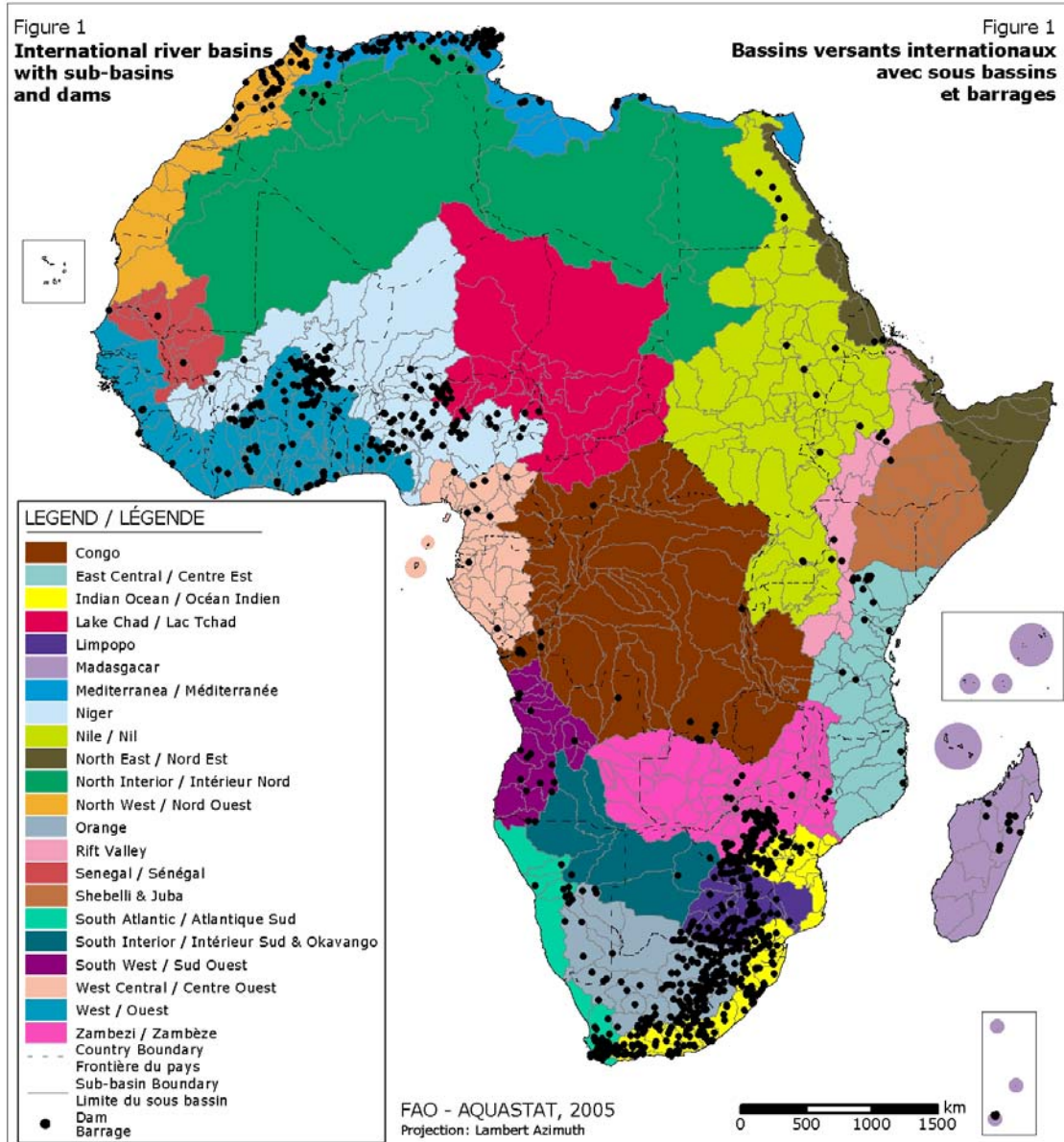
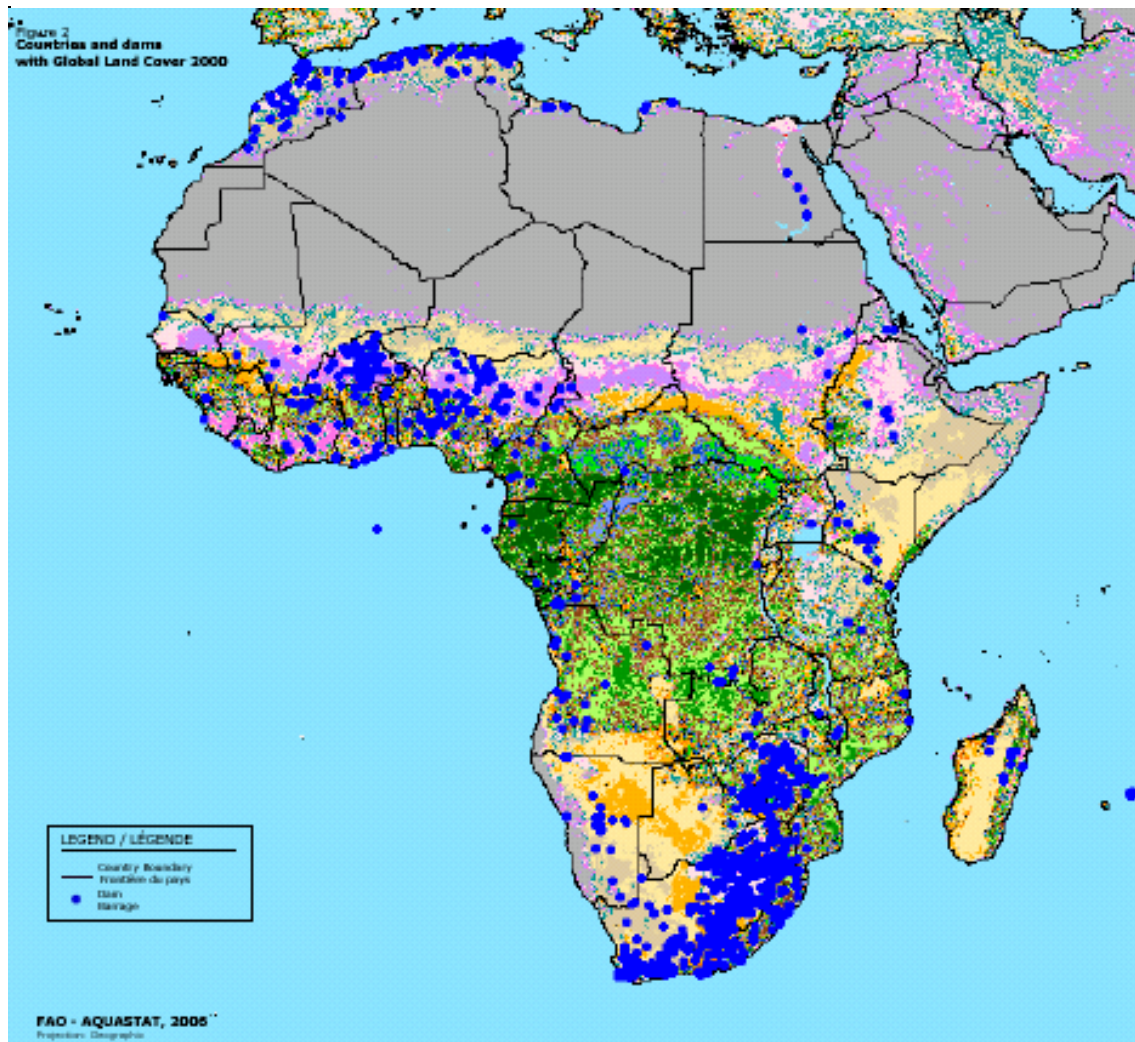
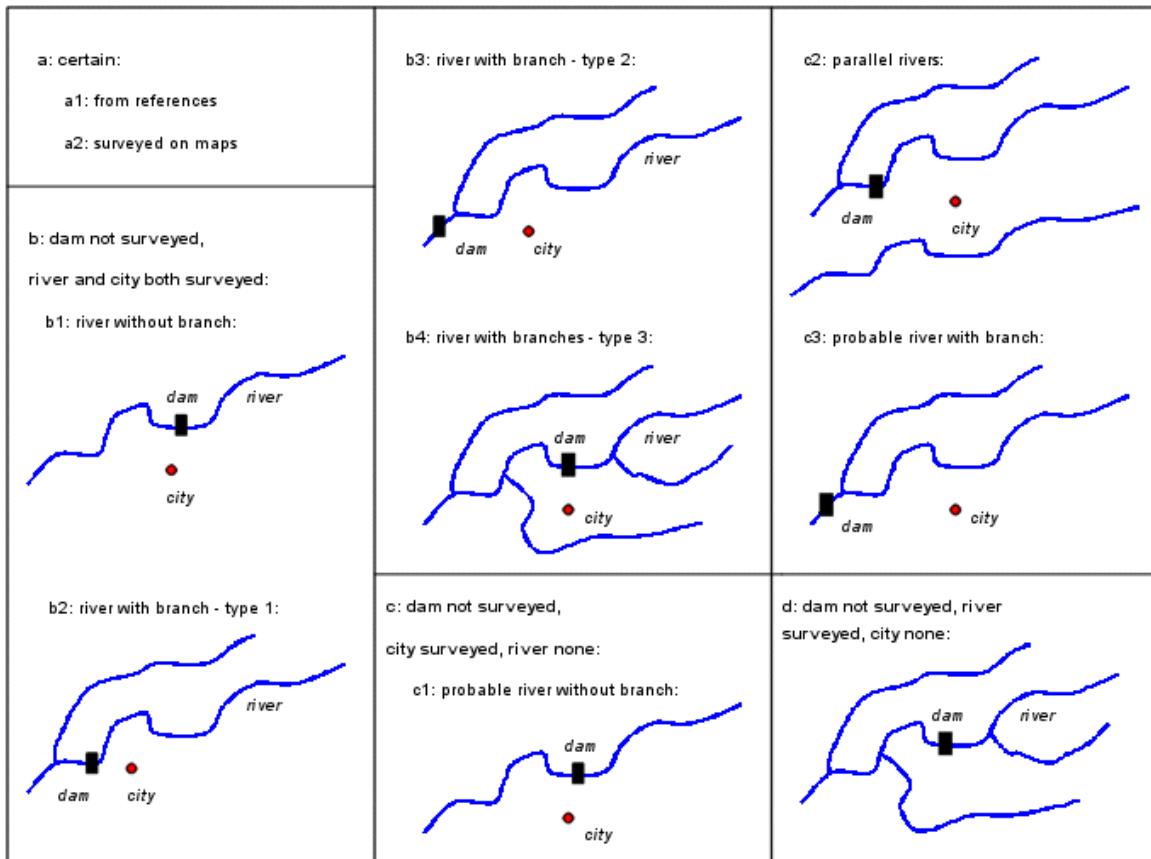


Figure 2:
Countries and dams in Africa, with global land cover 2000



The interactive map can be accessed on:
<http://www.fao.org/ag/aql/aqlw/aquastat/quickWMS/damsafrica.htm>

Figure 3:
Codes used to determine the reliability of the coordinates found (Column 34)



Explanation of the fields of the dams database in Excel

Field	Item	Description
1.	Reference – Dam Info a	Number of reference providing information on the dam. The references are given in Notes and References
2.	Reference – Dam Info B	Number of reference providing information on the dam. The references are given in Notes and References
3.	Reference – Dam Location	Number of reference containing the location of the dam. The references are given in Notes and References. If no reference is given in this column, the location either was available from the reference given in column 1 or was determined from the World Aeronautical Operational Navigation Charts (ONC). Figure 1 and 2 show the dams by basin and by country
4.	CODE	Feature identity, which is a unique identifier for the dams and the GIS points
5.	N°	National number of the dam, in ascending order for the country
6.	Name of dam	The name of the dam
7.	ISO alpha-3	Country codes used by United Nations
8.	GAUL_CODE	Global Administrative Unit Layers (GAUL) code for country, currently used only in FAO
9.	Country	The name of the country in which the dam is located
10.	Administrative unit	The name of the sub-national administrative unit in which the dam is located. Was often determined using the GAUL dataset.
11.	Nearest city	The name of the city closest to where the dam is located. Was often determined using populated places through the settlement points database of the Global Rural-Urban Mapping Project (GRUMP)
12.	River	The name of the river on which the dam is located
13.	Major basin	The name of the major river basin in which the dam is located. The major river basins are presented in Figure 1
14.	Sub-basin	The name of the sub-basin in which the dam is located
15.	Completed or operational since	Year in which the dam was completed, operational or improved
16.	Under construction	The flag "x" means that the dam is reported under construction in the year of the reference used. In case Reference N° 2 "World register of large dams" (ICOLD, 1985) was used and if no more recent information was available, the year 1988 was indicated for the year of completion (column 15) and at the same time "x" was put this column 16
17.	Height of dam	Height of dam in metres. The precision given is two decimals (cm), although most of the available figures are given with a precision of 1 metre

18.	Capacity of the reservoir	Capacity of reservoir in thousands cubic metres. It refers to the initial capacity, not taking into consideration the reduction in volume due to sedimentation (column 19)
19.	Level of sedimentation	Percentage of initial capacity lost to sedimentation (%). Not always the year to which this figure refers is available
20.	Area of the reservoir	Surface area of the reservoir in thousands square metres
21.	Irrigation	Purpose of the dam. Put "x" if it is one of the main purposes
22.	Water supply	Purpose of the dam. Put "x" if it is one of the main purposes
23.	Flood control	Purpose of the dam. Put "x" if it is one of the main purposes
24.	Hydroelectricity	Purpose of the dam. Put "x" if it is one of the main purposes
25.	Navigation	Purpose of the dam. Put "x" if it is one of the main purposes
26.	Recreation	Purpose of the dam. Put "x" if it is one of the main purposes
27.	Pollution control	Purpose of the dam. Put "x" if it is one of the main purposes
28.	Livestock rearing	Purpose of the dam. Put "x" if it is one of the main purposes
29.	Other	Purpose of the dam other than the 8 above
30.	Latitude	Latitudinal coordinate of the dam in degrees, minutes and seconds, drawn from the maps available at FAO, the World Aeronautical Operational Navigation Charts (ONC) and national maps (at scale 1:1 000 000 or more detailed)
31.	Longitude	Longitudinal coordinate of the dam in degrees, minutes and seconds, drawn from the maps available at FAO, the World Aeronautical Operational Navigation Charts (ONC) and national maps (at scale 1:1 000 000 or more detailed)
32.	Decimal Degree Latitude	Latitudinal coordinate of the dam, expressed in decimal degree, used to locate the points with GIS
33.	Decimal Degree Longitude	Longitudinal coordinate of the dam, expressed in decimal degree, used to locate the points with GIS
34.	Reliability of survey	This code shows the reliability of the coordinates found. See Figure 3 for a detailed description of the codes
35.	Validated	Put "x" if the dam location has been validated with Google Earth.
36.	Notes	In this column specific comments of importance to the dam are given

References and notes by country

Note: the reference numbers below correspond to the numbers in the columns 1, 2 and 3 of the database

General

1. Information provided by national experts through the AQUASTAT survey.
2. International Commission on Large Dams (ICOLD). 1985. *The World Register of Dams*.
3. Latitude and longitude were validated by locating with Google Earth

Angola

4. FAO. 1980. *Mission de formulation pour le secteur agricole – Rapport de la mission*. AG:DP/ANG/79/016.
5. Ministerio da Educacao. 1982. *Atlas geografico*.

Botswana

6. Ministry of Mineral Resources and Water Affairs. 1990. *Botswana national water master plan study - Vol. 6*.
7. FAO. 1994. *Water conservation and irrigation facilities - Project findings and recommendations*.
8. Ministry of Mineral Resources and Water Affairs. 1992. *Botswana national water master plan study - Executive Summary*.
9. Mopipi dam. Located with GeoNet Names Server (gns_swb_dams.shp) <http://earth-info.nga.mil/gns/html/index.html> (National Geospatial-Intelligence Agency) and the use of the FAO document: FAO. 1990. *Source book for the inland fishery resources of Africa, Vol. 1*. CIFA Technical Paper 18/1. http://www.fao.org/documents/show_cdr.asp?url_file=/docrep/005/T0473E/T0473E01.htm
10. Dikabeya dam. From: National master plan on arable agriculture and dairy development (NAMPAAADD) 28 July, 2003. <http://www.gov.bw/cgi-bin/news.cgi?d=20030728> "...Rainfed farming will be conducted in Barolong farms and a horticultural pilot project is earmarked for Dikabeya Dam in Palapye."

Burkina Faso

11. Ministère de l'eau. 1987. *Inventaire et Reconnaissance Générale de l'état des barrages et retenues d'eau*.
Note:
 - a. Only dams with a capacity of > 1 million m³ have been selected from this reference.
 - b. Several errors due to the distinction between east and west were observed in the reference and corrected whenever possible
12. Ministère de l'eau. 1991. *Carte des ressources en eau de surface*.

Cameroon

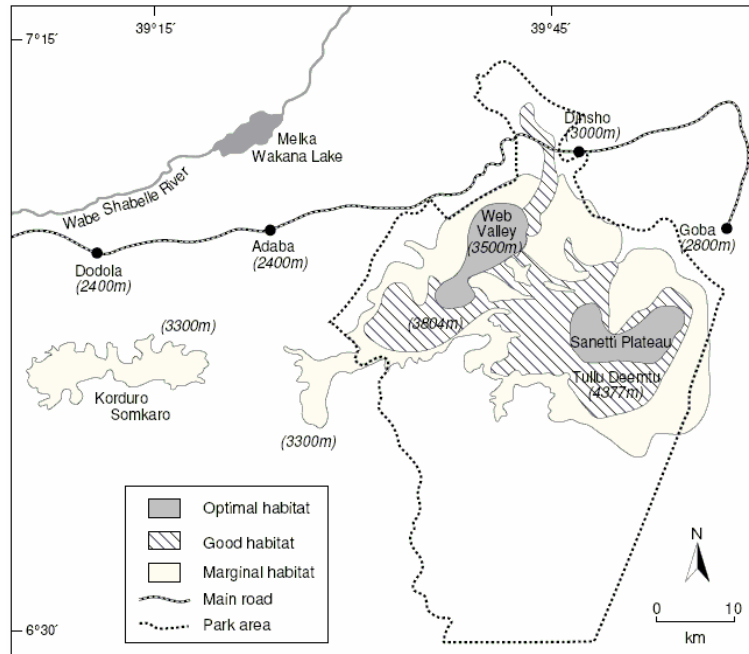
13. World Bank/Lake Chad Basin Commission. 2002. *Access of the Appraisal of the Safety of Maga Dam, Cameroon*. March 2002.
In section 2-1, Description of the Dam, a description of the location of the dam is given. http://www.iwlearn.net/docs/lcb1/lcb_magadam_en.pdf

Congo

14. Djoue dam. Located with GeoNet Names Server (gns_swb_dams.shp)

Ethiopia

15. FAO. 1993. *Utilization of natural resources for balanced development - Water resources development*.
16. Melka Wakena dam. From: The World Conservation Union (IUCN). 2002. *The Ethiopian wolf*. <http://www.canids.org/PUBLICAT/EWACTPLN/ewaptoc.htm>. Page 21, Chapter 2, was geo-referenced and used to pin point the dam's location in respect to the reservoir (lake).



17. Legadadi (Main) dam. From: Adinew, Adam. 1999. *Water supply upgrading projects – Their potential impacts*. The 25th Water, Engineering and Development Centre (WEDC) Conference, Addis Ababa, Ethiopia, 1999. <http://www.lboro.ac.uk/wedc/papers/25/359.pdf>
 "...The next major phase of expansion of the water supply facilities commenced in 1970 with the commissioning of the Legedadi dam/treatment plant which was located at 33 kilometres on the big Akaki river, east of Addis Ababa City. Further development of the water supply facilities was pursued in 1986 under Water Supply Stage II Project and treatment capacity of the Legedadi Plant was upgraded from 50 000 to 150 000 cubic metres of water per day. Along these, the Dire Dam Project is completed to avail additional 42 000 cubic metres of water per day for Legedadi Plant..." (p.359)
18. Alwero dam. The name of the dam is Alwero in the city Abobo of which the spatial location was readily available.

Ghana

19. World Bank. 1986. *Irrigation sub-sector review*
20. FAO. 1993. *Survey on water use for agriculture and rural development (AQUASTAT 1995)*
21. Bui, Kanyanbia, Kulpawn and Sissili dams. Location determined with: "Cultivated, uncultivated areas, principal dams & reservoirs, hydroelectric potential of principal rivers" (paper map), Land and Water Resources Survey – Upper and Northern Regions. FAO GEONETWORK: ISIS Identifier: 001858; Related document location: AGL GHA/S-3; Additional info: FAO/SF: 31/GHA Land and Water Resources Survey Upper & Northern Regions, Vol. V: Water Resources Development & Soil Conservation (AGL Documentation Library)
22. Barekese dam. From: FAO. 1990. *Source book for the inland fishery resources of Africa, Vol. 2*. CIFA Technical Paper 18/2.
http://www.fao.org/documents/show_cdr.asp?url_file=/docrep/005/T0360E/T0360E06.htm

Barekese Reservoir

Geographical data

Location:	Ghana - 6°44'; 1° 42'W
date closed:	February 1970
Surface area:	6.4 km ² at USL
Max. length:	13 km
Max. width:	1.25 km
Major inflowing river:	Ofin
Outflowing river:	Ofin

23. Kwanyaku dam. The location was found with the Earthsearch website.
<http://www.earthsearch.net/featureIndex.php?type=int&start=2616000&end=2617000>

Kenya

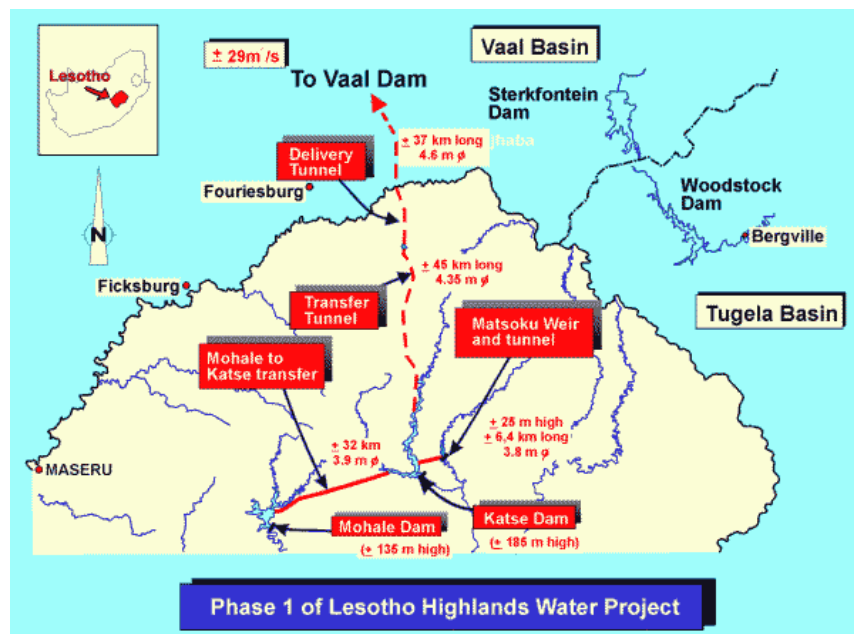
- 24. Ministry of Water Development. 1992. *The study on the national water master plan – Executive summary*. Funded by: Japan International Cooperation Agency (JICA)
- 25. Manooni dam. Location of the town was confirmed with the following website:
<http://www.fallingrain.com/world/KE/3/Manoni.html>

Lesotho

- 26. Katse dam. The dam was located through the Lesotho Highlands Water Project website
<http://www.lhwp.org.ls/engineering/phase1a/default.htm>
"Katse Dam is situated on the Malibamats'o River just downstream of its confluence with the Bokong River, and has a storage capacity of 1,950million m³."
- 27. Mhale dam. The map found on the following website shows the location for the Mhale and Katse dams in Lesotho: <http://www.go2africa.com/lesotho/lesotho/default.asp#map>

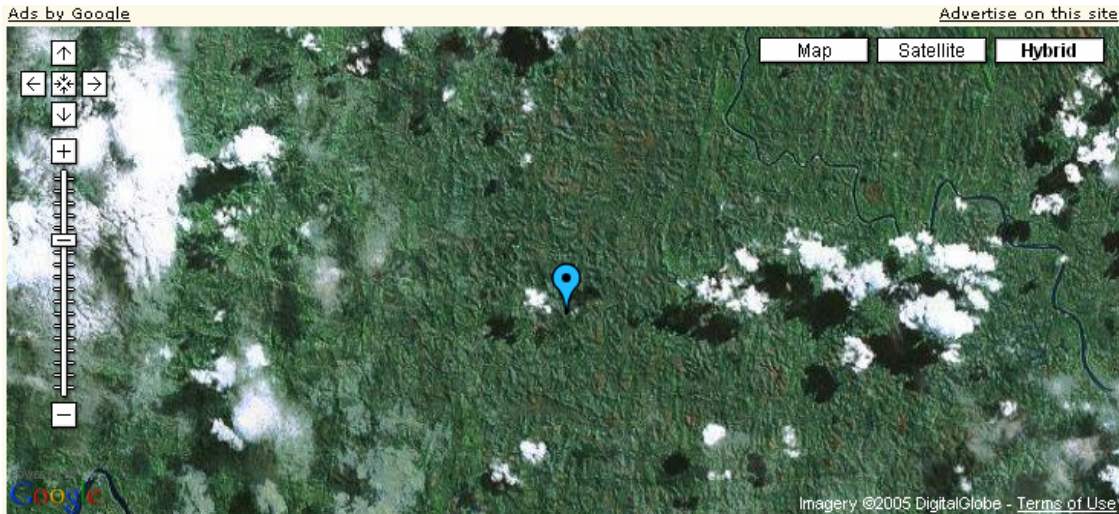


- 28. Muela dam. From: http://www.dwaf.gov.za/orange/Up_Orange/lhwpovert.htm.
"The 185 m high Katse Dam; the intake structure capable of handling 70 m³/s; the 45 km long transfer tunnel from Katse reservoir to the Muela reservoir; the Muela Dam and hydro-power station; the 37 km long delivery tunnel from the Muela reservoir to the Vaal River basin"

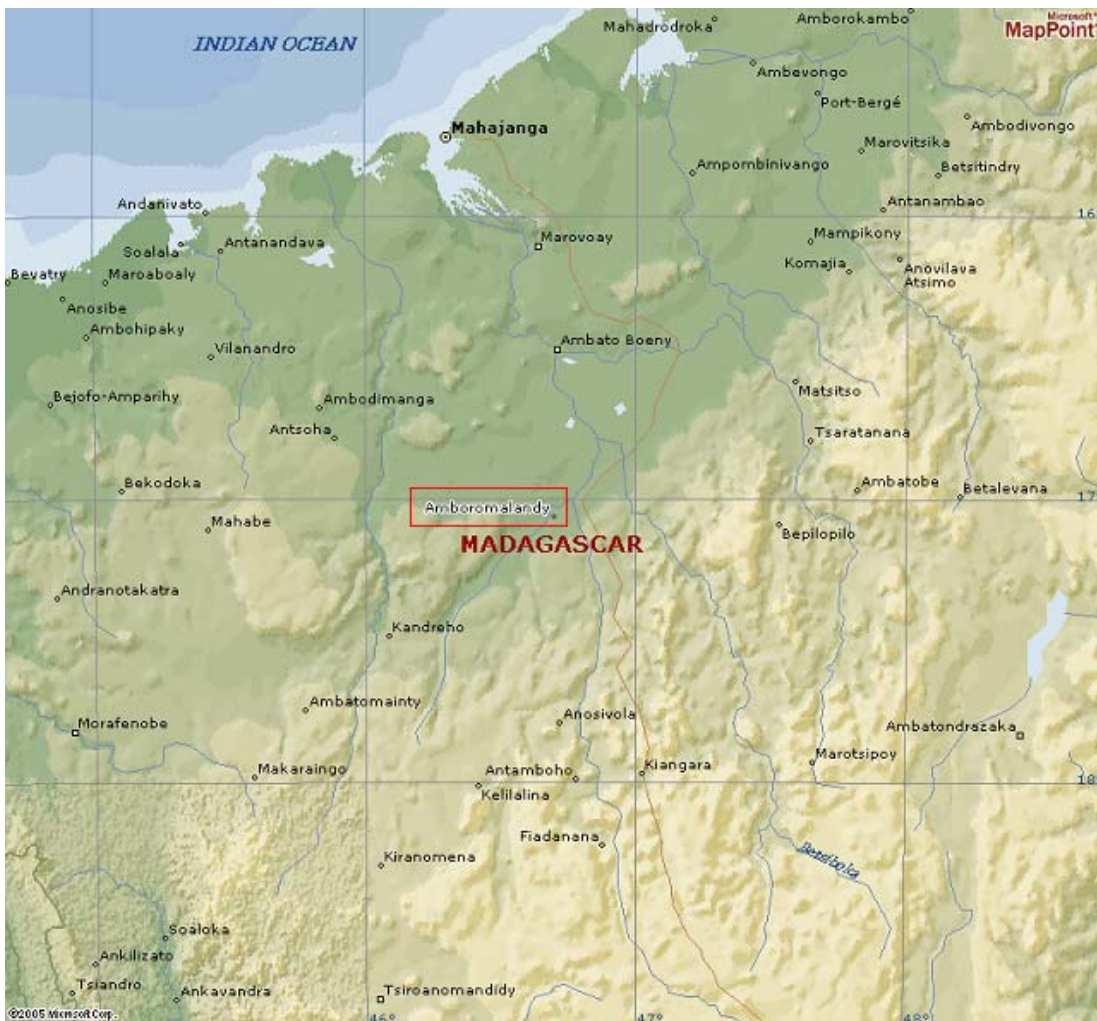


Madagascar

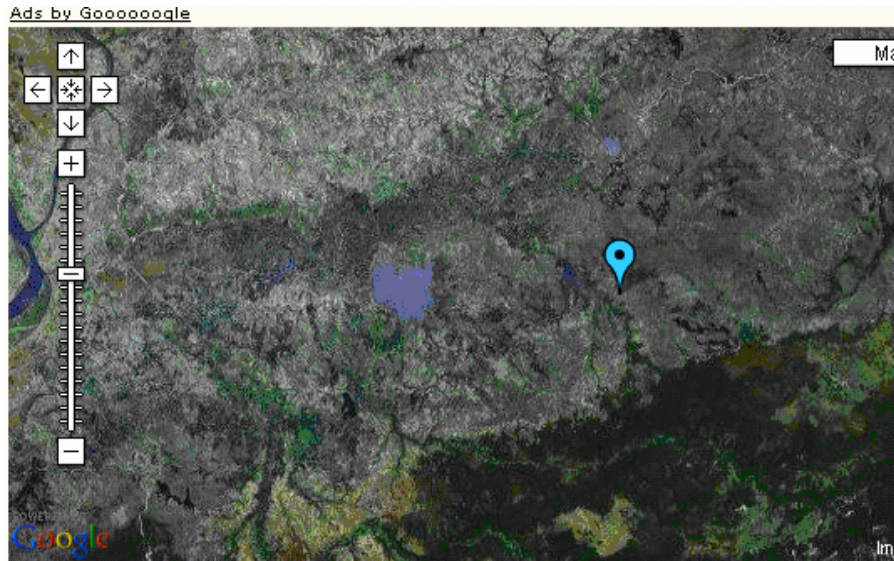
29. Mandraka dam. From: <http://members.virtualtourist.com/m/tt/36347/> and by using MapLandia with Google Maps <http://www.maplandia.com/madagascar/toamasina/toamasina-rural/mandraka/>
 "But to reach it, you will have to leave main road at Ambatoloana and drive some 12 kms. We hadn't done it this time. Mandraka Gradually, in a 10km length, you will descend to reach coastal area. Up to now, you were in the highlands. But soon, you have to descend Falaise de l'Angavo, (Angavo cliff), in Mandraka (some 70km from Tana). The descent from an average altitude of 1400m will lead you to an intermediary altitude of 900m. Combined actions of heat and humidity keep thick forests in good shape. While descending, you will see Mandraka hydraulic barrage."



30. Amboromalandy dam. A map of Amboromalandy was found using MSN Encarta Atlas



31. Ambilivily dam. By using the MapLandia website <http://www.maplandia.com/madagascar/mahajanga/marovoay/ambilivily/> and MSN Encarta Atlas, the location of the Ambilivily dam was found



Malawi

- 32. Mulunguzi dam. Was found with the Southern African development Community (SADC) database
- 33. Malingunde Dam II. From: <http://www.engineeringnews.co.za/eng/features/stainless/?show=8709>:
"The dam is located on the Lilongwe river about 20 km upstream and south-west of Lilongwe, and just downstream of Kamuzu Dam I."
- 34. Malingunde Dam I. From: Ministry of Water Development. 2004. *Report on the Malawi national consultative meeting on the World Commission on Dams (ECD) report – dams and development: a new framework for decision making*. Kambiri Resort Hotel, Salima, 30–31 July 2004. http://hq.unep.org/dams/files/malawi_report.doc

Mali

35. Traoré, Mamadou. 1980. *Atlas du Mali*. Les atlas Jeune Afrique.

Mauritania

36. Fom Gleita dam. Located with www.multimap.com and the document: FAO. 1984. *New reservoirs in Africa, 1980-2000*. CIFA Occasional Paper 11.
http://www.fao.org/documents/show_cdr.asp?url_file=/DOCREP/005/R0868B/R0868B07.htm



Morocco

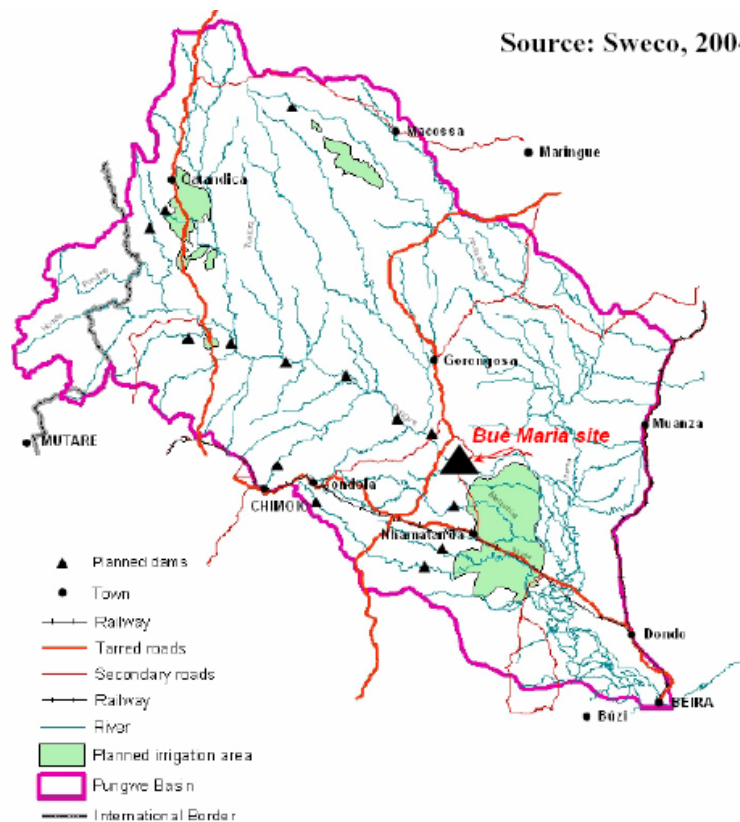
37. World Bank. 1995. *Le secteur de l'eau au Maroc*.
38. Ministère des travaux publics. 1993. *Les petits barrages*.
39. Royaume du Maroc, Conseil supérieur de l'eau (5ème Session). *Aménagement des bassins versants et protection des barrages contre l'envasement*.
40. Royaume du Maroc, Conseil supérieur de l'eau (7ème Session). *Plan intégré d'aménagement des eaux des bassins du Loukkos, du Tangérois et des côtières méditerranéens*.
41. Ministère chargé de l'incitation de l'économie. 1993. *Annuaire statistique du Maroc*.
42. Dhkila, Kasba Tadla, Ouazzane, Safi, Taghdout, Zemrane dams. Location determined with: "L'irrigation au Maroc" (paper map), GEONETWORK: Location: FAO – AGL Morocco/Miscellaneous (AGL Documentation Library) and, ISIS Identifier: 003667; "Carte Piscicole" (paper map) GEONETWORK: Location: FAO – AGL Morocco/Miscellaneous (AGL Documentation Library) ISIS Identifier: 003668

Mozambique

43. Ministry of Construction and Water. 1987. *Explanatory notes to the hydrogeological map of Mozambique scale 1 : 1 000 000*.
44. Mavuzi dam. Located with the GeoNet Names Server spatial dataset in point format.
45. Chimoio dam. From: Zaag, Pieter van der. 2000. *The Pungwe river basin*.
http://webworld.unesco.org/water/wwap/pccp/cd/pdf/educational_tools/course_modules/referen ce_documents/sharinginternwatercases/thepungweriver.pdf. 1 August 2000.



48. Bué Maria dam. From: Zaag, van der Pieter and Bolding, Alex. 2005. *Water governance in the Pungwe river basin: institutional limits to the upscaling of hydraulic infrastructure*. Bonn, 12 October 2005. The map on page 15 shows the site of the Bué Maria dam. http://www.bicc.de/events/open_meeting/presentations/zaag.pdf.



Namibia

- 49. Ministry of Agriculture, Water and Rural development. 1994. Namibia early warning and food information system. Crop and food security bulletin.
- 50. Tilda Viljoen, Bondels, Omatjenne, Otjivero Main, Daan Viljoen, and Olushandja dams. Located with South African Development Community – Surface Water Bodies Database (SADC_SWB.shp) which is a vector point file with almost 100 fields of potential data entry for each point.
- 51. Omarur Delta dam. From: <http://www.lce.com.na/projects.htm#33> Omdel (Lund Consulting Engineers, LCE).

Nigeria

- 52. Federal Ministry of Agriculture, Water Resources and Rural Development. 1993. *The study on the national water resources master plan*. Funded by Japan International Cooperation Agency (JICA).

South Africa

- 53. Department of Water Affairs. 1986. *Management of the water resources of the Republic of South Africa*.
The coordinates given in this publication were not verified, except in the case of four dams for which an obvious error could be observed (three were cancelled and one was corrected).
- 54. Gilbert Eyles, Kleinplaas, Klipplaatdrift, Lindley, Meulspruit, Molopo Oog, Spes Bona, Tuinroete, Vaalbank and Van Niekerk Broer dams. Located with South African Development Community – Surface Water Bodies Database (SADC_SWB.shp) which is a vector point file with almost 100 fields of potential data entry for each point.

Sudan

- 55. Abdalla Abdelsalam Ahmed. 1991. *Sedimentation in Sudan multi-purpose reservoirs*.

Togo

- 56. Nasia and White Volta dams. Location determined with: "Cultivated, uncultivated areas, principal dams & reservoirs, hydroelectric potential of principal rivers" (paper map), Land and Water Resources Survey – Upper and Northern Regions. FAO GEONETWORK: ISIS Identifier: 001858; Related document location: AGL GHA/S-3; Additional info: FAO/SF: 31/GHA Land and Water Resources Survey Upper & Northern Regions, Vol. V: Water Resources Development & Soil Conservation (AGL Documentation Library)

Tunisia

- 57. Ministère de l'agriculture. 1992. *Commission de réflexion sur le développement des ressources en eau de surface – analyse & plan d'action*.
This reference does not give 'reservoir capacity' but 'volume mobilisé' (in Mm³/an). Comparison with other references shows that the two figures are generally very close.



Uganda

58. Uganda third power project and proposed Bujagali hydropower project. Signed on 13 December 2005. Funded by the World Bank.

Zambia

59. The Kariba dam (Dam number 3) is located on the Zambezi river, which forms the border between Zambia and Zimbabwe. In order to be able to sum up all dam capacities in the Excel sheet and have the correct total for all dams in Africa, 94 km³ has been put under capacity of the Kariba dam in Zambia and 94 km³ in Zimbabwe.

Zimbabwe

60. Government of Zimbabwe, Department of the Surveyor-General. 1984. Topographic map scale 1 : 1 000 000.
A few dams have two names: the one given in ref. 2 and the one given in ref. 9.
61. Beitbridge ORS II dam. From: GeoNet Names Server point vector database.
62. Clifton ORS dam. Internet research showed that this dam is in Beitbridge. An approximate location was determined with this.
The Kariba dam (Dam number 46) is located on the Zambezi river, which forms the border between Zambia and Zimbabwe. In order to be able to sum up all dam capacities in the Excel sheet and have the correct total for all dams in Africa, 94 km³ has been put under capacity of the Kariba dam in Zambia and 94 km³ in Zimbabwe.