

**Islamic Republic of
Mauritania**

Ministry of the Environment

**Department of Environmental
Assessment and Control**

National Ozone Office



**United Nations Environment Program
(UNEP)**

Twelfth Meeting of the Ozone Research Managers (ORM12)

Geneva, April, 24 to 26, 2024

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March 2024

Content

- **General Introduction** 3
- **Situation of Mauritania** 5
- **Research actions related to the monitoring of the ozone layer** 7
- **Possible projects to be initiated** 8
- **Annex : Review of the National Ozone Office activities** 10

1- General Introduction

Ozone layer is a layer of the Earth's stratosphere that lies between 20 and 50 km above sea level. It is characterized by a proportionally higher concentration of ozone (O_3) than in other layers of the atmosphere, in the order of ten parts per million (ppm). This layer has the particularity of being able to absorb most of the ultraviolet radiation from the sun, that are harmful to life, can alter DNA, thus exercising a protective role for living beings and ecosystems.

This important role of ozone layer has been highlighted since the beginning of the 20th century. In the 1970s, it has been discovered that this ozone layer, so important, is submitted to deterioration in places, which can affect its protective role and it is apparently mainly caused by substances such as chlorofluorocarbons (CFC), in particular dichloro and trichlorofluoromethane. Brominated compounds and certain nitrogen oxides are also thought to contribute to the destruction of ozone.

Since these chemical molecules, introduced by human activities persist for a long time, their action is only neutralized after decades. Indeed, a molecule of CFC takes about 25 years to reach the stratosphere and has a lifespan of between 60 and 100 years...

Thus, CFC concentrations are decreasing very slowly. Even, if they are banned from all use and production. The substances responsible for the loss of stratospheric ozone are halocarbons (combining halogens and carbon). These are synthetic halogenated compounds, non-existent in nature including (chlorine, bromine, iodine and fluorine). They include all families of ozone depleting substances (ODS) such as:

- Chlorofluorocarbons (CFC),
- Hydrochlorofluorocarbons (HCFC),
- Bromofluorocarbons (also known as halons),

Or even more defined molecules, such as :

- methyl chloroform (1,1,1-trichloroethane),
- tetrachloromethane or carbon tetrachloride (CCl_4),
- methyl bromide (CH_3Br),

As well as substances that are alternatives to (ODS) such as hydrofluorocarbons (HFC) and perfluorocarbons (PFC).

It should be noted that CFCs have been developed for their industrial applications, particularly related to refrigeration, for conservation and also as solvents and extinguishing means or for other uses as pesticides, for example, useful in the applications of development.

Later, mankind developed HCFCs, which are less harmful to the ozone layer but have also been shown to have a high warming potential, undesirable under the conditions of climate change, they are also checked out by an international convention on climate change (IPCC).

In the face of this global and extremely serious phenomenon, the industrialized countries have adopted an international treaty, the Montreal Protocol of 1987, which follows on from the Vienna Convention of March 1985. The Montreal Protocol called for a halving of CFC production by the year 2000 ; It entered into force in 1989. However, with the urgency of the problem, it was decided in 1990, with the London Amendment, followed by the Copenhagen Amendment in 1992, the total phase-out of CFC production by the year 2000. Amendments were also agreed in 1995 in Vienna, in 1997 in Montreal and in 1999 in Beijing.

On 16 September 1987, 24 countries signed the Montreal Protocol on substances that deplete the ozone layer (ODS) under the auspices of the United Nations Environment Program (UNEP) with the aim of phasing out the production and use of the most ozone-damaging products. Since 16 September 2009, the Montreal Protocol has been ratified by all 197 members of the UN, making it the only universal treaty.

The protocol gradually banned the production of refrigerants and solvents containing chlorofluorocarbons (CFC), and the manufacture of fire extinguishers containing halons. It has set a clear timetable for the phase-out of other harmful substances such as hydrochlorofluorocarbons (HCFC) and methyl bromide.

In recent years, in connection with efforts to reduce CFCs, there has been some recovery of the ozone layer confirmed in 2018 by a UN report, but the rate of reduction of some CFCs seems to be slowing down, thus justifying the persistence in the application and monitoring of the implementation of restrictive measures on the use of ODS. New results (UN, 2023) also seem to confirm this trend of ozone recovery, with the hope of a reconstitution after 40 years, if efforts remain constant.

2- Situation of Mauritania

The Islamic Republic of Mauritania ratified the Vienna Convention on the protection of ozone layer and acceded to the Montreal Protocol in May 1994. This was followed by the ratification of the London, Copenhagen and Montreal amendments in 2005.

The Beijing Amendment was ratified in 2014; the Kigali Amendment was also accepted in 2016 and its ratification process is ongoing.

At the same time, there is also a constant evolution of legislation and general regulations in Mauritania towards greater environmental preservation.

The Framework Law on the Environment No. 2000-045 of 26 July 2000 remains the main framework and reference text. Article III covers the protection of ozone layer. We also note the introduction of several texts particularly oriented towards harmful products to ozone layer.

In particular, the joint decree R/n°0667 of 4 July 2017 carrying regulating import, marketing and distribution of HCFC & HFC and equipment, apparatus using such substances. This regulatory text is in application of the framework law on the environment and the international conventions applicable to ODS. In particular, the Vienna Convention and the Montreal Protocol. It lays down the conditions for the import, marketing and distribution of these substances, with provisions on the determination of quotas.

At the institutional level, too, considerable adjustments have been put in place since the 2000s. It is noted, in particular, there is the emergence of a dedicated and operational structure responsible for all matters relating to ODS. This structure, which is called the National Ozone Office (NO), is located in the Department of Environmental Assessment and Control within the Ministry of the Environment. The NOB has competence for all activities relating to the management, regulation and control of ODS.

The National Ozone Office was set up in 1999 and continues Mauritania's efforts to implement its commitments to protect the ozone layer to control and eliminate ODS (HCFC, HFC). To this end, it has an action plan and benefits from the collaboration of national entities (Customs, Ministry of Finance, and other Departments).

In 2022, with an estimated consumption of 237 tons of ODS, Mauritania remained classified as a low volume ODS consuming country (LVCC).

The methodology used to collect and validate data on the consumption of HCFCs (as pure chemicals) and HCFC-based chemicals included surveys and interviews with stakeholders (customs, gas and equipment importers, etc.). In particular, efforts to collect data and information on the following were actively pursued:

- Cold rooms in restaurants and hotels;
- Fishing industry, including industrial freezers in processing plants, and refrigerated vessels and/or freezers based in and around Nouadhibou;
- Households, wholesale and retail trade, and refrigerated vehicles;
- Etc.

The strategy to phase out HCFCs, related particularly to the refrigeration sector, aimed to reduce global quantities to 35% by 2020, 67.5% by 2025 and more than 97% by 2030. in accordance with the decisions of the 19th Meeting of the Parties (MOP).

Mauritania is also actively seeking to establish coordination mechanisms and develop synergies with other multilateral environmental agreements, in particular, those related to climate change and chemicals management.

The overall action plan is structured around the following main components :

- Strengthening the policy and regulatory framework
- Establishment of a national strategy for the protection of ozone layer
- Implementation of a training program for customs and other law enforcement officers.
- Training on good practices related to alternatives and capacity building from the Association of Refrigeration Engineers and Technicians
- Reporting and monitoring of MPEH activities.

The approach is to ensure the implementation of national and international legal instruments dealing with ODS management, to propose and implement technical and regulatory measures to reduce and/or eliminate ODS consumption in Mauritania, implement a program of information, training and public awareness of refrigeration technicians, custom officers and undertake the organization of the refrigeration sector in Mauritania, in particular through the control of the import of refrigerants into the national territory in collaboration with the General Direction of Customs (GDC), control and supervision of the marketing and distribution of refrigerant gases on the national market.

This global strategy is mainly implemented through the National Ozone Bureau mentioned above, which is headed by a Coordinator, focal point of the Convention, assisted by a technical unit (Deputy Coordinator, National Consultant, Assistant and an Accountant).

The BNO's actions are geared towards training, supervision and awareness-raising and are aimed at State agents (Customs, Regional Delegations for the Environment), the refrigeration production and technical sectors, civil society. This action is carried out with the support of UNEP /UNDIO (Cf. review of activities in the appendix)

3- Research actions related to the monitoring of the ozone layer

In Mauritania, as in the majority of underdeveloped countries, there is still a deficit in scientific research. It is primarily geared towards the protection and enhancement of local resources. We can note the existence of :

- Some Doctoral Schools and Research Teams within Faculty of Science and Technology of University of Nouakchott,
- A fisheries research center, the Mauritanian Institute for Oceanographic Research and Fisheries (IMROP),

Within the Doctoral School of Chemistry, research work is carried out within the framework of the supervision of doctoral students, often in partnership with foreign universities (France, Morocco, Spain, etc.). A research team is working on the theme of "Water, Pollution, Environment" with students in the course of their thesis. To date, 53 students have been enrolled in the doctoral school, 43 of whom are still in training, and a dozen doctoral theses have already been defended. Laboratories had the means of analysis at their disposal of XRD (X-ray Diffraction) and UV-Visible and Infrared (IR) Spectroscopy.

However, the university has just acquired, with new funding, new analytical equipment, in particular, Atomic Absorption Spectrophotometry, Gas chromatography (GC) and also High-Performance Liquid Chromatography (HPLC).

The research teams lack human and financial resources, but they could be used in partnership with other teams around the world to broaden the spectrum of scientific activity concerning ozone and especially the products that can affect it.

It should also be noted that the National Meteorological Office (NMO) based in Nouakchott has a measuring station for environmental parameters. particularly the concentration of sand

particles (PM 10) and also standard weather parameters (temperatures, pressure, humidity, winds), can also be connected to sensors measuring gases such as (CO₂, SO₂, and possibly ozone as a pollutant and greenhouse gas in the lower troposphere) and which could be used to support activities undertaken in collaboration with the teams of the University of Nouakchott.

In addition, there is a satellite image receiving station at the NMO with specific channels possibly dedicated to monitoring CO₂ and Ozone.

IMROP is mainly based in Nouadhibou. It aims to observe the situation of the fishery resource and the marine environment. It also has laboratories oriented towards the monitoring of species and indicators of the state of the marine environment.

To date, there are no research activities specific to monitoring the ozone layer, but, as explained above, an effort by public authorities to limit the use of ODS, mainly through the National Ozone Office.

4- Possible projects to be initiated

This first participation in the meeting of ozone research managers aims in particular to take a closer look at what is being done, particularly in the sub-region in terms of monitoring the ozone layer and also to exchange more widely with fellow researchers to examine avenues of collaboration and, if possible, identify partnership actions that can be carried out in order to participate in the global effort to protect the ozone layer.

Initially, it is a question of seeing what actions can be taken to strengthen a specialized research unit at the university and support the resources of the National Meteorological Office (NMO)

- Research unit at university

Support for a research unit focused in part on ozone and greenhouse gas issues could be provided through the financing of its own activities, exchanges with similar teams in the sub-region in particular (Morocco, Senegal) or around the world.

A joint project could be discussed at the sub-regional level. This twelfth meeting of ozone research managers could be used, in this context, to identify actions to be undertaken and to mobilize technical and financial partnerships.

- Strengthening of the National Meteorological Office

Support for the National Meteorological Office may be envisaged, in particular, by strengthening its own resources, conducting refresher courses for members of its technical staff, support for the extension of the parameters monitored, identification and support for the financing of joint actions to be carried out with research teams, notably within the University of Nouakchott, exchange of experiences with centers in the sub-region and at the international level.

Annex

Review of the National Ozone Office activities (2017 – 2023)

As part of the implementation of the Vienna Convention on the Protection of the Ozone Layer and the Montreal Protocol, the following activities were carried out :

- Establishment of a permit and quota system for HCFCs;
- Realization of fact-finding missions to ensure the continued elimination of CFCs, eliminated from the national territory in 2009;
- Launch of the partnership with the General Directorate of Customs with the aim of implementing the Country's Ozone Program and the fight against illicit trade in ODS;
- Realization of fact-finding missions to collect data on HCFCs for the development of the HCFC Elimination Management Plan (HPMP) ;
- Organization of a workshop to report the results of the survey on the data collected for the benefit of PGEH with the stakeholders concerned ;
- Proposal of a national strategy to the executive committee of the Montreal Protocol for the phase-out of HCFCs in Mauritania;
- Validation of the HCFC Phase-out Management Plan (HPMP) by the executive committee ;
- Realization of awareness missions for refrigeration stakeholders and professionals on the country's ozone program in the Wilayas of Nouakchott, Tiris Zemour, Dakhlet Nouadhibou and Trarza.
- Quality control missions for refrigerant gases in the Wilayas of Nouakchott ;
- Transmission of Article 7 data from the years 2016 to 2022 to the Ozone Secretariat ;
- Organization of a public awareness campaign in parallel with African Environment Day, International Environment Day and through the media to publicize the mission of the BNO and the benefits of ozone action;
- Realization of data collection missions on the types of ODS existing in the country to update the inventory of HCFCs and HFCs in terms of consumption and existing

equipment (headquarters and workshops of large factories and industrial companies, cold rooms, restaurants, fishing-related businesses, refrigerated fishing boats, etc.).

- Organization of thematic workshops on the training of refrigeration and customs trainers marking the launch of the implementation of the HPMP;
- Assistance to Associations of Refrigeration Engineers and Technicians in the process of authorizing associations with the Ministry of the Interior and Decentralization;
- Strengthening the institutional capacities of associations of refrigeration engineers and technicians in Nouakchott, Nouadhibou and the North (Tiris Zemour, Adrar and Inchiri) ;
- Preparation of the ratification file for the Kigali Amendment;
- Review and analysis of existing legislation ;
- Launch of surveys to re-evaluate the stock of HCFCs on the national territory ;
- Realization of the second mission to raise awareness among refrigeration stakeholders and professionals on the country's ozone program in the regions of Hodh Chargui, Hodh Gharbi, Assaba, Adrar.
- Realization of the third mission to raise awareness among refrigeration stakeholders and professionals on the country's ozone program in the regions of Trarza, Guidimaka, Gorgol.
- Training of DREDDs on the control, surveillance and monitoring of good practices in the cold sector in Mauritania
- Training of 30 refrigeration trainers on good practices in the refrigeration sector in Mauritania
- Realization of the Fourth mission to raise awareness among refrigeration stakeholders and professionals on the country's ozone program in the Tagant, Brakna and Inchiri regions.
- Quality control missions for refrigerant gases in the Dakhlet Nouadhibou region
- Mission to identify and raise awareness of ODS importers in Nouadhibou and Nouakchott;

- Launch of a data collection mission on HCFC R-22 in Nouakchott, Nouadhibou, Trarza and Inchiri (August 2023);
- Survey to re-evaluate existing HCFC R-22 stocks on the national territory;
- Training for 85 customs and DREDD agents on regulatory requirements relating to the control of HCFCs, good practices in the refrigeration sector in Mauritania, the identification of ODS and equipment containing ODS.
- Training of 300 refrigeration engineers on good practices in the refrigeration sector