

UGANDA

OBSERVATIONAL ACTIVITIES

Currently, Uganda is not implementing any activities relating to monitoring the status of the ozone layer and UV radiation – particularly focusing on trends over the years. Nevertheless, this is a matter which Uganda desires to pursue, and initiate activities geared towards monitoring factors that important to both climate and the ozone layer. There is urgent need for equipment and funds to initiate such activities including setting up monitoring stations. Although no actual measurements have been initiated for measuring ground surface ozone, it is believed that some considerable level of ozone emission is high in the urban centres, especially Kampala City, where there is high volume of motor vehicle traffic and traffic jams. Of recent, since the year 2003 Uganda's Customs Authorities (Department) are clearing on average a total of 2,700 (two thousand seven hundred) imported vehicles per month; and out of which a significant proportion of these vehicles are reconditioned vehicles).

In addition, as part of the process of developing Air Quality Standards for Uganda, a number of measurements were carried out for carbon dioxide concentrations in different locations in and around Kampala City. According to the proposed Air Quality Standards for Uganda (currently awaiting approval), *the ambient air standard for ozone gas and carbon dioxide is 0.1ppm and 900ppm, respectively*. The last inventory for sources and sinks of greenhouse gases in Uganda was finalised in 1994, by the Meteorology Department under the then Ministry of Natural Resources. The inventory was sponsored by UNEP/GEF. Since then not much has been done to update the status of GHG emissions in the country, due mainly to lack of funds and equipment/technology.

Column measurements of ozone and other gases / variables relevant to ozone loss (e.g. Dobson, Brewer, DOAS, FT-IR)

Such activities have not yet been carried out in Uganda.

Profile measurements of ozone and other gases/variables relevant to ozone loss (e.g. ozonesondes, ozone lidar)

Due to lack of the appropriate equipment to capture and process ozone layer-related variables transmitted by the satellite in space above Uganda, such measurements have never been carried out consistently at national level.

UV measurements

There is no facility / provision for direct measurement of UV, hence, there are also no UV forecasts carried out in the country. Measurements of sunshine give an indirect indication of radiation exposures.

Calibration Activities

This is the responsibility of the Uganda's National Meteorological Centre at Entebbe. Despite the fact that some equipment was acquired by the Centre, calibrated and test-run during the 2005 period, not further activities have been carried out due to limited financial support to upgrade such activities since 2005.

RESULTS FROM OBSERVATIONS AND ANALYSIS

(e.g., trend analyses, UV doses (annual, monthly etc.), UV maps)

The main sources of CO₂ emissions are land use change and forestry, main sources of NO_x- and CH₄-emissions are agriculture and savanna burning. Relative contribution of anthropogenic gases to the greenhouse effect: CO₂: 75%; CH₄: 13%; and, NO₂: 12%. Uganda participates in the Global Climate Observing System with 30 observation stations (1990: 18 stations). Due to lack of

funds, the stations are not operating at optimum level. There are no observation stations to participate in the Global Ozone Observing System.

THEORY, MODELLING, AND OTHER RESEARCH

(e.g. 3-D CTM modelling, data assimilation, use of satellite data, UV effect studies)

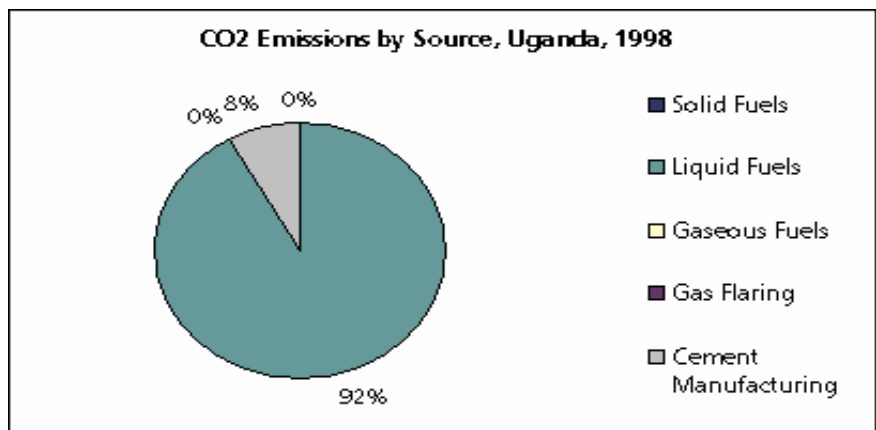
Such activities have not yet been carried out in Uganda.

DISSEMINATION OF RESULTS

Available information/records, indicate that data/information relating to the climate or monitoring of the atmosphere, Uganda has been submitting data to different data centres. Although the list was not compiled during the preparation of this report, there are certain trends which serve the purpose of illustrating the status of efforts in Uganda to protect the atmosphere – regarding climate change and ozone protection.

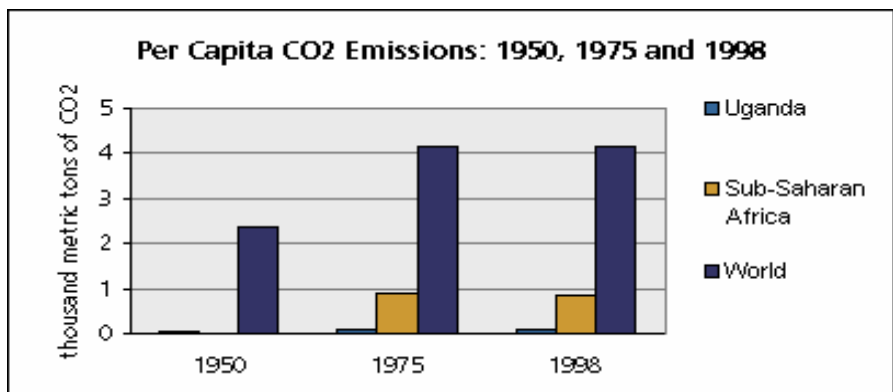
Data reporting (e.g. submission of data to the WOUDC and other data centres)

There are available some historical trends as depicted in the figures below.

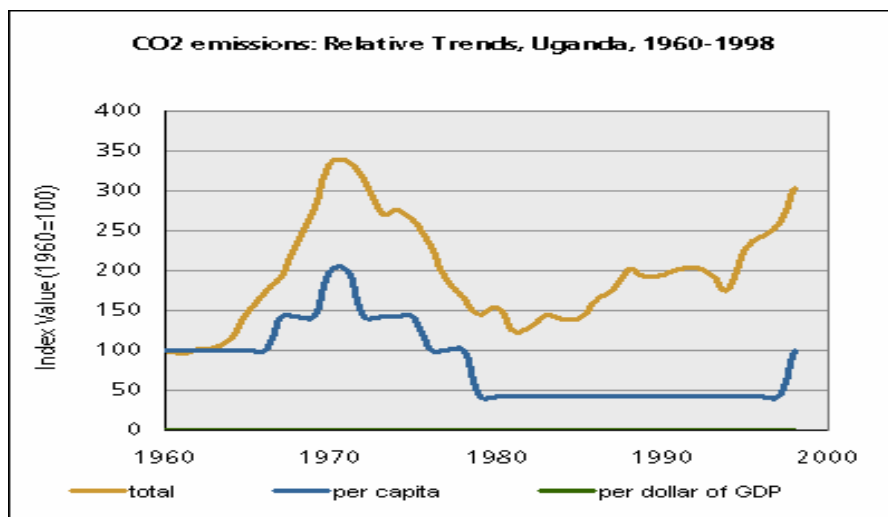


Source: World Resources Institute (WRI) (2006): Climate and Atmosphere, Country Profile – Uganda

In the WRI (2006) Report, it is indicated that by 1998 the percent change in total emission of carbon dioxide since 1990 was at 57%, compared to 10% an 8% for the rest of Africa and the world, respectively. Also the percent change *per capita* of total emissions since 1990 (as recorded in 1998) was at 133%, compared to -12% (minus 12%) and -2% (minus 2%) for the rest of Africa and the world, respectively.



Source: World Resources Institute (WRI) (2006): Climate and Atmosphere, Country Profile – Uganda



Source: World Resources Institute (WRI) (2006): Climate and Atmosphere, Country Profile – Uganda

Other historical data as provide by the Meteorology Department (Kampala, Uganda) in the 1995 status report, during the preparation of Uganda’s profile on green house gas emissions and sinks, is as summarised below in **Tables 1 and 2**.

Table 1: Carbon dioxide and Other Gases Emissions for Uganda

Source	Giga Grams (Kilo Tonnes)
(Fossil) Fuel Combustion	708.51
Biomass Burned for Energy	13,763.00
Industrial Processes	43.56
Land-use Change and Forestry	8,126.67
Total	22,641.84

Table 2: Carbon dioxide and Other Gases Emissions for Uganda

Source	CH ₄ (Gg)	N ₂ O (Gg)	NO _x (Gg)	CO(Gg)	NMVOG(Gg)
(Fossil) Fuel Combustion	0.334	0.607	3.971	27.286	4.996
Biomass Burned for Energy	74.52	4.704	22.81	822.93	-
Industrial Processes	-	-	1173.54	-	0.935
Agriculture	1189.766	40.38	0.319	16867.05	-
Land-use Change / Forestry	1.971	0.14	-	17.243	-
Waste	4.526	-	-	-	-

Information to the public (e.g. UV forecasts)
Such activities have not yet been carried out in Uganda.

Relevant scientific papers

(Not accessed by the time of writing this report – constrained by time factor)

PROJECTS AND COLLABORATION

(e.g. national projects, international projects, other collaboration (nationally, internationally))

Uganda is one of the host countries for the implementation of the Clean Development Mechanism (CDM) Project, under the auspices of the World Bank, geared towards reducing emission of greenhouse gases. Its implementation was initiated in November, 2007, with selection of nine (regional) pilot urban centres – namely: Lira, Soroti, Mbale, Jinja, Kabale, Fort Portal and Mbarara Municipal Councils; and two Town Councils – Mukono and Kasese. Currently, the main activity being undertaken in each of the urban centres is the construction of structures for the Compositing Plant, and related infrastructure like access roads and water/electricity supply systems. The collaborating authorities for this Project are the local urban authorities (Town Councils and Municipal Councils).

Another related on-going venture is the West Nile Hydropower Project bordering the Democratic Republic of Congo and the Sudan. This Project falls within the broader rural electrification and development plans of the Government's Energy for Rural Transformation programme. The Project aims to take advantage of the dual benefits of the CDM – o promote sustainable development in rural Uganda by investing in socio-economic development and poverty alleviation, to reduce carbon dioxide emissions through renewable energy and to generate certified emissions reduction (CER). Hence, such a project reduces carbon dioxide emissions by replacing the inefficient diesel generators with hydropower, and by using reducing the use of kerosene used for lighting purposes. Emission reductions are estimated at 1.8 million tonnes over a period of 20 years (UNEP, 2003).

FUTURE PLANS (e.g. new stations, upcoming projects, instrument development)

Recognising the importance of ozone monitoring and noting that most tropospheric ozone is generated over the tropical atmospheric, Uganda has:

- (a) A deliberate plan to acquire and establish its first upper air ozone monitoring station on either Mount Rwenzori in western part of the country (bordering the Democratic Republic of Congo) or Mount Elgon in the eastern region of the country bordering (Kenya). It is also important to monitor low level ozone generated in urban centres especially in the Kampala City. It is envisaged that Government of Uganda will spearhead these plans with the help of development partners.
- (b) A plan to set up a measurement site for monitoring and forecasting UV radiation; however, the target date has not yet been set.
- (c) Plans to train personnel to enhance professional competence in aspects of monitoring, data processing and research.

NEEDS AND RECOMMENDATIONS

In view of the proposed future plans, Uganda would appreciate support in the following areas:

- (i) Financial assistance for acquisition of ozone and UV monitoring equipment.
- (ii) Technical support for installation of the said equipment in (i) above.
- (iii) Training for technical staff for maintenance, calibration and operation of the said equipment.
- (iv) Support for scientific programmes in ozone and climate change.

References

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