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CASE STUDIES KENYA & TUNISIA 2022

GENDER DIMENSIONS OF CHEMICALS AND WASTE POLICIES IN RELATION TO BRS CONVENTIONS

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Abbreviations

Abbreviations general

AEEFG – L'Association de l'Éducation Environnementale pour les Futures Générations (Tunisian non-profit association providing youth and children with effective environmental education), Tunisia
AFFF – Fluoro protein foam and aqueous firefighting Foam (Significant source of PFOS in the Kenyan environment)
ANGed – Tunisian National Waste Management Agency
Barbechas – The name for informal waste collectors in Tunisia
BRS Conventions – Basel, Rotterdam, and Stockholm Conventions
CEDAW – Convention on Elimination of All Forms of Discrimination Against Women
CEJAD Kenya – Centre for Environmental Justice and Development (a public interest non-governmental organization)
CFSK – Computers for Schools Kenya, a charitable non-governmental organization
CJGEA – Centre for Justice, Governance, and Environmental Action
CleanFarms – Project to manage obsolete pesticide stocks in Kenya
Collectun D3E Recyclage - Tunisian company recycling electronic waste in an environmentally responsible manner
COPs – The meetings of the Conferences of the Parties, in this case to the Basel, Rotterdam, and Stockholm Conventions
Dandora – Waste dump located in Nairobi
Dirty Dozen – A group of 12 highly persistent and toxic chemicals regulated under the Stockholm Convention
Dudutech – An environmentally intelligent farming company based in Kenya
E-waste – Electronic waste
ECO-LEF – Public system for the recovery and management of packaging bags and used packaging in Tunisia, Tunisia's system of managing and packaging waste
EEE – Electric and Electronic Equipment
Eichhornia crassipes – Water hyacinth, for Kenya considered as an invasive species
FAO – Food and Agriculture Organization of the United Nations
Flexi-Biogas – Social enterprise in Kenya producing biogas
GPA – Global Plan of Action
Green Stem – Kenyan start-up company with investments in a production line using agricultural waste
HCW – Health care waste
HHPs – Highly Hazardous Pesticides
HS Code – Harmonized Commodity Description and Coding System
ICCM4 – The fourth International Conference on Chemicals Management
ILO – International Labour Organisation
IPEN – International Pollutants Elimination Network
KNH – Kenyatta National Hospital
MENA region – Middle East and North Africa

MoEF – Ministry of Environment and Forestry, Kenya
MOH Tunisia – Ministry of Public Health
NEMA – The Kenyan environmental authority
PCPB - The Pest Control Products Board, Kenya
REACH - Registration, Evaluation, Authorisation and Restriction of Chemicals, EU
Sinya Roses – Flower farms that are cooperating with worker's rights and women's rights organisations to improve gender equality and women's empowerment in their companies
SMEs – Small and medium enterprises
Table d'hôtes - Bed and Breakfast type of accommodation provision in Tunisia
Taka-Taka Solutions – Private waste company based in Kenya
Takelsa - Female Farmers' organisation for Development based in Tunisia
TEQ – Toxicity equivalent quantity, gives an approximation of toxicity of the mixture measured as TCDD, a conversion which allows to sum-up all dioxin-like congeners.
ULAB – Used Lead-acid Batteries
UN – United Nations
UNEP – United Nations Environment Programme
UTSS – Tunisian Union of Social Solidarity
WECF International – Women Engage for a Common Future, Netherlands
WEE Nairobi – Women Economic Empowerment Hub
WEP – Women Environmental Programme, Tunisia
WHO – World Health Organization
WRW – Workers' Rights Watch, Kenya

Chemical abbreviations

BFRs – Brominated flame retardants
DDT – Dichlorodiphenyltrichloroethane – highly persistent toxic chemical
Dioxins – Unintentionally produced POPs
DL- Dioxin like
Endosulfan sulfate - Pesticide / insecticide
Furans – Unintentionally produced POPs
GenX – PFAS chemical
HBCD - Listed under the Stockholm Convention and regulated to a certain level to be phased out.
HBCD – Hexabromocyclododecane
HCB – An organochlorine compound, detected in >95% of the study objects in Tunisia
HCB – Hexachlorobenzene, an UPOP
OC – Organochlorine
OCDD - Octachlorodibenzodioxin
OCDF – Octachlorodibenzofuran
OCP – Organochlorine pesticides
OCPs – Organochlorine pesticides
OCs – Organochlorine compounds
p,p'-DDE - An organochlorine compound, detected in >95% of the study objects in Tunisia

PBDE – Listed under the Stockholm Convention and regulated to a certain level to be phased out.
PCB - Polychlorinated biphenyls, an UPOP
PCB-138, PCB-153, PCB-180 - Organochlorine compounds, detected in >95% of the study objects in Tunisia
PCBs – Polychlorinated biphenyls
PcCB – Pentachlorobenzene, an UPOP
PCCD/Fs – Dioxins and furans
PCDD – Dioxins
PCDD/PCDF - Polychlorinated dibenzo-p-dioxins and dibenzofurans, UPOPs
PCDF – Furans
Pentachlobenzene – Unintentionally produced POPs
PFOA - Perfluorooctanoic acid, listed in the Stockholm Convention for global restriction and elimination
POPs – Persistent Organic Pollutants
TBBPA - Tetrabromobisphenol-A
UPOPs – Unintentional POPs
α- endosulfan - Pesticide / insecticide
α-HCH - Pesticide / insecticide
β- endosulfan - Pesticide / insecticide
β-HCH – Pesticide / insecticide
β-HCH (lindane) - Pesticide / insecticide
γ-HCH (lindane) - Pesticide / insecticide
BFRs – Brominated flame retardants

Introduction

Objectives

The scoping study "Gender, Chemicals and Waste" was carried out in Kenya and Tunisia between January and June 2022 on behalf of the BRS conventions secretariat. The scoping study aim was to identify the gender dimensions of the Basel, Rotterdam and Stockholm (BRS) Conventions as well as the Minamata Convention.

The scoping study sought to answer three key questions:

- How is women and men's health impacted differently by hazardous chemicals and waste?
- How do women and men's occupations and roles at home and at work influence their exposure to hazardous chemicals and waste?
- What best practices with women and men's leadership exist to substitute and eliminate hazardous chemicals and waste?

Fig.1: Images from the study visit in Kenya

Methodology

The scoping study was carried out by the independent organisations Women Engage for a Common Future (WECF) International, Centre Environmental Justice and Development (CEJAD), Kenya and L'Association de l'Éducation Environnementale pour les Futures Générations (AEEFG), Tunisia with the support of experts from NEXUS-3 foundation.

The scoping study is based on extensive **desk research**, complemented with focus sessions and **multistakeholder consultations** and **in-depth interviews** in the field.

In addition to the written **report**, presented in this publication, a **video-documentary** was made which is available online see: https://www.wecf.org/brs-gender-and-chemicals/

During the field visits in Kenya and Tunisia, leading scientists were visited and interviewed, as well as local and national authorities responsible for chemicals and waste, and UN representatives working in the country. Interview questions were prepared based on the desk research carried out in advance of the scoping visit by WECF and experts. For the list of interviewed experts, see the annex.

Multistakeholder dialogue meetings were organized in Nairobi and Tunis with key experts and stakeholders from national and local governmental institutions, agencies, science and representatives of women and environmental organisations. Participants shared the latest research and developments in the area of chemicals, waste and the implementation of the Basel, Rotterdam and Stockholm (BRS) and Minamata Conventions.

The field visits and interviews allowed to **identify the gender dimensions** of chemical and waste hotspots, as well as **good practices** in the area of waste separation, reuse, recycling of organic, plastic and e-waste, as well as reduction of pesticides and use of alternatives to pesticides and production of fuel and fibres from agricultural waste.

This **publication** presents the results and analysis of the scoping study. It is divided into five sections. Chapter 1 describes the gender equality situation, chapter 2 describes the issues of concern with regard to the BRS and Minamata conventions, chapter 3 presents a number of good practices identified and chapter 6 presents conclusions and recommendations.

Fig. 2. Scoping study visits to training centres and Ambassies in Tunisia and Kenya 2022

Fig. 3. Scoping study visit to the Mayor of Tunis, 2022

Fig. 4. Stakeholder meeting with government, private sector and civil society, 2022

CHAPTER 1
GENDER EQUALITY

Photo: S. Gabizon, Fisher woman Kenya 2022

CHAPTER 1

Gender Equality

Gender equality and women's rights in Kenya

Kenya has a population of almost 48 million people (2019) and is the third largest economy in sub-Saharan Africa.

In 2010, Kenya obtained a new Constitution which has the principles of equality and non-discrimination as its core values. It recognized human dignity and economic-, social- and cultural rights, including the right to education and housing and the right to health encompassing reproductive health care [1]. The national values and principles of governance include equity, social justice, inclusiveness, gender equality, human rights, non-discrimination, and protection of marginalized groups among others.[1]

Fig. 5. map of Kenya

The Kenyan Constitution recognises that every person is equal before the law and has the right to equal protection and benefit of the law. Women and men have the right to equal treatment, including the right to equal opportunities in the political, economic, cultural, and social spheres. The Kenyan parliament has passed enabling legislative frameworks to implement the Constitution, including National Gender and Equality Act 2011.[2] Kenyan women are now able to pass along their citizenship to their children born outside of Kenya. The Convention on Elimination of All Forms of Discrimination Against Women (CEDAW)[3] and the Protocol to the African Charter on Human and People's Rights and the Rights of Women in Africa[4] are key treaties promoting women's rights. Kenya has ratified both.

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[1] **See the constitution of Kenya on citizenship available at http://www.kenyalaw.org/lex/actview.xql?actid=Const2010**
[2] **See the National Gender and Equality Commission Act, 2011 available at https://constitutionnet.org/sites/default/files/the_national_gender_and_equality_act_2011_1.pdf**
[3] **CEDAW. Available at https://www.unwomen.org/en/digital-library/publications/2016/12/cedaw-for-youth#:~:text=The%20Convention%20on%20the%20Elimination,women's%20and%20girls'%20equal%20rights.**
[4] **The Protocol to the African Charter on Human and People's Rights of the Right of Women in Africa available at https://au.int/sites/default/files/treaties/37077-treaty-charter_on_rights_of_women_in_africa.pdf**

The State is expected to take legislative and other measures, including affirmative action programmes and policies designed to redress any disadvantage suffered by individuals or groups because of past discrimination. The provision also states that no more than two-thirds of the members of elective bodies shall be of the same gender. As a result of the decentralization of power, 47 County Governments were created. This has brought many women into the public leadership space at the local governance levels. The aim is to have 50:50 gender representation.

To further support gender mainstreaming, the Kenyan government issued in 2019, the National Policy on Gender and Development. The goal of the policy is to "achieve gender equality and women's empowerment in national development so as to enhance participation of women and men, boys and girls, vulnerable and marginalized groups for the attainment of sustainable development".

Gender equality and women's rights in Tunisia

Tunisia has a population of 11 million people (2021) most of whom live in the coastal areas as 40% of the country's territory is Sahara desert.

The state has experienced significant changes since the Arab Spring in 2010."Tunisia's democratic transition testifies its resilience and determination in the face of endemic structural challenges and regional conflicts."[5] The country's progress in areas such as human and political rights as well as governance have been remarkable. For example, advancing gender equality was strengthened through Tunisia's new 2014 Constitution.[6]

Fig. 6. map of Tunisia

The Government of Tunisia highlights four main areas for advancing gender equality and women's empowerment:

1. Women's equal political leadership and participation;
2. Women's economic empowerment and autonomy;
3. Women and girls' equal engagement in and contribution to resilience, peacebuilding and prevention of crises;

[5]UN Women. Available at https://arabstates.unwomen.org/en/countries/tunisia
[6]UN Women. Available at https://arabstates.unwomen.org/en/countries/tunisia

4. Strengthening Tunisia's policies, standards and gender-responsive budgeting to empower women and reduce inequalities between women and men is in line with Tunisia's international commitments to gender equality and women's empowerment.

The democratic process in Tunisia has been significant. Nevertheless, possible risks stopping the state from achieving Agenda 2030 or the SDGs remain. The transition process including the implementation of legislation and gender-equality initiatives has proven to be challenging. Such challenges include e.g., regional conflicts, marginalization of women and other vulnerable groups, and growing exclusion. [7]

The Global Gender Gap Report by the World Economic Forum provides the means to measure gender equality. In 2022, Tunisia ranked 120 of the 153 countries measured.[8] The United Nations Development Programme places Tunisia on spot 95 within its Gender Inequality Index.[9] The UN is actively cooperating with government and stakeholders to advance gender equality in Tunisia. Since 2009, UN Women has developed strong partnerships with the Tunisian Government. The leading partner of UN Women in Tunisia is the Ministry of Women, Family and Seniors, civil society, development partners, UN agencies, academia and the wider public.

In 2020, Tunisia became one of the Global Leaders of the Generation Equality Action Coalitions[10] to accelerate gender equality. As convenor of this global forum, UN Women is committed to supporting Tunisia on its path towards gender equality and women's rights.

COVID-19 has disproportionately affected women and resulted in alarmingly higher domestic and gender-based violence levels. During the 16 Days of Activism in 2020, organised by UN WOMEN, young Tunisians from across the country participated in a 72-hours coding competition to develop innovative solutions to respond to violence against women.

[7] **op. cit.**
[8] **World Economic Forum. Available at https://www3.weforum.org/docs/WEF_GGGR_2022.pdf**
[9] **UN Women. Available at https://arabstates.unwomen.org/en/countries/tunisia**
[10] **https://www.unwomen.org/en/news/stories/2020/6/announcer-global-leaders-of-the-generation-equality-action-coalitions-to-accelerate-gender-equality**

CHAPTER 2
CHEMICALS AND WASTE

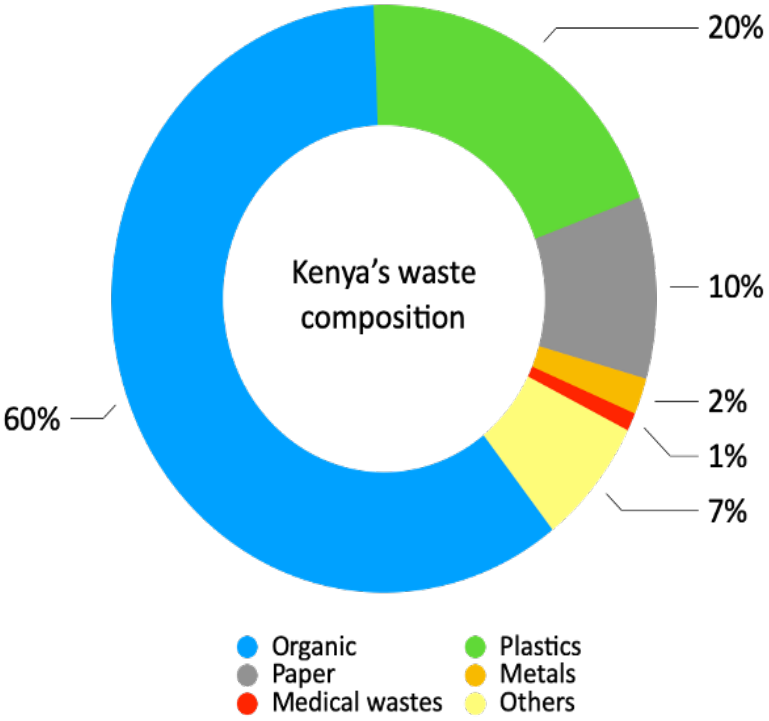
Photo: S. Gabizon, selfie with waste pickers Dandora, Kenya 2022

CHAPTER 2

Chemicals and Waste Regulatory and Institutional Framework

Kenya

Kenya, with a population of 45 million (2019), generates approximately 22,000 tons of waste per day with an average of 0.5 kg per capita. In total, Kenya's annual waste generation is 8 million tonnes per year[11]. Out of this total, some 5.5 million tonnes of waste per year are generated in urban areas, of which about 60% is organic waste.



Article 42 of Kenya's constitution (2010) states the right for all to live in a clean and healthy environment. Kenya's vision 2030 recognized that efficient and sustainable waste management systems are required as the country develops into a newly industrialized state by 2030. Kenya aims

[11] Material Flow Analysis and Resource Recovery Potential Analysis of Selected Fruit, Vegetable and Nut Waste in Kenya, 30 March 2022 https://link.springer.com/article/10.1007/s12649-022-01751-8

to half all environment-related diseases by ensuring a clean, secure, and sustainable environment. In 2017, Kenya adopted its Zero Waste strategy that includes the ban of single-use plastics,[12] and promotes a circular economy through the '7-R' principles: reducing, rethinking, refusing, recycling, reusing, repairing, and refilling.

The National Waste Management Policy aims to increase the value extraction from waste and thus consider waste as a resource to the Kenyan economy. It states that properly managed waste is a resource, and that waste recovery and recycling can create new jobs and attract new investments. It intends to transition the waste sector away from low collection rates and illegal dumping towards affordable collection, recycling, and composting. The remaining, minimize waste fractions, should be disposed of in well-engineered and regulated landfills.

According to this National Waste Management Policy, the government will establish legal frameworks and take actions that will enable Kenya to incentivize significant investments in Kenya's waste recovery and recycling industry.

The waste sector in Kenya's National Climate Change Action Plan 2018-2022 highlights the importance of:

- the development of a "National waste management policy to substantially reduce waste generation through prevention, reduction, recycling and reuse"; and
- the development of a "Five County-based waste management plans and regulations that are consistent with National Waste Management Strategy and other relevant policies."

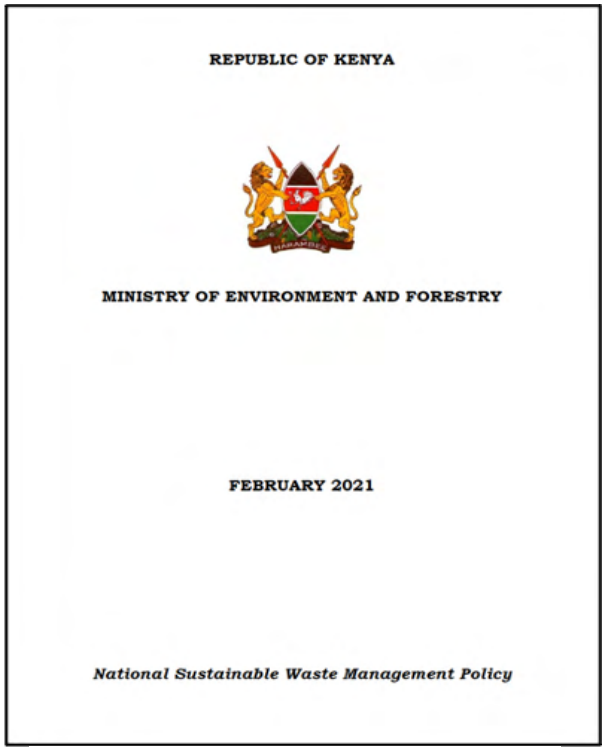


Fig. 8. The National Sustainable Waste Management Policy stipulated Kenya's comprehensive waste management. Source: MoEF, 2021

Documents currently under development or approval related to waste management in Kenya are:

- E-waste management regulations;

[12] **See:** http://www.environment.go.ke/wp-content/uploads/2021/04/FINAL-National-Waste-Policy-Feb-20211.pdf

- Asbestos handling and disposal guidelines;
- Regulations on used oil, waste tires and plastic wastes, and;
- End of life tire regulation.

A recent study shows that the total consumption of plastic packaging in Kenya, resulting in plastic packaging wastes, is estimated to be around 260 thousand tonnes annually. About 18% is estimated to be collected for recycling, and only around 15% (38,000 tonnes) are actually being recycled or down-cycled [4]. Surveys of waste recyclers and waste pickers during the scoping study, seemed to indicate a higher level of plastic waste recovery of approximately 59,000 tonnes per year. In the plastic waste stream, HDPE, the most common form of plastic, makes up about 30% of the total, followed by LDPE with 22% and PP 19%. Figure 9 shows the flow diagram of plastic packaging waste in Kenya.

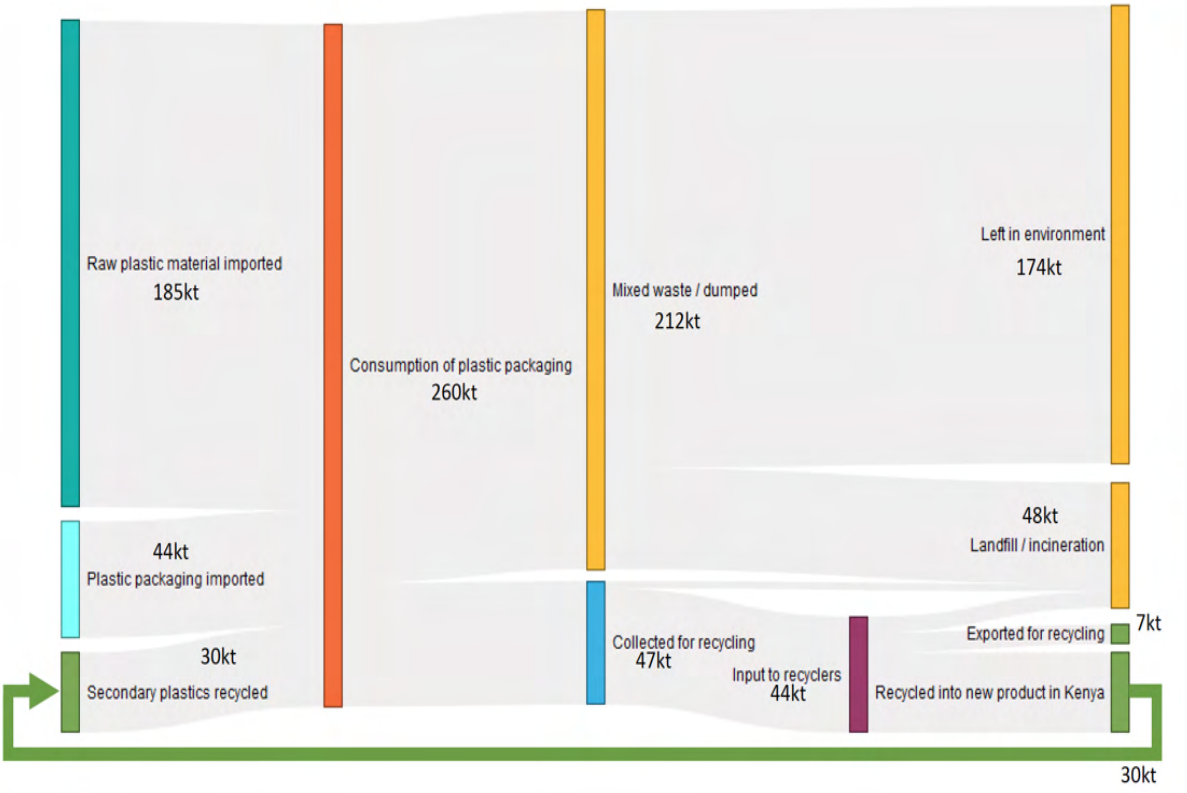


Fig. 9. Flow diagram of plastic packaging waste in Kenya.
Source: Tim Elliot et al. (2018)

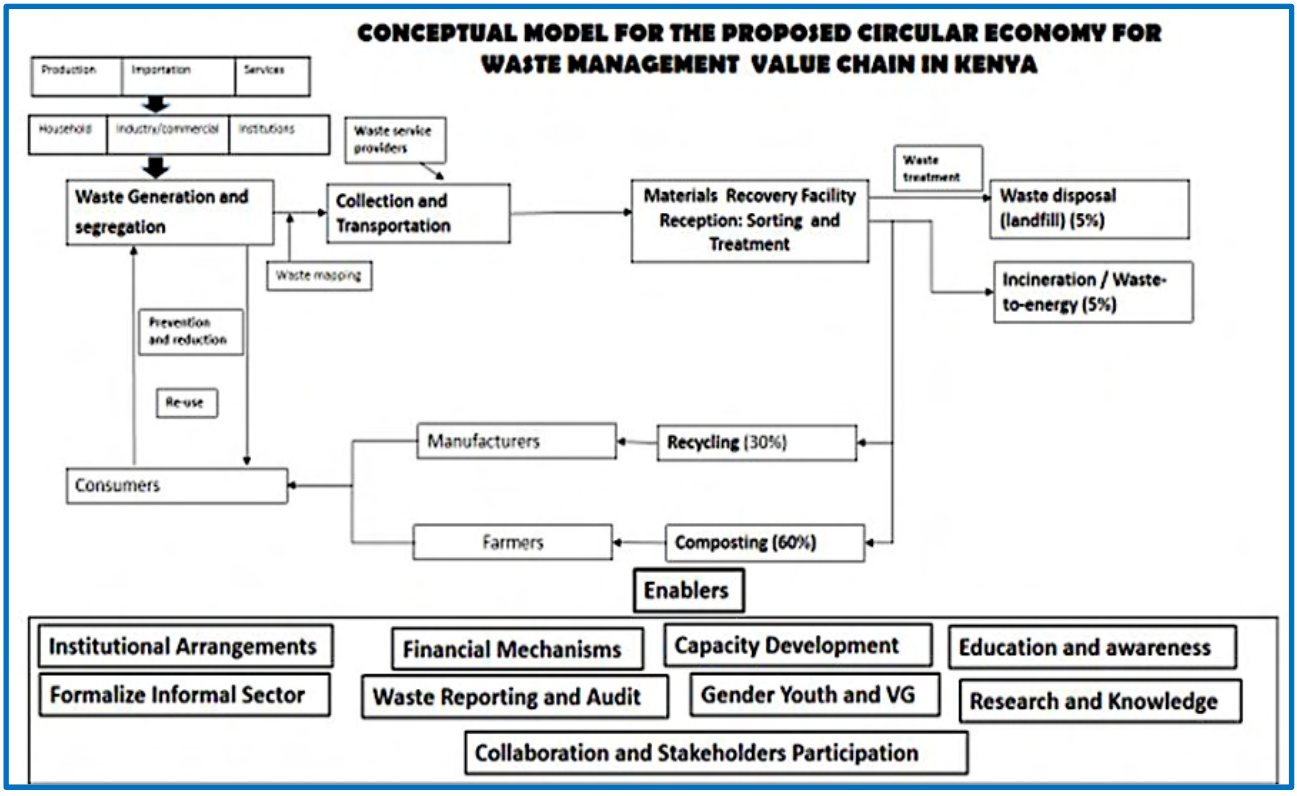


Fig. 10. Diagram of waste hierarchies the order of management preferences for waste management which considers the prevention of its generation as the first alternative. Source: National Sustainable Waste Management Policy, 2021

Tunisia

Tunisia, with a population of 11 million people, generates 2,6 million tons of waste per year, averaging 4,2 tons per person per year, of which 63% is organic waste, followed by plastics (9.4%).

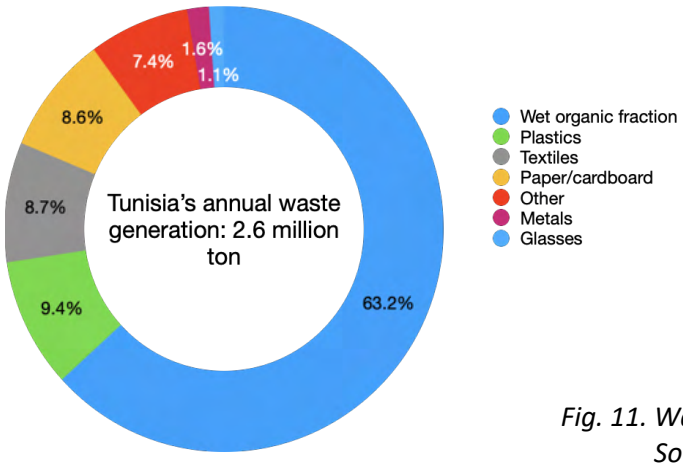


Fig. 11. Waste generation in Tunisia. Source: ANGeD 2022

Tunisia's Constitution of 2014 includes an article about the state's duty to guarantee a healthy environment and to provide the means to eradicate pollution has been included.[13]

The constitution is transposed into national waste management regulations[14]:

- The Municipal Organic Law No. 95-68
- The Waste Framework Law No. 96-41 relates to waste and the control of its management and disposal.
- Decree No. 97-1102 sets the conditions and procedures for the recovery and management of packaging bags and used packaging. A public system for the recovery and recovery of used packaging called ECO-LEF has been in place since March 1998. This system regulates packaging bags, plastic, and metal packaging. ECO-LEF relies on the co-responsibility of manufacturers and distributors for the recovery and recovery of their used products;
- Decree No. 23-39 of October 10, 2000, established the list of hazardous waste;
- Decree No. 693-2002 of April 1, 2002, set the terms and conditions for the recovery of used lubricating oils and used oil filters and their management;
- Decree No. 3395-2005 of December 26, 2005, set the terms and conditions for the collection of used accumulators and batteries.

The decree of 13/03/1991 related to environmental impact studies is one of the few applying a preventive approach.[15] Specific decrees exist that set modalities of management of different waste streams like medical waste, biosolids produced in treatment plants, slaughterhouses waste, organic waste, hospital waste and other hazardous waste. Implementation of the decrees is a challenge. Numerous hospitals are not sorting and treating their hazardous medical waste. Studies show that hazardous waste ends up in regular municipal waste sites or uncontrolled landfills.

The implementing body for waste policies is the National Waste Management Agency or 'Agence Nationale de Gestion des Déchets' (ANGed), which is a public institution created in 2005. ANGed has legal status and financial autonomy, under the supervision of the Ministry of Local Affairs and the Environment. One of the tasks of ANGeD is to rehabilitate illegal landfills and create controlled landfills.

Currently, about 4-7% of Tunisia's waste is recycled. The recycling sector is driven almost exclusively by informal waste collectors known as barbechas.[16] They go through trash containers and landfills

[13] https://www.csis.org/analysis/decentralized-waste-management-mena-countries-lessons-tunisia
[14] https://www.wtert.net/org/72/ANGed-Agence-Nationale-de-Gestion-des-Dchets.html
[15] **Décret relatif aux études d'impact sur l'environnement**, Tunisie, http://www.citet.nat.tn/Portail/doc/SYRACUSE/40782/decret-n-91-362-du-13-mars-1991-decret-n-91-362-du-13-mars-1991-relatif-aux-etudes-d-impact-sur-l-en?_lg=fr-FR
[16] **Malak Altaeb. 31 March 2021. Middle East Institute @75 available at** https://www.mei.edu/publications/solving-tunisias-growing-waste-management-problem

and remove recyclable items without having any official legal status enabling them to do so. The country lacks a system that allows the barbechas to use their skills in collaboration with municipalities, in order to handle waste from collection to sorting and processing methods. It is still to be determined how many informal collectors make a living from waste collection.

Tunisia has the first system of managing packaging waste in the MENA region. The system called 'ECO-LEF' is a public-private partnership to collect, sort, and resell plastic waste to recyclers. The system is primarily funded by a 5 per cent “eco-tax” on imports of raw materials and packaging made of certain materials, including plastic. The government has developed a “polluter pays” scheme for industrial waste, but the system is unevenly enforced.

As garbage piles up in the streets and in tourist destination areas, Tunisians are increasingly concerned about the country’s waste pollution problems. The Ministry of Local Affairs and the Environment of Tunisia has developed an integrated strategy of solid waste management for 2020 to 2035. Tunisia aims to increase by 40 per cent waste for energy recovery and to reduce landfilling of municipal solid waste by 60 per cent.[17] The strategy includes several specific targets in terms of waste prevention and management: reduce the amount of household and similar waste produced per inhabitant by 10 per cent, increase the material recycling rate of household and similar waste to 20 per cent. To achieve these national objectives, the strategy requires local authorities to strengthen their municipal waste management plans and cooperate with other actors.

Fig 12. Chemical pollution and the Borj Chakir landfill near Tunis (source: AEEFG)

[17] https://www.csis.org/analysis/decentralized-waste-management-mena-countries-lessons-tunisia

CHAPTER 3
ISSUES OF CONCERN

Photo: S. Gabizon, civil society at UN Environment, Kenya 2022

CHAPTER 3

Issues of Concern

3.1. POPs in Agriculture

POPs (Persistent Organic Pollutants) are a set of toxic chemicals that are persistent in the environment and able to last for several years before breaking down (UNEP/GPA 2006a).[18] POPs accumulate in the food chain, so that animals that are at the top of the food chain including fish, predatory birds, mammals, as well as humans, tend to have the greatest concentrations of these chemicals as body-burden, and are at the highest risk from acute and chronic toxic effects.

The first groups of POPs listed in 1995 in the Stockholm Convention were known as the 'Dirty Dozen'. This group of 12 highly persistent and toxic chemicals include aldrin, chlordane, DDT, dieldrin, endrin, heptachlor, hexachlorobenzene, mirex, polychlorinated biphenyls, polychlorinated dibenzo-p-dioxins, polychlorinated dibenzofurans, and toxaphene. Many of these are pesticides which are no longer used for agricultural purposes, but a few continue to be used in global South countries.

Experts confirmed that there is a strong association between occupational exposure to pesticides and the development of acute as well as chronic diseases [6-8]. Epidemiological surveys have demonstrated that these toxic compounds in pesticides and herbicides can interact and exert negative effects not only on their targets but also on the environment and humans, including children. This is particularly relevant in the case of workers involved in the production, transportation, preparation, and application of these toxicants.

According to Gangemi et al., there is evidence proving a correlation between pathologies such as neurological diseases or eczema and workplace exposure to pesticides [9]. The exposure can be lessened or prevented through the use of personal protective equipment and should be considered a necessity.[19]

[18] https://www.unep.org/cep/persistent-organic-pollutants-pops-and pesticides#:~:text=POPs%20are%20a%20set%20of,(UNEP%2FGPA%202006a).

[19] **S. Gangemi et al.,** Occupational exposure to pesticides as a possible risk factor for the development of chronic diseases in humans (2016) Molecular Medicine Reports, Available at https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5101964/

In Tunisia

POPs used in agriculture are a concern for public health and environment in Tunisia. Little information is available about the gender dimensions of POPs use and pollution from agriculture.

A study by Ben Hassine et al. (2014) looked at human serum samples (n = 113) from Bizerte, Northern Tunisia (2011 and 2012) and analysed eight organochlorine pesticides (OCPs) and 12 polychlorinated biphenyls (PCBs) congeners. The most abundant organochlorine compounds (OCs) detected in >95 % of the study subjects were HCB, p,p'-DDE, PCB-138, PCB-153, and PCB-180 [11].

The study found the mean levels of p,p'-DDE and HCB in serum were **168.8 and 49.1 ngg−1 lipid**, respectively. The sum PCBs concentrations ranged from **37.5 to 284.6 ngg−1 lipid** in the samples, with the mean and median values of **136.1 and 123.2 ngg−1 lipid**, respectively.

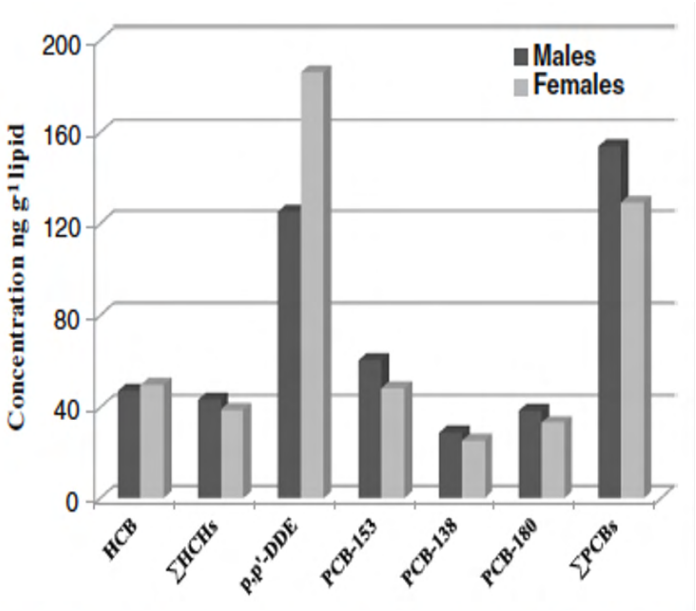


Fig. 13. Gender comparison of means concentrations of OCs in human serum samples from Bizerte, Northern Tunisia

About 82.7% of all serum consisted of persistent PCBs and most organochlorine (OCs) correlated significantly with age. The study shows that the levels of p,p'-DDE and ∑DDTs were significantly **higher in females than in males.** However, PCB levels were significantly **higher in males (p < 0.05) than in females**. The differences might be related to gendered division of labour and exposures at work and at work.

Box: Tunisia – use of HHPs and increase in cancers

Tunisia is ranked 13th in the world in terms of cultivable area compared to the country's total area and ranks top among world olive oil exporters with a market share of 6% of the world production. It is the leading producer and exporter of olive oil in the southern Mediterranean and the second worldwide, after the European Union.

Agriculture ranks high in the Tunisian economy; it occupies an important place in the national economic development strategy. The agricultural sector contributes significantly, accounting for 11% of the country's GDP and 25% of employment of the active population. In addition, agricultural products represent around 8% of the country's export earnings.

In 2015, the fourth International Conference on Chemicals Management (ICCM4) adopted a resolution that recognized Highly Hazardous Pesticides (HHPs) as an issue of concern. The resolution called for concerted action to address HHPs, with emphasis on promoting agro-ecologically based alternatives and strengthening national regulatory capacity to conduct a risk assessment and enhance risk management. Stakeholders were encouraged to align efforts and abide by the guidelines and the definition of HHPs in the Code of Conduct.

The World Health Organization, Pesticide Action Network, U.S. Environmental Protection Agency, and International Agency for Research on Cancer created HHPs references. In addition, a Tunisian study (published in January 2018) on the effects on pre-pubertal mice of exposure to malathion demonstrates significant distortion of liver and kidney biochemistry and function in the animals.

A relevant study (2019) denounced the use of pesticides banned in Europe and still used in Tunisia, such as imidacloprid.

Fig. 14. An average farmer in Tunisia uses no fewer than five different pesticides on tomatoes often without knowledge about toxicity and environmental impacts. Photo Inkyfada

Box: Tunisia – use of HHPs and increase in cancers (cont.)

Research by Hortense Lac (2020), 'Pesticides in Tunisia, The Poisoned Gift,' revealed that nationally, pesticides are the second leading cause of poisoning after medicines. It also indicates the dire conditions of pesticide use and that farmers are conscious of pesticides' impacts on their health, as they live with health problems.

According to experts from the World Health Organization (WHO) and public health experts, the use of HHPs may partly explain the increase in cancer diseases observed in Tunisia [12-14].

In Kenya

Agriculture accounts for about 24% of Kenya's GDP, with an estimated 75% of the population working in the sector either directly or indirectly. As an agricultural economy that mainly promotes conventional agriculture, Kenya's demand for pesticides is relatively high and steadily increasing. The increased use of pesticides requires safeguards to control how they are applied, however enforcing safety measures is challenging in Kenya.

The Pest Control Products Board (PCPB) data shows that 247 active ingredients are registered in 699 products for horticultural use. It is concerning that there are products on the Kenyan market, which are classified as carcinogenic (24 products), mutagenic (24), endocrine disrupter (35), neurotoxic (140) and many which show clear effects on reproduction (262) [15].

Box: Kenya – health impacts of pesticides

A retrospective study of poisoned patients admitted at Kenyatta National Hospital (KNH) over the period between January 2002 and June 2003 was carried out by Nyamu et al. (2012)[16].

The two most important poisoning agents identified in the hospital were:

- **Pesticides** accounted for 43% of poisonings. Organophosphates 57.4% and rodenticides 31% were the most common among pesticide poisoning.
- **Household and industrial chemicals** accounted for 24% of poisonings

Box: Kenya – health impacts of pesticides (cont.)

The study showed that self-poisoning was prevalent in the age bracket 21-30 years (70.7%) and particularly high in males. Accidental poisoning was prevalent amongst children in the age group 0-5 years (83.9%). The overall mortality rate from poisoning was 7.0%.

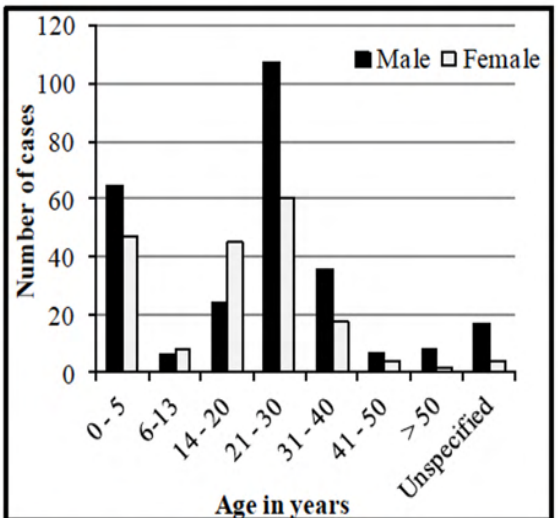


Fig. 15. Distribution of poisoning cases by age and sex in Kenyatta National Hospital, Nairobi. Source: Nyamu et al.

Another study by Aucha et al. (2017), collecting and analysing air and soil samples from four sites for selected organochlorine pesticides (OCP), using gas chromatography equipped with an electron capture detector, confirmed the use of GC/MS. The targeted pesticides / insecticides were α-HCH, β-HCH, γ-HCH (lindane), α- endosulfan, β- endosulfan and Endosulfan sulfate from four different sites, on Mount Kenya (to show migration of POPs), Kabete (residential area outside Nairobi), Dandora (Nairobi waste dump) and industrial areas (Nairobi).

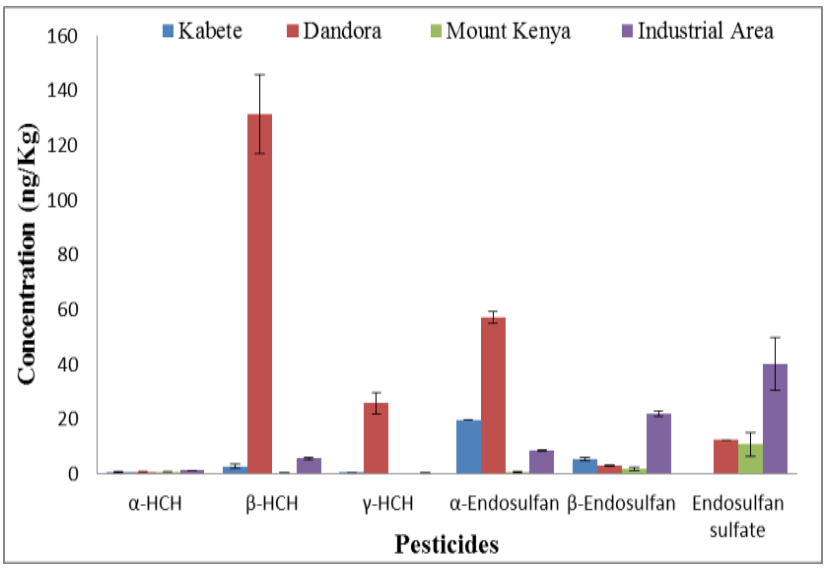


Fig. 16. The average pesticide POPs residue levels in the soil during sampling period in Kabete, Dandora, Nairobi industrial area and Mount Kenya (Jan-Apr 2013). Source: Aucha et al. (2017)

The samples were seasonally collected between the months of July 2012 and April 2013. The pesticide residue levels of the analysed POPs in the air and soil were very high at the Dandora and Industrial area sites, in particular Lindane (β-HCH) and Endosulfan. This indicates that industrial activities and waste burning are the main sources of the POPs pesticide pollution in Nairobi. The high concentration level poses a health risk to residents of and workers in these areas, many of which are women [17].

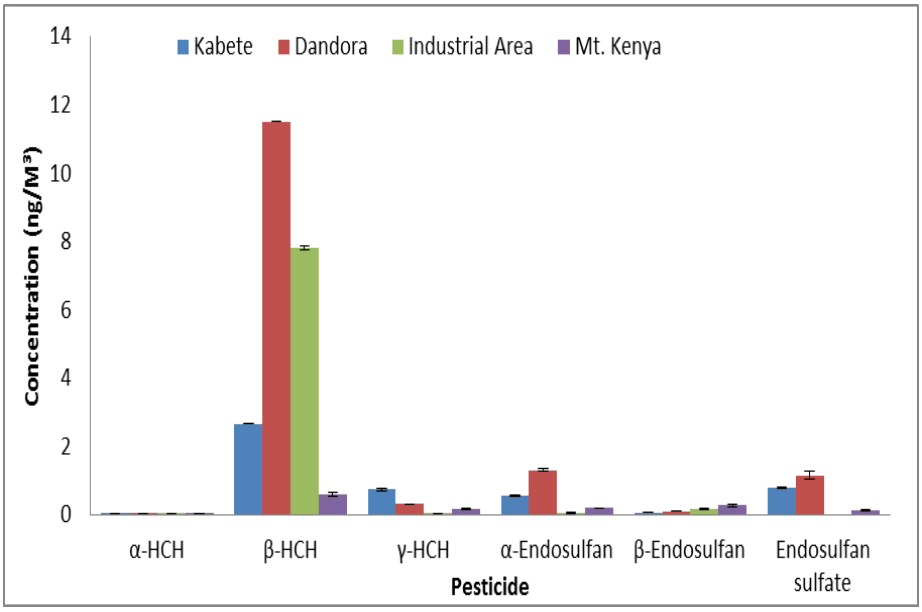


Fig. 17. The average new POPs residue levels in the air during sampling period in Kabete, Dandora, industrial area and Mount Kenya (Jan-Apr 2013). Source: Aucha et al. (2017)

3.2 Unintentional POPs (UPOPs)

Article 5 of the Stockholm Convention requires parties to identify, characterize, quantify and prioritize the sources that unintentionally release the POPs listed in Annex C Part I. Parties to the Stockholm Convention are urged to develop strategies with concrete measures, timelines and goals to minimize or eliminate these unintentional POPs (UPOPs) releases.

The Chemicals and Health Branch of the UN Environment Programme (UNEP) has been cooperating with partners worldwide to monitor and control UPOPs and implement the concrete measures to minimize the releases of unintentional POPs, especially Hexachlorobenzene (HCB); Pentachlorobenzene (PeCB); Polychlorinated biphenyls (PCB)[20]; Polychlorinated dibenzo-p-dioxins and dibenzofurans (PCDD/PCDF)[21].

[20] https://www.unep.org/explore-topics/chemicals-waste/what-we-do/persistent-organic-pollutants/pcb-forgotten-legacy
[21] https://www.unep.org/explore-topics/chemicals-waste/what-we-do/persistent-organic-pollutants/pcdd-pcdf-inventory

The following list categorising the industrial and non-industrial sources of UPOPs that have a high potential for the formation and release of POPs chemicals into the environment.

Industrial and non-industrial sources of UPOPs based on Article 5 Stockholm Convention

Source categories that have the potential for comparatively high formation and release of POPs chemicals to the environment	Source categories that potentially emit UPOPs involving organic matter and chlorine as a result of incomplete combustion or chemical reactions
• **Waste incinerators**, including co-incinerators of municipal, hazardous or medical waste or of sewage sludge	• Open burning of waste, including the burning of landfill sites
• **Cement kilns** firing hazardous waste	• Thermal processes in the metallurgical industry not mentioned in Part II
• **Production of pulp** using elemental chlorine or chemicals generating elemental chlorine for bleaching	• Specific chemical production processes releasing unintentionally formed persistent organic pollutants, especially the production of chlorophenols and chloranil
• The following thermal processes in the **metallurgical industry**: (i) Secondary copper production; (ii) Sinter plants in the iron and steel industry; (iii) Secondary aluminium production; (iv) Secondary zinc production.	• Fossil fuel-fired utility and industrial boilers
	• Firing installations for wood and other biomass fuels
	• Residential combustion sources
	• Crematoria
	• Motor vehicles, particularly those burning leaded gasoline
	• Destruction of animal carcasses
	• Textile and leather dyeing (with chloranil) and finishing (with alkaline extraction)
	• Shredder plants for the treatment of end-of-life vehicles
	• Smouldering of copper cables
	• Waste oil refineries

Source: UNEP 2001

UPOPs in Kenya

Unintentionally produced POPS include: dioxins, furans and pentachlobenzene. In Kenya, a total of 2872 toxic equivalents (TEQs) were released in 2012 from several major sectors, such as heat and power generation (964.1 TEQ), medical waste incineration (837.1 TEQ), and open burning processes (241.1 TEQ g/year) [18]. Amugsi et al. (2020) examined the integrated environmental management and sector-specific policies in Nairobi and Mombasa, Kenya's two biggest cities.

They highlighted existing policies covering the differential challenges of exposure to solid waste and the associated health of women and children. The study found that apart from one municipal policy

and the Kenya Vision 2030 documents, which underscore the importance of including women and young people in waste management, 16 other reviewed policy documents are generally silent on issues related to women and children [19].

Box: Kenya – UPOPs and waste pickers at Dandora waste dump

Dandora was officially named Nairobi's dumpsite in the mid-1970s, with a total area of 30 acres (approx. 12 Hectare), making it one of the largest dumpsites in the world. The landfill receives about 850 tonnes of solid waste daily generated by Nairobi's population of about 6.5 million people. An estimated 200,000 to 500,000 waste pickers depend on this landfill for income and food. A large number of the waste pickers are women and children. Exact numbers are unknown. Interviews by the scoping-team with female waste pickers indicated that women have specific health problems that might be linked to the POPs pollution, such as hormonal disorders impacting their menstrual cycles.

In one study by Gitau (2020), health care providers near Dandora landfill stated that 50% felt that male recyclers were more affected by diseases than women, while 7% of them said that females were more affected. 34% thought that both sexes were equally affected [22].

Further, Gitau's study stated that only 7% of the health workers interviewed followed the waste workers to their homes or workplaces and reported their patients' conditions, such as the level of poverty, poor/unsanitary environments, and lack of education. The unsanitary environment, including overcrowded homes and lack of medical care, was observed as a possible additional cause of their patients' health problems.

Located 8km from the city centre, Dandora was declared full in 2001. Yet, 11 years after the site was declared full by the Nairobi city council and over 20 years longer than allowed by international law, the landfill is still actively used. The city passed a decree to decommission the landfill and has already developed a relocation strategy over a decade ago, so far without any change in situation.

Fig. 18. A woman waste-picker amidst toxic smoke at Dandora waste dump in Nairobi,

The Dandora landfill affects the surrounding communities in the form of respiratory diseases, breeding grounds for rodents, and causes the pollution of their water, air and soil. Nearly a quarter of Nairobi's residents live near Dandora but their health risks such as eye irritation, stomach ailment and skin inflammations are largely neglected.[22][21].

Students from the St. John's School in Korogocho that is near Dandora, inhale smoke from the landfill during their classes, whereby the smoke sometimes affects their health. Some pupils have problems with their eyesight, some skip school because of illness or breathing difficulties such as asthma.[23]

Fig. 19. A woman takes a break from collecting waste to read the newspaper at the Dandora municipal dump site in Nairobi, Kenya, on Feb. 15, 2020. Photo: Khadija Farah for The Intercept

[22] https://pulitzercenter.org/stories/dandoras-scavengers-and-recyclers
[23] https://www.unep.org/news-and-stories/story/smoking-nairobi-landfill-jeopardizes-schoolchildrens-future

Fig. 20. toxic air pollution from Dandora landfill easily enters St. John's School in Korogocho, which located near the landfill. Photo: Duncan Moore/ UN Environment

Shih et al. (2016) assessed the incremental health risk of exposure to dioxins and furans (PCDD/Fs) resulting from the indiscriminate burning of waste in Nairobi and the potential economic benefits of reducing dioxin-induced cancer mortality through proper waste management [20].

PCDD/F concentrations in potatoes, eggs, beef, and long-life milk samples were analysed and compared with the modelled values. The PCDD/F concentration of 3.35 pg TEQ/ g in the milk samples ranked the highest among the food samples and exceeded the criteria set by the European Union.

The study also estimated the cumulative dietary exposure to PCDD/Fs for the residents in Nairobi to be 0.08–2.15 pg TEQ/kg-day, falling within the WHO tolerable daily intake of 1–4 pg TEQ/kg-day. Therefore, potential excess cancers due to dietary exposure to PCDD/F associated with all illegal waste burning in Nairobi were estimated to amount to 636 cases over the last 30 years or 21 cases per year, accounting for 0.05 % of cancer cases in the entire country of Kenya.

The economic benefits of reducing the amount of waste burnt at dumpsites and the development of sanitary landfills in Nairobi ranged from US$ 0.16–1.93 million, depending on what scenario is applied. In addition, increasing 5% of the waste recycling rate along with opening of a new sanitary landfill can reduce 50% of the waste disposed in Dandora [20]. It is evident that improving the waste management system in Kenya, especially city landfills, will have considerable health benefits, including avoiding cancer deaths.

Another study conducted by Omwoma et al. (2015) shows that the Winam Gulf is polluted by dioxins and dl-like PCBs, especially near Kisumu City Bay and Homa Bay [23]. These contaminants are most present in areas with anthropogenic activities, such as landfills, incinerators, petrol stations, and automotive garages and workshops (Jua Kali).

The contamination levels with these estrogenic compounds were lower in Homa Bay and at Mbita beaches, where anthropogenic activities and population levels were lower. The high levels of OCDD and OCDF obtained indicated that the sources of the dioxins could include chemical processes and effluent discharge into the lake.

Box: Dioxins in eggs from Kenya's community kitchen

A study by CEJAD Kenya, investigated Chicken eggs samples collected from Mirema, Kenya. The eggs were collected at circa 300 meters from a community school kitchen situated inside the fenced-in school grounds. The stove uses plastic waste as fuel. The dioxin level in the Mirema eggs was 12 pg TEQ g-1 fat, almost five times above the EU limit of 2.5 pg TEQ g-1 fat (the tolerable level of dioxins PCDD/Fs in eggs).

Fig. 21. Women cooking on a 'community cooker' powered by plastic waste and other rubbish. Photo: BBC

The concentration of dioxins in the Mirema eggs is comparable to the levels of PCDDs in highly contaminated sites near chlorine chemical plants in Russia [24] or a municipal waste incinerator located in Slovakia [25], and higher than the samples collected from a solid waste landfill in Belarus [26]. A high concentration of HBCD was detected in the samples and ranked fourth in Africa. This figure is more than double the Guiyu e-waste site in China [27]. The kitchen is mainly run and managed by female workers. There is no information how the ashes from the kitchen have been handled, and if those handling them are wearing any protection against inhalation of toxics.

Overall, apart from hotspots such as Dandora Nairobi and the school kitchen, a review by Pius et al. (2019) [28] revealed that PCDDs/Fs and dl-PCBs in the African Region are (still) well below the recommended levels as established by other countries. Furthermore, the study shows that most African countries had on average lower PCDD/F and dl-PCB levels in human milk compared to European countries.

UPOPs in Tunisia

Tunisia became a party to the Stockholm Convention in 2004 and improved waste management was among the priorities of the 11th National Development Plan from 2007. One of the sources of UPOPs is medical waste. The Decree 2008-2745 issued in 2008 mandated all public and private health care facilities to dispose of their waste safely and legally. As there existed no clear allocation of responsibilities for controlling health care waste (HCW) in Tunisia, there is a lack of enforcement. Even when hospitals separate waste, most hazardous healthcare waste is re-mixed and disposed of together with domestic waste in public waste dumps or illegal dumpsites [29]. Since then, the use of incineration for HCW destruction became widespread, which unfortunately has led to emissions of dioxins and furans [30].

Box: Tunisia's medical waste management

A World Bank-funded project was conducted from 2014 to 2017. By processing 3,274 tons of health care waste using non-combustion technology, 8 per cent of furans and dioxins releases have been reduced. In addition, in February 2017, the MOH of Tunisia signed an agreement with six private service providers on HCW treatment and disposal during a term of 5-years, demonstrating a model that other regions can replicate. Finally, Tunisia has established sound, sustainable waste management practices by strengthening the regulatory framework and promoting a new model based on the best available techniques and practices in healthcare waste management.

Fig. 22. Healthcare waste separated by type: glass, hazardous waste, plastics, and paper. source: GEF-World Bank

In 2007, the Tunisian National Agency for Sanitary and Environmental Control of Products conducted a study to detect and characterize the potential presence of persistent organic pollutants such as dioxins (PCDD), furans (PCDF) and PCBs in milk.[24]

The toxicological analysis of **milk samples** showed that the levels of contamination differ quite remarkably according to the geographical situation and the sources of exposure (landfills, industries, etc.). The study highlights the big gaps between regional disparities within two regions:

- Highly contaminated areas including the governorates of Ariana, Bizerte, Sfax and Gabes;
- Low exposure areas include the governorates of Beja, Kairouan and Kebili.

The concentration of dioxin (PCDD/PCDF) and PCB-DL observed in Tunisian cow milk is on average equal to 1.41 pg TEQOMS98/g MG, with a minimum of 0.52 and a maximum of 3.86 pg TEQOMS98/g MG. Most of the concentrations measured in PCDD/F TEQ and in total TEQ (PCDD/F + DL-PCB), do not exceed the regulatory thresholds set by the European Community. Amongst the 40 milk samples taken as part of the study, two samples – collected from Bizerte and Ariana near a landfill and watercourse – showed PCB-DL levels higher than the European maximum allowed levels.

Fig. 23. ANGed has developed a regulatory framework, healthcare facilities have to allocate an adequate budget for waste management, and to have a central location for hazardous medical waste collection and storage. Photo: GEF & World Bank

[24] http://www.ancsep.rns.tn/dioxine-furanes-pcb-dans-la-chaine-alimentaire-etat-des-lieux-a-travers-un-produit-index-le-lait/

3.3. POPs in the environment and populations, Kenya

Kenya's National Implementation Plan for the Stockholm Convention (2014) stated that there were significant quantities of POPs contaminated waste. The first POPs inventory done in 2006 indicated that most of the residual DDT was found with the Kenya Farmers Association in Nairobi, the Rift Valley and Central Provinces [18].

In September 2007, Kenya became the first country in Africa to initiate the CleanFarms project to manage obsolete pesticide stocks. The project conducted an inventory of all obsolete pesticides and empty containers in the private and public sectors and safeguarded those that pose a hazard to the environment in a contained location.

As a result, Kenya's CleanFarms programme in Kitengela has secured nearly 170 tonnes of obsolete pesticides, including over 30 tonnes of highly toxic products. The first 30 tonnes, along with 15 tonnes of contaminated packaging material, were shipped to Europe for incineration in March 2012 [31].

According to the National POPs inventory, 30% of suspected POPs Hotspots in the country have not yet been assessed. However, it is worth noting that the inventory did not aim to establish a detailed analysis and primarily consisted of preliminary surveys. The stakeholders hoped to use the Kitengela study to narrow down the knowledge gap for planning purposes [32].

Box: Kenya - Obsolete POPs dump sites

From 2008 to 2014, Kenya participated in the Africa Stockpiles Project 'Cleanfarms' in partnership with FAO. The project involved taking inventory of obsolete pesticide stocks, safeguard them and eventually ensure their disposal.

Some farms and storage facilities in Kenya held pesticide stocks dating back to the countries' independence. They kept expired and banned products. The project dispatched 222 metric tons of obsolete pesticides to the UK for disposal at USD 1,000,000.

In the past decade, increased demand for pesticides in agricultural production, procurement policies and counterfeiters in Kenya could have led to another stockpiling of obsolete stocks.

Box: Kenya - Obsolete POPs dump sites (cont.)

Fig. 24 (a) and (b). Safeguarding of obsolete stock -CleanFarms project in 2015.
Photo: Agrochemicals Association of Kenya (AAK)

Fig. 25. AAK launched the EMPTY PESTICIDE CONTAINER INITIATIVE (EPCI) in 2015.
Photo: AAK

Fig. 26. EPC transportation for proper disposal.
Photo: AAK

In Tunisia - POPs in breastmilk

In 2019, Martin van Berg et al. (2019) conducted a study looking at the WHO and UNEP survey of PCDDs, PCDFs, PCBs and DDTs in human milk and the benefit-risk evaluation of breastfeeding [36]. The study observed that PCDDs and PCDFs were highest in India and some European and African countries. At the same time, PCB levels were highest in East and West Europe. The highest levels of ΣDDTs are prominent in less industrialized countries. The study provided a solid argument for a plea for further global source-directed measures to reduce human exposure to further dioxin-like compounds.

The levels of exposure to POPs warrant a biomonitoring program to identify routes of exposure and population groups at higher risk. As recommended by the Stockholm Convention, conducting a POPs monitoring program will help establish prevention policies and determine the association between exposure to POPs and chronic diseases

Box: Tunisia - POPs levels in breastmilk

A study conducted by Ennaceur et al. (2008 and 2010) found that DDTs, PCB 153, 180, and 118 are the main contributors to the total OC burdens in Tunisian breast milk [33, 34]. Additionally, the comparison of the findings to a global report has shown that OC residue levels in human breast milk revealed higher DDTs in developing countries, including Tunisia than in developed nations.

The age of the mothers and the number of parities played an essential role in influencing the OC concentrations in the Tunisian population. Estimated breast-fed children's intakes were generally lower than guideline standards proposed by WHO and Health Canada. The study also found a positive correlation between fish consumption and breast milk levels of pesticides and PCB. Furthermore, fatty fish consumption influenced the serum and breast milk PCB levels.

Women living in northern Tunisia showed higher serum levels of all PCBs. Working outside the home and cereal consumption were positively associated with serum levels of p,p'-DDE. The duration of the lactation was also related to lower serum levels of p,p'-DDE and HCB.

A study by Artacho-Cordón et al. (2015) found three PCB congeners and two organochlorine pesticides (OCPs) in breastmilk from Tunisia [35]. Serum median concentrations of PCB congeners (-138, -153 PCB-180) were 26.08, 119.1 and 29.84ng/g lipid, respectively, and median concentrations of HCB and p,p'-DDE were 19.98 and 127.59ng/g lipid, respectively. In addition, the study found that age was positively correlated with serum levels of selected POPs.

POPs negatively impacting semen from Tunisian men

In Tunisia, the uncontrolled use of pesticides for several decades has led to a worrying situation. Despite being banned since the early 1980s, highly toxic pesticides such as PCB, organochlorine (OC), and dichlorodiphenyltrichloroethane (DDT) are suspected to have persistent environmental and health effects on the Tunisian population.

A study conducted by Salima Daoud et al. (2017) between January 1996 and December 2012 analysed semen collected from 2122 men who worked in various sectors in Sfax, Tunisia [37].

Exposure to pesticides was associated with a significantly higher risk of asthenozoospermia[25] [38] and necrozoospermia[26] [39]. In addition, exposure to cement at work correlated to a higher risk of oligozoospermia[27] [40]. In 2006-2008, 40 tonnes of 50 year old DDT were found in one of the old buildings of the Menzel Bourguiba Hospital, Bizerte, Tunisia.

Fig. 27. Old DDT warehouse of Menzel Bourguiba Hospital, Bizerte, Tunisia (2008). Photo: FAO

3.4. Plastic wastes trade in Kenya and Tunisia

Until January 2018, China received most of the world's plastic waste [41]. Since China closed its doors to plastic waste in 2018, plastic waste exports shifted to Southeast Asian countries, who responded [42] and as a result, the plastic waste trade has moved largely to Turkey and the African regions [43].

Due to the lack of infrastructure and rapid urbanisation, Africa faces challenges managing its solid waste. Meijer et al. (2021) projected that mismanaged plastic waste in Kenya and Tunisia was approx. 290,000 metric tonnes and 289,500 metric tonnes respectively [44]. Jambeck et al. estimated that Africa's total mismanaged plastic waste may increase from 4.4 million metric tons in 2010 to 10.5 million metric tons in 2025 [45].

Thirty-three African countries with a total population of 856 million people imported approximately 86.14 metric tonnes of polymers in primary form and 31.5 metric tonnes of plastic products. The largest share of plastic waste imports arrived in Egypt (43 Mt, 18.7%), Nigeria (39 Mt, 17.0%), South Africa (27 Mt, 11.7%), Algeria (26 Mt, 11.3%), Morocco (22 Mt, 9.6%), and Tunisia (16 Mt, 7.0%).

[25] Asthenozoospermia is an infertility condition in men wherein a man produces sperms with low motility. Motility is the ability of the sperm to move forward swiftly and in a straight line. It is an essential requirement for natural conception.
[26] Necrospermia (or necrozoospermia) is a condition in which there is a low percentage of live and a very high percentage of immotile spermatozoa in semen
[27] Oligozoospermia is deficiency of spermatozoa in the semen.

The assessment showed that environmentally sound end-of-life management of waste plastics by recycling and energy recovery is in its infancy in Africa. Plastic waste thermal recovery have started in a few countries but are often a source of pollution.

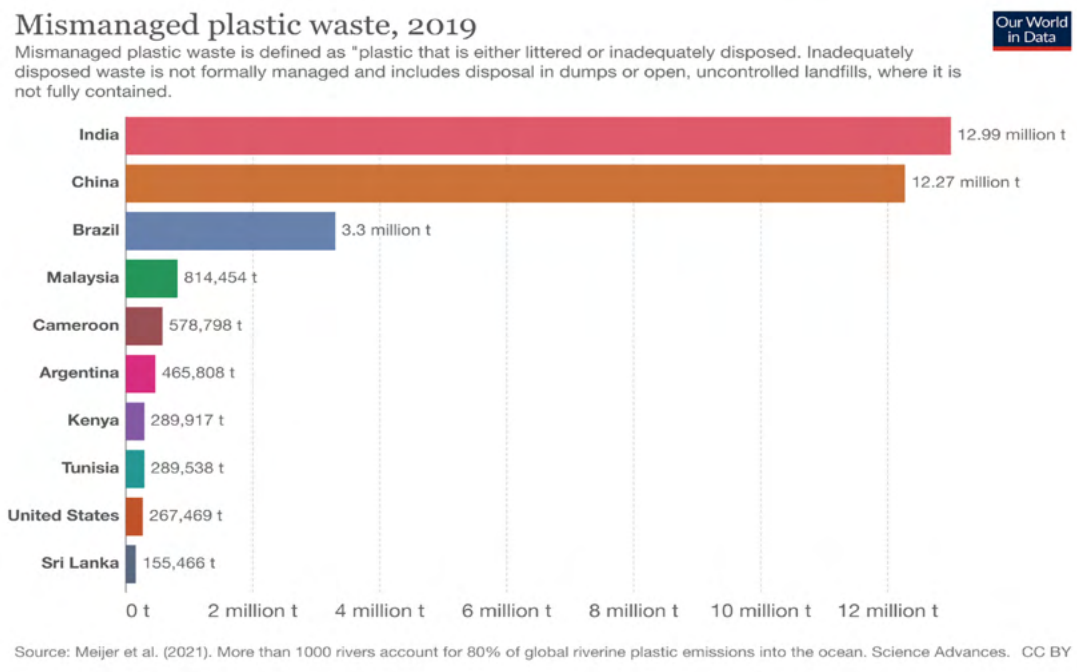


Fig. 28. Mismanaged Plastic Waste. source: Meijer et al. (2021)

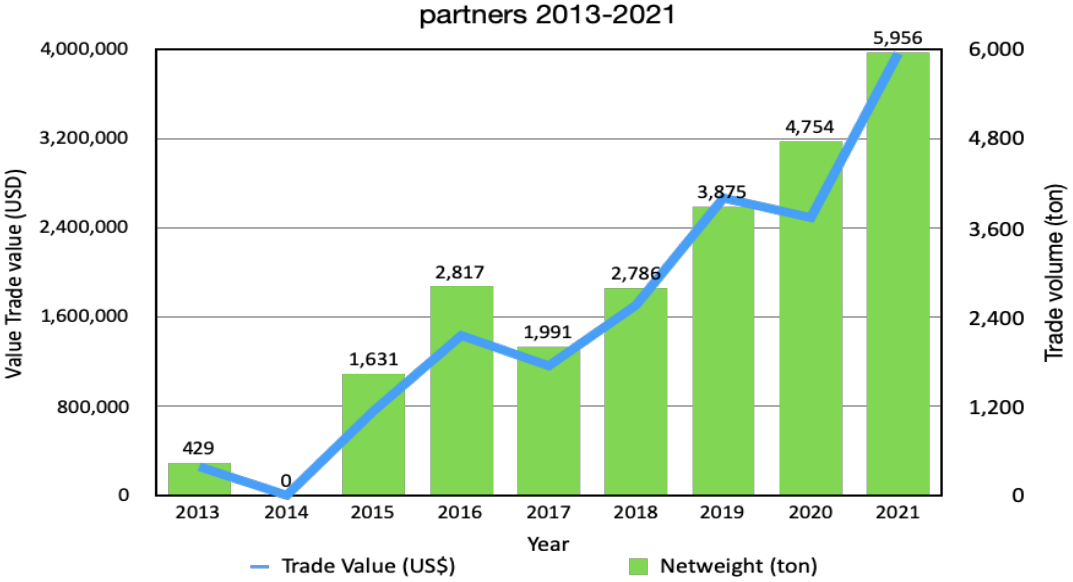
Kenya - plastic production and plastic waste imports

Around 48,000 tonnes of waste generated daily in Kenya are sent to landfills, and 37,000 tonnes are sent for re-/down-cycling. These figures result in an estimated recycling rate of 15 per cent, with waste pickers mainly collecting recycling materials [4].

In the last ten years, from 2013 to 2021, Kenya's plastic waste import (as HS 3915) increased almost 100 per cent or 15 folds. In 2020, at its peak time, Kenya's trade partners reported that the volume of plastic waste exported to Kenya was approximately 8,000 tons.

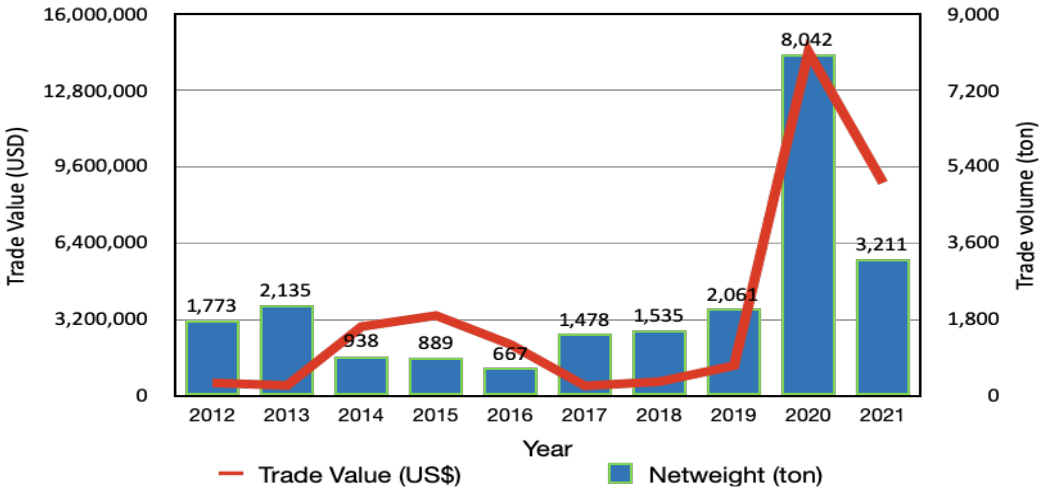
Fig 29: Young Kenyan activist holding a placard saying "Africa Ain't No Dumpster" at the September 2020 climate strike in Nairobi. Photo credit: Greenpeace

Fig: 29 Kenya imported plastic wastes (HS3915) from trade partners 2013-2021



However, Kenya's import report only recorded half of the volume reported by exporters. There is a significant discrepancy in volume and trade values on plastic waste trade between Kenya's import report against the trade partners' export reports. The discrepancy could be due to misclassification, misdeclaration, delayed reporting or illegal activities.

Fig: 30 Trade partners exported plastic wastes (HS 3915) to Kenya 2012-2021



Between 2013 to 2018, the United Arab Emirates was the highest exporter of plastic wastes (HS3915), ranging from 194 tons to 2156 tons. Meanwhile, between 2019 to 2021, China was the largest exporter of plastic wastes to Kenya, with a volume ranging from 1430 tons to 3646 tons.

Table 1. Kenya imported plastic scrap (HS 3915) from trade partners 2013-2021

Year	Trade Value (US$)	Netweight (ton)	Trade partners	Remarks
2013	256,385	429	UK, UAE, Uganda, Turkey, Other Asia, nes, Malaysia, Indonesia, China, Belgium	Trade partners: 9 countries; UAE the highest exporter, 194 ton (45.2% of total import)
2014	0	0	Not available	Not available
2015	760,659	1,631	USA, UAE, Uganda, Rep. of Korea, Other Asia, nes, Netherlands, Malaysia, India, China, Belgium, Areas, nes	Trade partners: 11 countries; UAE the highest exporter, 1384 ton (84.8% of total import)
2016	1,433,443	2,817	UAE, Uganda, South Africa, Singapore, Other Asia, nes, Netherlands, Malaysia, India, China, HK SAR China	Trade partners: 10 countries; UAE the highest exporter, 2156 ton (75.8% of total import)
2017	1,161,486	1,991	United Arab Emirates, Uganda, South Africa, Singapore, Other Asia, nes, Netherlands, Malaysia, Japan, Italy, India, China, Hong Kong SAR, China	Trade partners: 12 countries; UAE the highest exporter, 952 ton (48% of total import)
2018	1,706,091	2,786	United Rep. of Tanzania, United Kingdom, United Arab Emirates, Ukraine, Uganda, Spain, South Africa, Singapore, Romania, Rep. of Korea, Qatar, Poland, Other Asia, nes, Malaysia, Japan, Italy, India, Greece, China, Hong Kong SAR China, Burundi	Trade partners: 21 countries; UAE (769 ton) and Japan (730 ton) were the highest exporters (28% and 26% of total import)
2019	2,666,761	3,875	USA, United Rep. of Tanzania, United Kingdom, United Arab Emirates, Uganda, Spain, South Africa, Romania, Qatar, Poland, Other Asia, nes, Oman, Malaysia, Kuwait, Japan, Italy, India, Greece, China, Canada	Trade partners: 20 countries; China the highest, 1429 ton (37% of total import)
2020	2,490,643	4,754	Viet Nam, USA, United Rep. of Tanzania, United Arab Emirates, Switzerland, Spain, South Africa, Rwanda, Romania, Rep. of Korea, Qatar, Poland, Malaysia, Japan, Italy, India, China	Trade partners: 17 countries; China was the highest exporter, 2503 ton (53% of total import)
2021	3,963,674	5,956	Burundi, China, Egypt, India, Indonesia, Italy, Japan, Malaysia, Portugal, Qatar, Rep. of Korea, Rwanda, Spain, Thailand, Uganda, UAE, USA, Vietnam	Trade partners: 18 countries; China was the highest exporter, 3646 ton (61% of total import)

Source: UN Comtrade database

Tunisia - illegal waste imports from Europe

From 2012 to 2021, Tunisia imported plastic waste scrap (using the code HS 3915) from several countries. The UN Comtrade database shows that between 2016-2018 Libya was the main exporter of plastic waste scrap (code HS 3915) to Tunisia with a volume of 2800 to 3500 tons per year. The volume of plastic waste exported to Tunisia continued to decline from 2019 to 2021, reducing to 44 to 429 tons per year from EU countries in particular Germany. However, at the same time, municipal waste exports (using code HS 3825) to Tunisia were increasing significantly, reaching 8122 tons in 2020.

An investigation showed that these large volumes of municipal waste were really plastic scrap and hospital waste imports. In particularly Italy exported mixed waste, including plastic waste/scrap, using code HS 3825 instead of HS 3915, to avoid scrutiny from customs officers. In this manner, Italy tried to export 282 containers of hazardous plastic waste to the port of Sousse, Tunisia.[28;29] On the Italian side, the exporter, Sviluppo Risorse Ambientali Srl, based in Naples had signed a €5 million contract with Soreplast for the disposal of 120,000 tons of garbage in Tunisia.[30]

This illegal waste shipment became a key political issue and was highlighted in many media outlets. Many of those involved have now been arrested and the case has been recognised as a corruption case at the highest level.

To combat the illegal trade of waste, a national committee to counter the illegal waste trade in Tunisia has been established. In October 2021, as a result of the public pressures and the CSO movement in Tunisia, the EU code has been changed to no longer allow unclarity of the term 'mixed' waste [46]. Of the 282 containers, 212 were returned to Italy and a further 70 containers – which had already been dumped in Tunisian communities – have been incinerated.[31]

[28] https://robindesbois.org/en/les-cargos-de-dechets-voyagent-malgre-la-pandemie-covid-19/
[29] https://inkyfada.com/en/2021/03/09/investigation-waste-corruption-italy-tunisia/
[30] https://en.econostrum.info/A-case-of-corruption-at-the-highest-level-in-Tunisia_a820.html
[31] https://www.independent.co.uk/news/world/europe/italy-tunisia-waste-dump-illegal-rubbish-b2020782.html

Fig 31: Italian waste exported to Tunisia in the port of Sousse, December 2020. Photo credit: Hamdi Chebaane

Table 2. Trade partners exported wastes (HS3825) to Tunisia 2012-2021

Year	Trade Value (US$)	Net weight (ton)	Partners	Remarks
2012	US$124,727	25	France	One trade partner countries; France was the highest exporter, 25 ton (100% of the total export to Tunisia in 2012)
2013	US$88,619	54	France, Italy	Two trade partner countries; Italy was the highest exporter, 39ton (73% of the total export to Tunisia in 2013)
2014	US$147,784	189	France, Italy	Two trade partner countries; Italy was the highest exporter, 184 ton (98% of the total export to Tunisia in 2014)
2015	US$90,605	24	France, Italy, Netherlands, Spain	Four trade partner countries; France was the highest exporter, 13 ton (55% of the total export to Tunisia in 2015)
2016	US$71,278	13	France, Italy, United Kingdom	Four trade partner countries; France was the highest exporter, 8 ton (63% of the total export to Tunisia in 2016)
2017	US$51,159	14	France, Italy, Spain	Three trade partner countries; France was the highest exporter, 12.7 ton (90% of the total export to Tunisia in 2017)
2018	US$37,233	52	France, Italy	Two trade partner countries; France was the highest exporter, 51.8 ton (99% of the total export to Tunisia in 2018)
2019	US$45,813	34	China, France, Italy	Three trade partner countries; China was the highest exporter, 22 ton (65% of the total export to Tunisia in 2019)
2020	US$609,764	8,122	France, Italy, Morocco, Sweden	Four trade partner countries; Italy was the highest exporter, 8118 ton (99.96% of the total export to Tunisia in 2020)
2021	US$26,358	3	France, Italy	Two trade partner countries; France was the highest exporter, 2.8 ton (91% of the total export to Tunisia in 2021)

Source: UN Comtrade database

Table 3. Trade partners exported plastic scraps (HS 3915) to Tunisia 2012-2021

Year	Trade Value (US$)	Net weight (ton)	Trade partners	Remarks
2012	US$576,938	785	Algeria, Belgium, France, Germany, Italy, Saudi Arabia, Spain, Switzerland, Turkey, Morocco	Ten trade partner countries; Algeria was the highest exporter, 267 ton (34% of the total export to Tunisia in 2012)
2013	US$2,444,630	2,964	Algeria, China, France, Germany, Greece, Italy, Pakistan, UAE, Turkey, UK, Yemen	Eleven trade partner countries; Italy was the highest exporter, 1220 ton (41% of the total export to Tunisia in 2013)
2014	US$3,250,825	3,548	Algeria, Belgium, France, Germany, Italy, Portugal, Spain, UK, Morocco	Nine trade partner countries; Italy was the highest exporter, 2259 ton (64% of the total export to Tunisia in 2014)
2015	US$2,239,625	2,804	Algeria, France, Germany, Italy, Netherlands, Spain, UK	Seven trade partner countries; Italy was the highest exporter, 2438 ton (87% of the total export to Tunisia in 2015)
2016	US$2,192,858	5,469	Algeria, Canada, France, Italy, Spain, Sudan, Libya	Seven trade partner countries; Libya was the highest exporter, 3505 ton (64% of total export 2016)
2017	US$1,781,048	5,444	Algeria, Canada, France, Italy, Morocco, Portugal, Spain, Sudan, Turkey, Qatar, Libya	Eleven trade partner countries; Libya was the highest exporter, 3505 ton (64% of total export 2017)
2018	US$728,279	3,545	France, Italy, Morocco, Spain, USA, Libya	Six trade partner countries; Libya was the highest exporter, 2856 ton (81% of total export 2018)
2019	US$83,665	241	Belgium, Canada, France, Germany, China Hong Kong SAR, Italy, Spain, UK	Eight trade partners countries; Germany was the highest exporter, 44.2 ton (18% of total export 2019)
2020	US$110,484	280	EU, Ireland, Italy, Spain	Four trade partners countries; EU was the highest exporter, 227.5 ton (81% of total export 2020)
2021	US$224,199	616	EU, Italy, Spain	Four trade partners countries; EU was the highest exporter, 429 ton (70% of total export 2020)

Source: UN Comtrade database

3.5. New POPS: PFOA, PFAS and HBCDs in Kenya and Tunisia

Per- and polyfluoroalkyl substances (PFAS) are a large class of more than 4,500 chemicals, including PFOA, PFOS, GenX, and many other substances. PFAS are globally widely distributed due to their high solubility in water, low/moderate sorption to soils and sediments and resistance to biological and chemical degradation [60]. The properties of PFAS have resulted in extensive use as surfactants and surface-active agents in products [61].

Perfluorooctane sulfonate (PFOS) and perfluorooctanoic acid (PFOA) are the two most widely used members of this class have been. However, as these two substances have come under regulatory pressure, the industry has shifted to other PFAS with similar properties. PFOS and PFOA are listed in the Stockholm Convention for global restriction and elimination. The PFOA listing includes the prohibition of 184 substances such as salts and PFOA- related substances (UNEP/POPS/POPRC.13/INF/6/Add.1)

In Kenya, it comes in formulations of fluor protein foam and aqueous firefighting Foam (AFFF). Firefighting foams could be a significant source of PFOS in the Kenyan environment. The other significant source of PFOS is domestic use, particularly as a stain repellent in furniture and other

furnishing items [62]. These items will likely remain a source of PFOS emissions for an extended period.

Although the concentrations are lower than in industrialized countries, studies found PFOA in wastewater, the White Nile and Lake Victoria and wastewater treatment outlets of hospitals in Kenya [63]. Further, studies also found that PFOA concentrations in urban areas are higher than in rural areas.

UNEP conducted a global POP monitoring program since 2004. A new study (2002) compared POPs in breastmilk in several countries and revealed a significant decrease of 50% of PFOA in breastmilk, within these years in Kenya [64]. The reason for this difference needs further investigation, and sources of new POPs have not been eliminated in Kenya.

Box: Kenya - New POPs in products from recycled waste

A recent study detected analysed products from Kenya, Tunisia and nine other African countries and found high concentrations of PBDEs, and HBCD, including novel BFRs (nBFRs) and tetrabromobisphenol-A (TBBPA) [65].

These substances are unregulated yet pose significant health risks as they bio-accumulate in the environment and the human body [66]. PBDEs and HBCD are already listed under the Stockholm Convention and regulated to a certain level and should be phased out.

Samples collected and analysed for flame retardant chemicals found these new POPs in consumer products made with recycled e-waste plastics such as children's toys, hair accessories, office supplies, and kitchen utensils purchased from the African market. The accumulation of the POPs chemicals is uncontrolled due to unregulated recycling of e-waste plastics.

Fig. 32. Children's toys, hair accessories, and kitchen utencils samples from Kenya and Tunisia with high levels of new POPs: PBDEs, HBCD, and novel BFR. Photo: IPEN, 2022

3.6. Lead and electronic and waste in Kenya and Tunisia

Electronic waste exports to the African region are a great problem, and source of POPs pollution. Since the 1980s electronic waste has been exported to Africa. Often e-waste labelled as charity goods, but in many cases the products were largely waste. Kenya generates 51.300 tons of e-waste per year. About 99% of e-waste is not collected and only one per cent is collected and refurbished.

Electronics imports into Kenya are a combination of new and second-hand electronic equipment and local assembly of different parts. There are little to no options for consumers to dispose of e-waste in an environmentally sound manner [47].

Currently there is a lack of data on total e-waste collected or recycled. It is estimated that most e-waste ends up at the Dandora dumpsite in Nairobi and other dumpsites in the country. With the lack of a specific government policy on e-waste, best practices such as WEEE Nairobi (see chapter 4), are hard to replicate. End of life electronics are often hoarded in stores and homes for lack of awareness of safe e-waste management and options.

In 2013, The Kenyan environmental authority NEMA developed guidelines (NEMA, 2013) that have been used by different stakeholders such as recyclers and transporters, in the management of e-waste. However, the 2013 guidelines have not been enforced. NEMA also developed a draft e-waste regulation (2013). The draft was amended in 2019 and is still in draft form awaiting parliament approval. The Ministry of Environment and Forestry has also developed an e-waste strategy [48] that has gone through several stages of public participation as required by the Constitution of Kenya (Public Participation Bill, 2018).

The Public Procurement and Disposal Act, No.33 2015, Part XIV governs public institutions' disposal of public assets. Section 165 (2) prescribes that electronic and radioactive waste shall be disposed of only to persons licensed to handle the respective E-waste under section 88 of the Environmental Management and Co-ordination Act, 1999. However, the Act is silent on consideration of the end-of-life effects of Electric and Electronic Equipment (EEE) procured [47].

Kenya - lead battery waste pollution

Lead battery recycling is a growing hazardous industry throughout Africa. Gottesfeld et al. (2018) collected hundreds of soil samples from recycling plants and a battery manufacturing site in seven countries and analyzed them for total lead [49]. They found lead levels in soils ranged from < 40–

140,000mg/kg, and overall mean lead concentrations were ~23,200mg/kg. The average lead levels were 22-fold greater for soil samples from inside plant sites than from those collected outside these facilities. Lead concentrations in soil samples from communities surrounding these plants were ~2600mg/kg.

As the lead battery industry in Africa continues to expand, it is expected that the number and size of lead battery recycling plants will grow to meet the forecasted demand. There is an immediate need to address ongoing lead contamination and exposure of communities from this industry. Unless government regulates site closures and provides financing procedures for clean-up of lead contaminated sites, lead contamination will impact millions of people throughout Africa. Children exposed to lead contamination can suffer irreversible harm and even death from living near polluted sites.

Kenya - the case of Mombasa lead smelter pollution

There is an increasing demand for lead by industry in Kenya. One of the sources of lead is from recycling car batteries in smelters. A number of low-income communities across Mombasa became locations for lead-acid battery recycling.

Within the community of Owino Uhuru, a lead smelter facility emitted toxic fumes, very often released at night to avoid detection. The untreated wastewater from the lead smelter was discharged into streams that are commonly used by residents for washing, cooking, and cleaning.

Workers and the community living near the lead smelter plant were exposed to chemicals every day. To lower the risk of exposure, the company provided one pair of cotton gloves per month, which quickly disintegrated after a few days. Once the gloves were gone, workers continued to work with bare hands. In contrast, managers entering the factory did so in full protective gear.[32]

The community witnessed their chickens die after drinking the waste water flowing out from the smelter. Hundreds of children of the Owino Uhuru community developed high fevers and complained of stomach-aches, and child mortality increased. Many male workers of the smelter plant suffered from breathing difficulties and felt dizzy by the end of their shift. Their wives had difficulties getting pregnant. Some women suffered miscarriages and stillbirths. Not only the men working in the plant, but also women were exposed to lead dust when they washed their husbands' clothes.[33] The Centre for Justice, Governance, and Environmental Action (CJGEA) convinced the

[32] https://www.goldmanprize.org/recipient/phyllis-omido/
[33] https://theecologist.org/2016/mar/03/dirty-business-africas-unregulated-lead-battery-smelting

government health centre to test local community members and children on lead contamination. The result of the blood tests was that children in the community had almost 20 times higher lead levels than the median level among children in the US [50]. Local soil tests showed lead levels increased almost tenfold from 2008 to 2009 when the plant became operational. Ms. Phyllis Omido from the local community, together with CJGEA requested the National Environment Management Authority to shut down the smelter. Finally, after a long fight, the plant smelter ceased operations in January 2014.

Fig. 33. Phyllis Omido meeting a resident of Owino Uhuru, whose grandson is suffering from lead poisoning. Ms Omido has pushed the Kenyan government to commit to clean up of the and providing care for local residents. Photo: Goldman Environmental Prize

After a four-year legal battle, a court in Mombasa has awarded compensation to residents of Owino Uhuru for deaths and health impacts from a nearby lead smelter for recycling batteries. The ruling, delivered by a judge of the 'Land and Environment' Court on 16 July 2020, declared that the community's rights to a healthy environment, the highest attainable standard of health, clean and safe water, and life had been contravened and ordered the Kenyan government and two companies to pay compensation.[34] The court found the authorities guilty of negligence, the company owners – EPZ and Hezron Awiti's Penguin Paper and Book Co. – liable for damages and ordered a clean-up

[34] https://www.ohchr.org/en/stories/2020/09/court-ruling-called-milestone-environmental-justice

of the site within four months. The $12million (*KSH 1.3Billion)* compensation payments for the environmental and health damage, were supposed to be paid jointly by the government agencies that were found to have been negligent, as well as the directors of the company. To date (2022) the community is waiting for a court's decision on an appeal for them to be compensated. The judge also ordered the government to clean Owino Uhuru within four months (120 days), stating failure to act would result in a fine.

Fig. 34. Community of Owino Uhuru with the chimney of the lead smelter and factory building amongst residential homes and playing children (top). Inhabitant with thyroid disease linked to lead pollution (left, middle row) who died. Demonstrations by inhabitants and with copies of the court decision (middle, right). Soil samples being taken for lead pollution (bottom left) and Ms Omido and CJGEA staff after they won the court case in July 2020 which ordered a KSH 1.3Billion compensation for the pollution and health impact of lead smelter (bottom right). Photos: CJGEA and others.

Tunisia - electric and electronic waste

Three of Africa's most active ports: Durban-South Africa, Bizerte-Tunisia, and Lagos-Nigeria have been identified as the major ports of entry of used Electrical and Electronic Equipment (EEE) to the African continent [51].

However, the legal landscape of Africa is changing rapidly, with the number of African countries covered by e-waste legislation, policy or regulation rising from three in 2018 to thirteen in 2020 [52]. Subregional approaches are also occurring within the East African community, adopting a regional e-waste strategy, and an enforcement programme to monitor and control transboundary movements of used EEE customised for Benin, Egypt, Ghana, Nigeria, and Tunisia. A scheme for exchanging information on used EEE between exporting and importing states was also developed [52, 53].

About 90,000 tons of e-wastes are deposited every year in Tunisia but only 22,500 tons (or 25%) are collected. Six processing units having a capacity of 18,500 tons per year were installed and a a further 24,000 tons per year capacity was added in 2014 [5].

Collectun D3E Recyclage is a Tunisian company that recycles electronic waste in an environmentally responsible manner. The company has been certified by the Ministry of Environment to disassemble transportation and e-waste in the country, and it collects all sorts of electronic equipment, from computers to mobile devices and home IT equipment. Once gathered, Collectun D3E Recyclage recovers valuable material from these devices. Between 2009 and 2015 the company recycled more than 395 tons of electronic waste.[35]

Fig. 35. Electronic recycling workers at Collectun D3E are dismantling EEE generated from households. Photo: The Switchers

[35] https://www.theswitchers.eu/en/switchers/electronic-waste-recycling-tunisia/

3.7. Chrysotile Asbestos in Kenya and Tunisia

According to Kenya's Legal Notice No. 121 of the Environmental Management and Coordination (Waste Management) Regulations 2006, waste containing asbestos is classified as hazardous waste. In addition, the Legal Notice requires that hazardous waste be disposed of in a specified manner as approved by the National Environment Management Authority (NEMA). However, there is plenty of asbestos waste across Kenya and East Africa.[36] This is probably due to a lack of technical know-how in handling and disposing of asbestos through the complex procedures that must be inspected by NEMA.

NEMA already issued national guidelines on the Safe Management and Disposal of Asbestos in Kenya [54]. Asbestos waste collectors must obtain permits from NEMA. However, there is no specific disposal site for asbestos waste materials. Recently, Kenyan Police were investigating the disposal of a large consignment of asbestos waste at a site on the Nairobi-Mombasa highway[37] and in Laikipia.[38] The site is located on two-acre land that is said to be under the jurisdiction of the Taita Taveta County government and Nanyuki South respectively.

Fig. 36. Broken and old asbestos roofing materials are exposing high risk to public health and must be handled carefully and in an environmentally sound manner. Photo: Kenya CIC

Fig. 37. The County Government of Nakuru has embarked on a major environmental clean-up in the building industry by removing asbestos roofing in hospitals and residential building due to its health hazard. Photo: Kenya News.

Tunisia - asbestos in J&J's baby powder and ovarian cancer

Documents show J&J was aware since the late 1950s that the talc used in Johnson's Baby Powder sometimes contained asbestos.[39] From at least 1971 to the early 2000s, the company's raw talc and

[36] https://www.kenyacic.org/2019/11/exposure-to-the-noxious-asbestos-needs-to-be-alleviated-with-a-lot-of-care/
[37] https://nation.africa/kenya/counties/taita-taveta/state-probes-dumping-of-asbestos-waste-at-taita-taveta-site-3732234
[38] https://www.the-star.co.ke/counties/rift-valley/2019-12-18-firm-loses-license-for-dumping-asbestos-in-laikipia/
[39] https://www.reuters.com/investigates/special-report/johnsonandjohnson-cancer/

finished powders sometimes tested positive for small amounts of asbestos and expose cancer risks [55, 56]. Company executives, scientists, doctors, and lawyers fretted over the problem, but covered-up the problem and failed to disclose the asbestos content of its baby talc it to regulators or the public.[40]

Asbestos is a classified as human carcinogen and cause of mesothelioma by the World Health Organisation. Instead of warning consumers about possible health risks, J&J instead doubled down on aggressively marketing its talc-based baby powder to lower-income communities in the US, targeting women of colour and distributing free samples in black community churches and advertising on Spanish-language radio.[41]

In 1976, researchers at Mount Sinai Hospital examined 19 samples of American talcum powder products and found asbestos in 10 of them, with the asbestos content ranging from 2% to as much as 20%, depending on the brand. Since then, other brands of talcum powder[42] and baby powder have tested positive for asbestos [57].

An internal J&J memo from 1992 acknowledged the potential links to ovarian cancer, while simultaneously recommending increased marketing to African American and Hispanic women.[43]

Fig. 38. Asbestos in talcum products is a risk of mesothelioma cancer and ovarian cancer.
Photo: The Mesothelioma Center

In May 2020, a Missouri court in the US awarded a $2.1 billion settlement to plaintiffs who claimed that J&J's talc-baby powder product caused their ovarian cancer [58]. The courts agreed to state that "plaintiffs proved with convincing clarity that defendants engaged in outrageous conduct

[40] **https://www.asbestos.com/featured-stories/cover-up/**
[41] **https://www.bcpp.org/wp-content/uploads/2020/07/JJ-Consumer-group-letter.pdf**
[42] **https://www.asbestos.com/products/talcum-powder/**
[43] **https://www.reuters.com/article/us-johnson-johnson-marketing-specialrepo-idUSKCN1RL1JZ**

because of an evil motive or reckless indifference."[44] Already before the court decision, J&J had decided to halt sales of its baby talc in the US and Canada. However, J&J decided to continue exporting baby talc to countries in the global South,[45] including Tunisia.

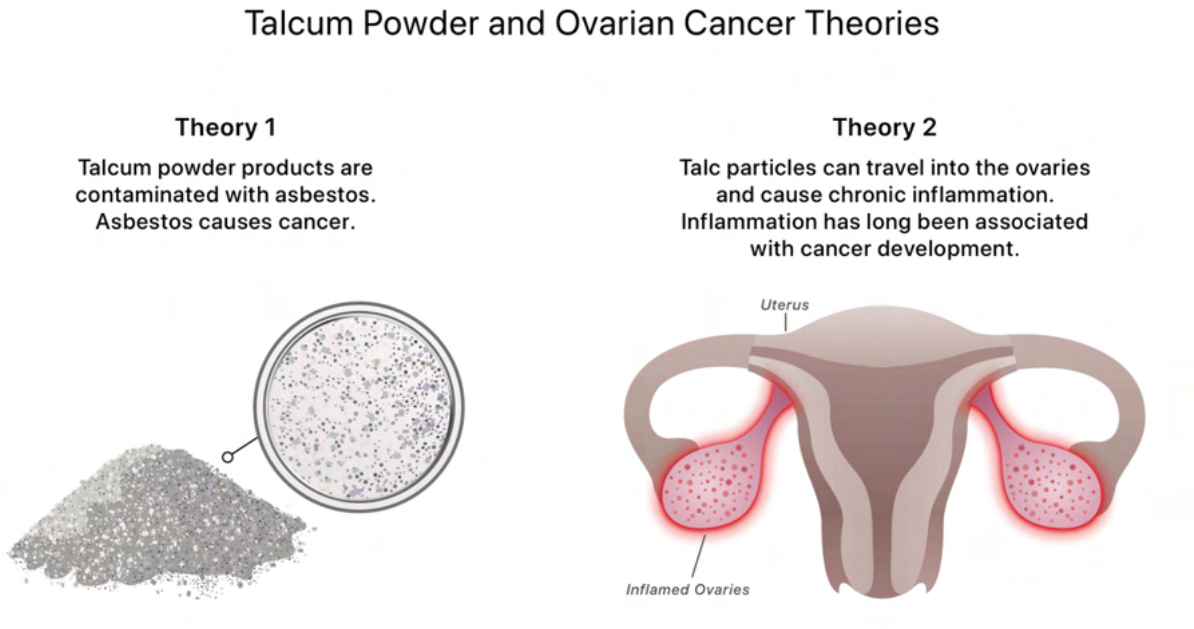


Fig. 39. Asbestos in talcum products is a risk of mesothelioma cancer and ovarian cancer.
Photo: DrugWatch

The organisation AEEFG (l'Association de l'Éducation Environnementale pour les Futures Générations) has officially requested the government of Tunisia to stop imports of J&J baby talc and other talc. In total 4000 tonnes of steatite and talc were imported to Tunisia (INS 2019) for use in cosmetics, food, pharmaceuticals, and other sectors[46].

[44] https://www.reuters.com/investigates/special-report/johnsonandjohnson-cancer/#johnson-research-sidebar
[45] https://www.yabiladi.com/articles/details/93961/talc-johnson-and-johnson-interdit-vente.html
[46] https://lapresse.tn/87811/sante-une-association-environnementale-appelle-a-retirer-du-marche-tunisien-des-produits-importes-contenant-du-talc-cancerigene/

CHAPTER 4
GOOD PRACTICES IDENTIFIED

Photo: WEP Tunisia, Takelsa cooperative members receive organic training certificate, 2022

CHAPTER 4

Good Practices Identified

4.1 Organic farming and agroecological practices

Tunisia – women farmers, agroecology and a guest house

The Takelsa Female Farmers' Organisation for Development was established in 2015 with the support of the Tunisian Union of Social Solidarity (UTSS) and the French Ministry of Foreign Affairs. Takelsa supports 164 women farmers and craftswomen who are members of the association, promote women's autonomy, and defend their economic rights daily. As part of the Women2030 programme by WECF and Women Environmental Programme (WEP) Tunisia, Women farmers received training in agroecology and how to transition from conventional agriculture and the use of industrial pesticides and fertilizers to organic agriculture. Despite resistance from their husbands, the women farmers practiced the agroecology principles in some areas, starting in small plots, and proved that they could yield organic products at better prices. Finally, as the income from the organic produce was good, husbands started supporting and larger plots are now being cultivated.

As an outcome of the training, the women farmers created the first agro-ecological 'guest house' for tourists ("Table d'hôtes", equivalent to Bed and Breakfast) in 2022. The Guest house serves the food produced organically by the women farmers of Takelsa. It is the first example of an ecological transition that improves women's income in the region.

Fig. 40. The principle of a table d'hôte consists in sharing a meal with the owners of the house and the ingredients coming mainly from the region. Photo: Marhb.tn

Tunisia – women beekeepers

In Tunisia, apiculture is traditionally done by men. Honey makers who employ mainly women is a new phenomenon, breaking down traditional gender roles. Mariem Cherni helped establish the 'Bee Treasures' initiative that brings together women from low-income communities to learn how to become professional beekeepers and honey producers.[47] Bee Treasurers avoids the use of plastic in their packaging and transforms all the honey by-products in an organic way to close the loop without any waste.

Fig. 41. Mariem Cherni and her team at Bee Treasures Initiative in Tunisia helped marginalized women to become professional beekeepers. Photo: sg.news.yahoo.com

Tunisia – moving to plastic-free packaging, bio-pesticides

The Takelsa Female Farmers' Organisation for Development assists its women farmers with advertising and marketing of their products from cattle breeding, poultry farming, milk production, fruits, vegetables, pepper, spices and even textiles.

Fig. 42. Reusable packaging and plates made from natural fibres to replace Single Use Plastics. Photo: WEP Tunisia

[47] https://www.facebook.com/gdatresorsdabeilles

As a result of the training on agroecology by WEP Tunisia, and an increasing share of ecological products which are sold on markets in Tunis, the Takelsa women have shifted from plastic packaging to reusable bags from cloth as well as the use of reusable cutleries. On the market they are educating consumers on why it is important to stop using single-use plastic packaging.

Through a training in artisanal cheese production, the women farmers have learned organic methods and about closing the loop without waste, by packing the cheese into wicker baskets, to avoid plastic packaging. With the example of Takelsa cooperative, and the increasing popularity of organic farming and organic products, start-up businesses have emerged in Tunisia that are now developing bio-pesticides.

Fig. 43. Female farmers supported by Takelsa have better access to sell their products. Photo: WEP Tunisia
Soap products made by craft-women members of Takelsa. Photo: WEP Tunisia

Kenya – recycling electronic waste: women's empowerment

A number of social enterprises have started to propose services for safe collection, recycling and disposal of e-waste. The Waste Electrical and Electronic Equipment Centre (WEEE Centre) near Nairobi is a social enterprise that collects e-waste in accordance with NEMA's waste regulations. At arrival at the center it is sorted by type and category, and the reusable parts are collected, and the unrecyclable parts are disposed of in an environmentally safe manner. The WEEE-centre also proposes as service to safe destruction of data.

The WEEE Centre has a partnership with Carrefour supermarket stores in Kenya. There are e-waste bins in all the eight Carrefour stores in Nairobi to provide centralized drop off points for e-waste such as phones, batteries, laptops, lamps, cables and other house appliances.

For larger items that cannot fit into the bins, the stores have provision for larger items through the information desk. All equipment dropped in these bins is collected and transported to the WEEE Centre for safe disposal.

The WEEE Centre also provides training on safe e-waste management and disposal and cooperates with 'Computers for Schools Kenya (CFSK) on the training women and youth on proper handling of e-waste through the Digi-truck, which is a mobile classroom that moves around Kenya. The computers inside the 2 digi-truck are refurbished, the trucks are powered with solar panels and battery storage, including wireless broadband for digital education. After the training, participants receive certificates of completion.

Computers for Schools Kenya (CFSK) is a charitable non-governmental organization registered in 2002, which now has eight Regional Centres hosted by various Government institutions country-wide. CFSK has sourced for over 400,200 students refurbished personal computers, in cooperation with WEEE Centre. The computers are installed with requisite software in 12,010 public Secondary and Primary schools, Technical Institutes, Teacher Training Colleges, Medical Training Centres and several Universities.

Fig. 44. the e-waste recycling facility is open for public. Technical skill program are open for women, the computers inside the Digi-Trucks are refurbished. Photo: ewik.org

Kenya – biogas production from waste

The social enterprise Flexi-Biogas has local solutions to produce biogas for cooking from food waste, fish market waste, animal dung and even from harvesting invasive species such as the water hyacinth (*Eichhornia crassipes*).

Flexi-biogas has installed a number of biodigester units that are cost-efficient. Near Nairobi it has installed a biodigester at a local market. At the end of the market-day, the green waste goes into the digester, which in turn produces biogas for the local restaurant. Similar units have been installed for community kitchens on Victoria Lake using water hyacinth waste. The biodigesters do not take much space and are easy to maintain. Besides producing methane gas, the digester produces slurry from the fermentation process, which is a rich fertiliser for soil improvement. Methane gas is a clean alternative to other traditional cooking fuels like charcoal or wood, and reduces smoke, soot, and indoor air pollution.

Fig. 45. Demonstrating cooking with Biogas from food waste, and the Methane gas container from Flexi Biogas BG5 using PVC tarpaulin material. Photos: The Guardian and Flexi Biogas

Kenya – waste separation, collection and recycling

Taka-taka Solutions is a private waste company established in 2011 that collects 60 tons of waste per day of which 95% is recycled. The company operates mainly in the Nairobi area and has 350 employees of which 50% are women. There are different ways of waste collection, either directly from the household where the household pre-sorts the waste into different bags of recyclables (plastic, paper etc.), or from public stations. Taka-taka also provides organic waste collection services for households and public gardens, and then processes it into compost, which is later sold and can be used as soil enhancer or compost material.

The public 'stations' are available at numerous points (see map) where residents of Nairobi can come and bring their recyclable waste.

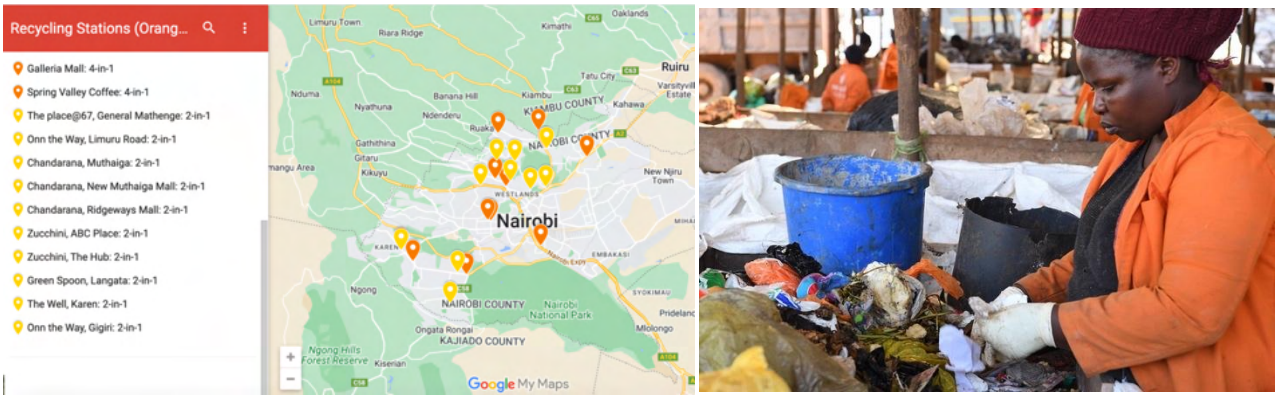


Fig. 46. Locations of recycling drop-offs of Taka-taka Solutions and 50% of employees are women. Photo: Taka-taka.

There exist two different units within their recycling stations:

- **4-in-1:** four types of wastes: metal/aluminium, cardboard/paper/tetrapak, plastic containers, and PET bottles
- **2-in-1**: two types of waste only: plastic containers and PET bottles.

Fig. 47. Taka-taka's 4-in-1 recycling station in Nairobi
Photo: Taka-taka

Kenya – good insects replace bad pesticides

The company Dudutech - Environmentally intelligent farming - is based in Naivasha, Kenya, where there are many flower farms. Many of the flower farms are clients of Dudutech. 'Dudu' means insect in Swahili. Dudutech produces 'natural enemies' of pests that are a problem for the flower growers.

These natural enemies are 'friendly insects' that are produced, selected, and sold in bottles that are cooled at a low temperature so that the 'friendly insects' can be transported around the world and applied to flower and agricultural farms. The natural enemies are an alternative to harmful pesticides that are listed or potentially listed under the BRS Conventions. The friendly insects get rid of the bad insects and are fully harmless for humans and the environment.

The production of 'natural enemies' is a market of growing interest and the company has recently been acquired by investors for Europe. Dudutech employs women at all levels, in the laboratories and in management. The beneficiaries of the products produced by Dudutech are the farm workers, which in the Kenyan flower farms are in large majority (up to 90%) women.

Fig. 48. employees of the company Dudutech in Kenya carrying out quality checks of their 'natural enemies'. Photo: excerpt from the BRS film "Tackling Toxics: Gender Inclusive approaches in Kenya" by WECF and CEJAD.

Kenya – Ending gender-based violence in the workplace

Flower farms such as 'Sinya Roses' are cooperating with worker's rights and women's rights organisations to improve gender equality and women's empowerment in their companies. The 'Sinya Roses' farm has several hundred employees working in the green houses and the packaging house. It produces flowers for the export market, including 'fair trade' flowers that bring a premium price. The 'premium price' is collected, and the workers representatives vote on how the funds are used, for example, providing driving lessons for (female) employees. It has a 'gender committee' that organises training sessions on specific topics. It engages the organisation Workers' Rights Watch (WRW) to give training sessions on preventing sexual harassment and abuse.

In many companies in Kenya, sexual harassment is a common practice when female workers require a change in work schedule, for example when a child is ill, or when applying for a promotion. The fair-trade companies are applying WRW's sexual harassment policy in the flower sector in Kenya which is aligned with the Convention No. 190 of the International Labour Organisation (ILO).

Fig. 49. There are a majority of female workers in Kenya's flower farms. The gender committee organises trainings. Photo: excerpt from the BRS film "Tackling Toxics: Gender Inclusive approaches in Kenya" by WECF and CEJAD.

The United Nations Environment Programme (UNEP) based in Nairobi, also applies policies to safeguard the rights of staff, visitor and project partners. It encourages project partners, staff and visitors to their premises and conferences to raise any concerns regarding inappropriate conduct including sexual harassment as well as environmentally damaging conduct. UNEP has staff dedicated to addressing these concerns, which can be expressed directly to trust persons and/or via their online hotline (see UNEP's misconduct and anti-fraud policies[48]).

Kenya – Women's entrepreneurship for transition to green and circular economy

The start-up company "Green Stem" has invested in a production line that uses agricultural waste - leaves and stems from banana, palm and bamboo - to produce fibre from which to create environmentally friendly alternatives to plastic. The company has produced a number of sample products including cutlery and food-take away boxes, which have been tested and shown to provide a benefit to the restaurant and street-food sector. The prices are competitive, and the waste product breaks down naturally after a short period. The fibres are being used by the women-led social enterprise "Weaving Workshop" that employs marginalized women to weave carpets and bags. The fibres from the agricultural waste form a cheap and good alternative to synthetic fibres.

[48] **https://www.unep.org/about-un-environment-programme/policies-and-strategies/unep-integrity-and-fraud-and-corruption**

Fig. 50. Fibres from agricultural waste are a locally produced resource for the "Weaving Workshop" in Nairobi. Photo: excerpt from the BRS film "Tackling Toxics: Gender Inclusive approaches in Kenya" by WECF and CEJAD.

Kenya – training women farmers on smart agroecological systems

The RODI FARM is an agroecology training centre on the outskirts of Nairobi that works across the country providing training for farmers, including women farmers. The training centre is a demonstration site where participants learn how farms can integrate innovative solutions, where different crops are grown to support each-other, where farms produce super-fertilizer 'Bocasa' that are soil improvers made from a mix of organic and animal waste, and where produce become valuable products such as soaps, spices and herbs. In Kenya, most of the people working the farms are women in rural areas. Women often lack education and access to information about innovative methods that can increase revenue while reducing expensive and polluting pesticides. Rodi farms provides practical in-the-field training in local languages specifically targeted at women farmers, and the women farmers share their indigenous knowledge.

Fig. 51. Entrance to Rodi Farm Kenya training centre (left) and plastics alternative from "Green Stem" Photo: excerpt from the BRS film "Tackling Toxics: Gender Inclusive approaches in Kenya" by WECF and CEJAD

CONCLUSIONS AND RECOMMENDATIONS

Photo: J. Hausmann, directors of CEJAD, AEEFG and WECF, 2022

CHAPTER 5

Conclusions and Recommendations

5.1. Conclusions and lessons learned

Lessons and conclusions from the scoping studies on gender mainstreaming, chemicals and waste management in Kenya and Tunisia can be organised in three categories: A) Gender data and analysis, B) Legal and institutional situation, and C) Barriers to gender-equality identified

A. Gender data and analysis:
    - Overall, there is more research available about health and environmental impacts of the agriculture sector than for chemicals and waste sectors.
    - More research studies with male than female respondents were found in literature reviews.
    - More laboratory analyses looking at POPs concentration in males than females were found in literature reviews.
    - Data on the health and POPs contamination situation of waste pickers and other informal workers, both female and male, is not available.
    - Only with regard to cancer-related studies was equal information on both genders found.

B. Legal and institutional situation:
    - Gender equality is one of the fundamental principles of the Kenyan Constitution, which provides the framework for policies and regulations related to gender equality measures in the agricultural, chemicals and waste sector.
    - All government policies in Kenya, are supposed to include an assessment or review of gender equality, incorporated into the plans and systematically implemented and monitored. However, progress often depends on resources and leadership.

- Gender equality legislation in Tunisia is the most advanced in the MENA region. The use of temporary measures such as gender quotas in national and local elections has resulted in women's leadership in local government.
- Successful integration and institutionalisation of gender equality by the public and private sectors is effective when pursued by all staff and championed by top leadership. Resources from premium market prices for fair-trade products are important for the sustainability of interventions.
- Programmes for restricting and monitoring of hazardous chemicals used by consumers and producers are more successful when going hand-in-hand with the promotion of safer alternatives and supported by financial and technical resources. Reaching women consumers and producers requires specific allocated resources, as they face more barriers in accessing funding and technologies.

C. Barriers to gender equality identified:

- The lack of public policies and measures to reduce the disproportionate burden of care on women is a barrier to women's empowerment and leadership in the transition to toxic-free economies and societies.
- Measures such as affordable day-care centres for small children, elderly care and paid parental leave are effective in reducing the care burden on women but are often inaccessible for women working with chemicals and waste in agriculture and informal sectors such as waste pickers.
- Gender-stereotypes and harmful gender-norms and practices are a barrier to women's equal participation and decision making.
- Policies to ensure that work and living spaces are free of sexual and gender-based violence are insufficient and lack enforcement.
- Voluntary measures to end sexual harassment in the workplace, supported by financial incentive schemes, have shown some level of success, and can be an intermediate step in the absence of legal measures.

Summary Table: Lessons and conclusions of gender mainstreaming in chemical and waste management in Kenya and Tunisia

Gender data and analysis	Legal and institutional	Barriers to equality
Scoping studies on different impacts and roles (by sex) predominantly about males	Gender equality strongly anchored in Constitution/Laws	Public policies to reduce burden of care on women lack: e.g. affordable healthcare, (pre-)schools
Laboratory analysis e.g. POPs in human body (by sex) predominantly about males	Government policies include gender equality analysis and plan, but lack resources	Policies for equal decision-making women & men in public/private sector: less in rural, informal sectors
Monitoring chemical's use and restrictions & gender roles need specific resources for women	Public and private sector integrate gender equality in institutions, including on SEAH	Policies to ensure work and living spaces are free of sexual violence: mostly voluntary basis, not enforced

5.2. Recommendations

Achieving gender-equality requires a multi-sectorial and multi-faceted approach by government and other actors. It requires, policies, guidelines, capacity building, strategies, plans, finance, data, awareness raising and leadership. Gender biases are prevalent in all areas and sectors. A combination of measures is required addressing internal processes and external behaviour and mind sets.

General recommendations to improve the mainstreaming of gender in relation to chemicals in Kenya and Tunisia can be grouped into four categories: A) Equal participation and leadership for implementation of environmental and gender-equality policies, B) Capacity building and gender data, C) Access to finance and resources for gender equality and women's empowerment and D) (Gender-equal) Just Transition to sustainable and toxic-free economies.

A. **Equal participation and leadership to advance gender equality in relation to chemicals and waste**
   - Advance gender-responsive implementation of the chemical conventions by the ministries of environment and in cooperation with ministries of agriculture, trade and finance, by developing, implementing and resourcing a gender action plan. Kenya MoEF has a draft Gender Action Plan which needs approval and resourcing.
   - Update Tunisia's and Kenya's National Implementation Plans for BRS conventions by including recently adopted decisions on restrictions of new POPs such as PFAS and new pesticides, develop strategy to pro-actively start phasing out those listed on the

candidate lists, and integrate more strongly gender-equality measures in the new NIPs. Kenya and Tunisia should speed up ratification of the Minamata Convention

- Create inter-ministerial cooperation to build capacity and advance implementation of gender-equality policies and measures on chemicals and waste that are cross cutting between different parts of government
- Strengthen and enforce policies to end the use of highly hazardous pesticides (HHPs) that are already subject to elimination or restriction or on the candidate list for elimination or restriction, and support (women) farmers and (women) entrepreneurs with the transition to organic farming and non-toxic production
- Gender quotas for leadership and managerial positions in the public and private sectors, including in public offices dealing with chemical and waste, need to be defined and supported by enforced regulations.
- Leadership training for women in the chemical and waste sectors is needed to improve their knowledge and participate in decision-making.
- Measures need to be established to increase girls' participation in green chemical studies, research, and development programmes.
- Redress mechanisms must exit for women and men to pursue cases of gender-based discrimination

B. **Capacity building and Gender Data**

- More training for women and men in chemical pollution prevention techniques and safer alternatives need to be organised by the public and private institutions.
- Government agencies and private sectors must promote public awareness and training for facilitators, civil servants, and educators on ending gender-biases (e.g. depending on woman's martial status) and sexual violence in workplaces and public spaces.
- Targeted training programs for women, e.g. on agroecology, must be promoted and supported by all stakeholders.
- Gender data gaps regarding chemicals and waste and differentiated impacts on women and men and vulnerable groups, need to be identified and addressed, for example on the chemical pollution and contamination regarding informal workers e.g. women waste workers and specific health impacts.

- Provide policies and incentives for all public offices and private companies to create 'gender equality committees' that support and monitor gender policies including preventing and addressing sexual harassment and abuse.
- Create a platform that maps all ongoing and previous programmes and policies addressing chemicals and waste, including special section for gender-responsive programmes, specifically for Tunisia.
- More projects to generate data and information (especially in rural areas) should be funded/supported: plastics pollution, HHPs, women waste pickers, no information available on women workers in chemicals industry.
- Chemicals area transversal across all sectors. Consider how Kenya and Tunisia can make use of the European REACH data information system for chemicals, and share and exchange information on hazardous chemicals in products and waste between countries in the African Union, building on the BRS and Bamako Conventions.
- Transfer of technologies and increase capacity of analytical laboratories in both countries (Kenya and Tunisia) and increase the capacity of the research institutions to generate data at the national level to support evidence-based policy.

C. **Access to finance and resources for gender equality and women's empowerment**

- Financial institutions should provide targeted funds accessible for women green start-up and entrepreneurs, in form of low-interest loans, equity and grants. Currently women entrepreneurs have great barriers to accessing affordable loans and equity in Kenya and Tunisia. In Kenya and Tunisia local banks have loans which can have 25% interest rates per year, but start-ups become unviable with such high financial cost.
- Donors and government agencies should allocate higher budgets and financial resources for gender analysis, research, and gender-responsive measures relating to chemicals and waste.
- Increase funding for feminist and civil society organizations for awareness raising, education, capacity building on avoiding POPs contamination, with a focus on vulnerable groups such as informal workers.
- Raise awareness with donors on the need for more funding for civil society activities to reduce chemicals and waste pollution and to demonstrate safe and sustainable alternatives, in particular with gender-responsive approaches.

- Cooperate with impact funders, multilateral and bilateral donors to create start-up funding for green entrepreneurs, with specific windows for women-led initiatives, that provide accessible and affordable funding for locally produced safe alternatives to harmful chemicals and products, including alternatives to plastics and pesticides.
- Cooperate across government, with local authorities and multilateral donors to create a fund for remediation of contaminated sites and waste dumps and to ensure alternative livelihoods for impacted communities and informal workers, in particular women farmers and waste pickers.
- Prioritize policies, public investments and capacity building in waste management system and infrastructure at highest level of government. Apply polluter-pays and extended-polluter mechanisms to finance urgent measures such as the closure of open landfills which pose a general health hazard due to open burning and water pollution (e.g. Dandora landfill Nairobi), whilst creating a just-transition scheme for (women) waste-pickers.
- Fund and strengthen asbestos regulation for enforcement for safe recovery and disposal sites for asbestos waste by registered collectors and for public awareness raising campaigns about the highly carcinogenic nature of asbestos and need to protect construction workers, in majority men, and waste workers and children living around waste and construction sites.
- Fund immediate measures to stop the import and use of mercury and the import of plastic and electronic waste, by cooperation with international agencies, civil society organisations and customs agencies.

D. **(Gender-equal) Just transition to sustainable and toxic-free economies**

- Map critical actors for the green transition, identify winners and losers and any gender-patterns, to develop a gender-just transition strategy towards a non-toxic economy.
- Cooperation between public and private sector for training and job-creations for impacted women and men, especially waste workers.
- Create fiscal incentives for combining green and gender-just job creation that can support social-entrepreneurship such as safe e-waste collection and refurbishment (example of WEEE and Computers for Schools Kenya, see chapter 3).
- Strengthen legislation and enforcement for occupational health protection of workers in the chemical and agricultural industries, with gender-responsive guidelines

- Create cooperation with national and international researchers and laboratories to support small and medium enterprises (SMEs) to identify current use of hazardous chemicals, especially for the recycling sector (recycled plastics and e-waste often have high POPs content) so as to support companies to source safe and clean materials and to protect their workers health (in Kenya several 'recycling' companies are women-led but highly polluting)
- Support specific 'women in transition to safe jobs' programmes by associations of waste workers (e.g. WIEGO, CEJAD) and workers in the Artisanal Small Gold Mining (Kenya) to shift to new, safer livelihoods
- Cooperate across ministries, with local authorities and tourism agencies to support women sustainable farming and guesthouse initiatives (see example of Takelsa, Tunisia, chapter 3).
- Create highly visible good practice award programme for young people working on gender-responsive non-toxic solutions.

Summary Table: Recommendations for advancing gender equality and women's rights and empowerment related to chemical and waste in Kenya and Tunisia

Gender Equality in BRS	Capacity building	Access to finance	(Gender) Just transition
Gender Action Plans for implementing BRS at national level	Training of women & men on chemical pollution, prevention	Create funds accessible for women green entrepreneurs	Identify key actors for green transition, winners, and losers (by sex)
Gender quota in public private sector, incl. chemical and waste	Training on ending (sexual) violence in work + public spaces	Support finance for gender studies no chemicals, waste	Training and job-creation for impacted women & men (waste workers)
Update NIPS and add legislation and actions on new POPs	Targeted training for women e.g. agroecology	Funding awareness raising by feminist civil society	Fiscal incentives for combining green and gender-just jobs
Leadership training women in chemical and waste sector	Identify gender gaps in data e.g. health impacts on women waste pickers	Fund civil society and private sector to promote and show safe POPs-alternatives	Strengthen occupational health protection laws, gender-specific guidance
Measures to increase girls in green chemical studies	create 'gender equality committees' for action, monitoring incl. SEAH	Affordable funding (equity, loans, grants) for (women) green entrepreneurs	Cooperation to support (women-led) SMEs to identify POPs in their production/sourcing
Redress mechanisms to pursue cases of gender-based discrimination	Map and link all chemicals, waste projects incl. gender dimensions	Create fund for remediation, clean up and support polluted communities/groups	Support "women in transition to green and safe jobs' programmes

Inter-ministerial cooperation on gender, chemicals, waste	Improve chemical in product and waste data sharing within AU	Fund urgent closure of waste dumps (e.g. Dandora) from ecotax	Support women sustainable farmers, artisans, tourism
End use of HHPs and support (women) farmers on agroecology	Increase local laboratory and research capacity on POPs chemicals, waste	Fund safe removal, disposal of asbestos, end imports mercury	Create award programme youth on gender just green solutions

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Photo: S.Gabizon, odour testing of fertilizer produced from biogas plant, Kenya, 2022

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