ENVIRONMENTAL ADVOCACY AND VOLUNTEERISM : A TOOL FOR IMPROVING ENVIRONMENTAL HEALTH AND CURBING WATER EPIDEMICS

By

Prof. Oladele Osibanjo*, *FNES,FIPAN, FCSN,FICCON*

PRESIDENT

Waste Management Society of Nigeria (WAMASON)

c/o 130 Obafemi Awolowo Way, Ikeja, Lagos.

Presented at the 13th NESREA National Stakeholders Forum

NICON Hilton Hotel Abuja; 29-30 October 2019

Overview Of Presentation

- **Importance of Water as a Resource**
- **Sources of Surface and Groundwater Pollution**
- **Hazardous Substances in Water, Wastewater and Solid wastes including Lifecycle Consideration**
- **Hazardous Chemicals in Water & Health Effects**
- **Factsheet on Water and Sick Water**
- **Sustainable Development Goals and Clean Safe Water**
- **Environmental Advocacy and Volunteerism in improving Environmental Health and curbing Water Epidemics**
- **Conclusion and Recommendations**

Introduction : Importance of Water as a Resource

- **Sustenance of Natural Ecosystems, Human Society and National Economies all require Clean Fresh and Safe Water in sufficient amounts. Hence the cliché :**

  ‘’ Water is Life ‘’

- **There is need for multifarious daily use of clean water for : .Drinking ,**
- **Bathing,**
- **Washing,**
- **Cooking, and Production of Industrial Goods and Services; Recreation, Agriculture (including Irrigation, Livestock watering, Aquaculture) , Hydro-energy production, Environmental sanitation etc.**

Introduction : Importance of Water as a Resource

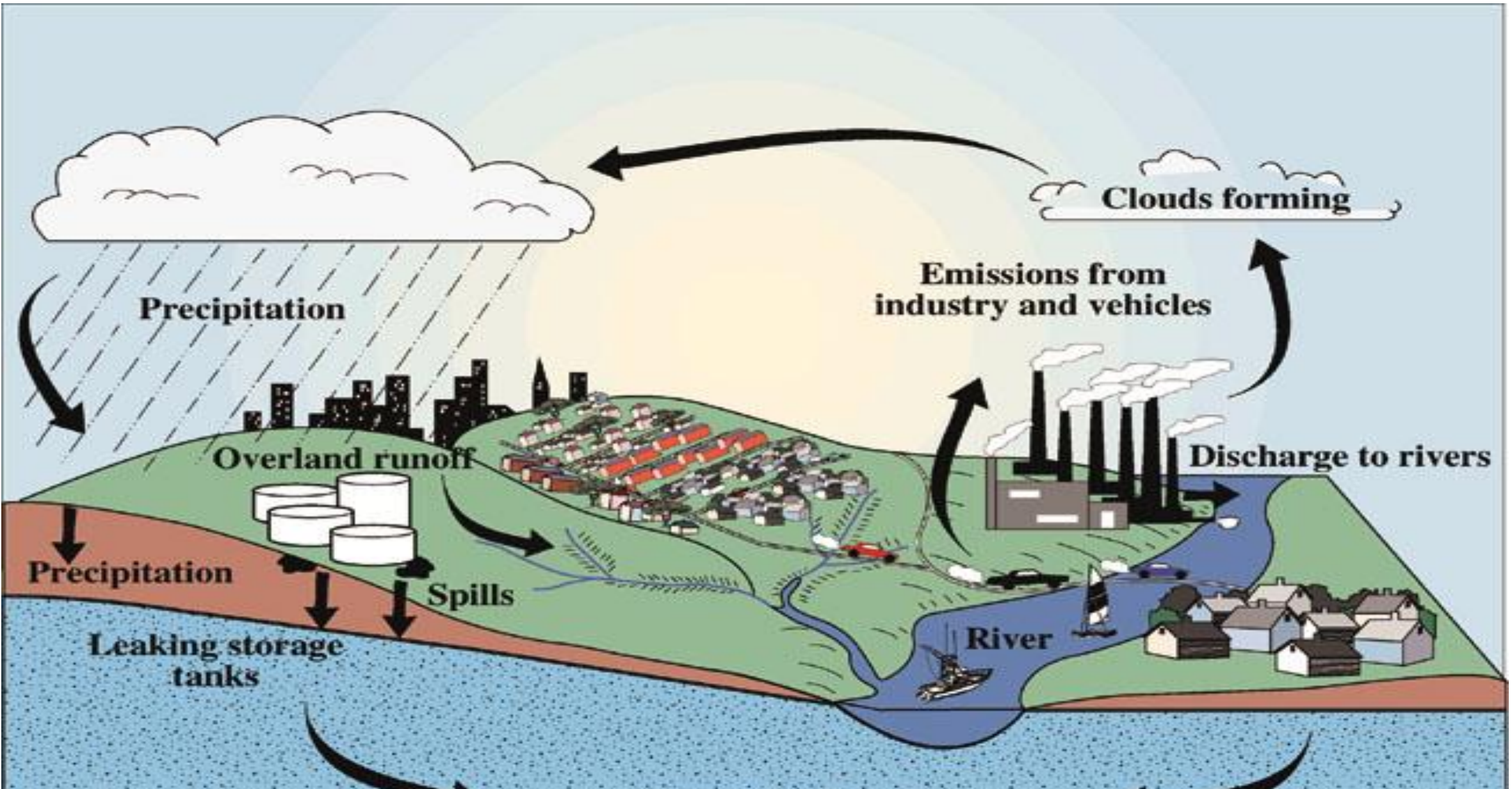
Introduction : Importance of Water as a Resource

- **About 71% of the entire earth's surface is covered by water, and only about 3% of this is fresh water, and much of this fresh water is not clean or fit for most uses due to polluting human/ anthropogenic activities. Thus only around 1 % of the world's fresh water is easily accessible, but it is not evenly distributed around the world and is vulnerable to contamination from human activities.**

- **Increasing demand for clean freshwater caused by Continuing population growth and urbanisation, rapid industrialization, and expanding and intensifying food production are all putting pressure on water resources and increasing the unregulated or illegal discharge of contaminated water within and beyond national borders with fresh clean water scarcity in most developing countries including Nigeria..**

Importance Of water as a Resource

- There are fresh water access problems in many parts of the world especially developing countries due to unsustainable management of water resources
- Some travel 2km to fetch water
- It is now a human right to have access to Clean Fresh Water but many are not so fortunate !!!!!
- 1.6 billion people live in water-stressed areas in 1995
- 2.8-6.9 billion people projected to live in water stressed areas by 2050
- UNEP warned a couple of years ago that the next world war may be caused by water scarcity with countries going to war over access to fresh water resources.


Clouds forming
Precipitation
Emissions from
industry and vehicles
Overland runoff
Discharge to rivers
Precipitation
Spills
River
Leaking storage
tanks

Sources Of Surface & Ground Water Pollution

- **Refuse Dumpsite leachate***
- **Industrial Effluent – Iya Alaro River in Ikeja Lagos!!!!!!**
- **Residential / Domestic Effluent**
- **The use of Agricultural Chemicals and Fertilizers**
- **Accidents/Vandalization and Leakages from Oil and Gas Pipeline, Leaking Underground Storage Tank (Baruwa area of Lagos , most ground water polluted by oil, therefore not drinkable)**
- **Chemical Infiltration ***
- **Mining Activities**
- **Salt Water Intrusion***
- **Surface (Urban) Run – Off; Floods**
- **Other sources* (Atmospheric Pollution, River Pollution, Facilities such as Abattoirs, Cemetery)**
- *** Especially for ground water**

: **Pictures of refuse dumps and leachate collection points in some Lagos Dumpsites**

Hazardous Waste Toxic legacy from Ubsustainable Crude Waste Management Practices

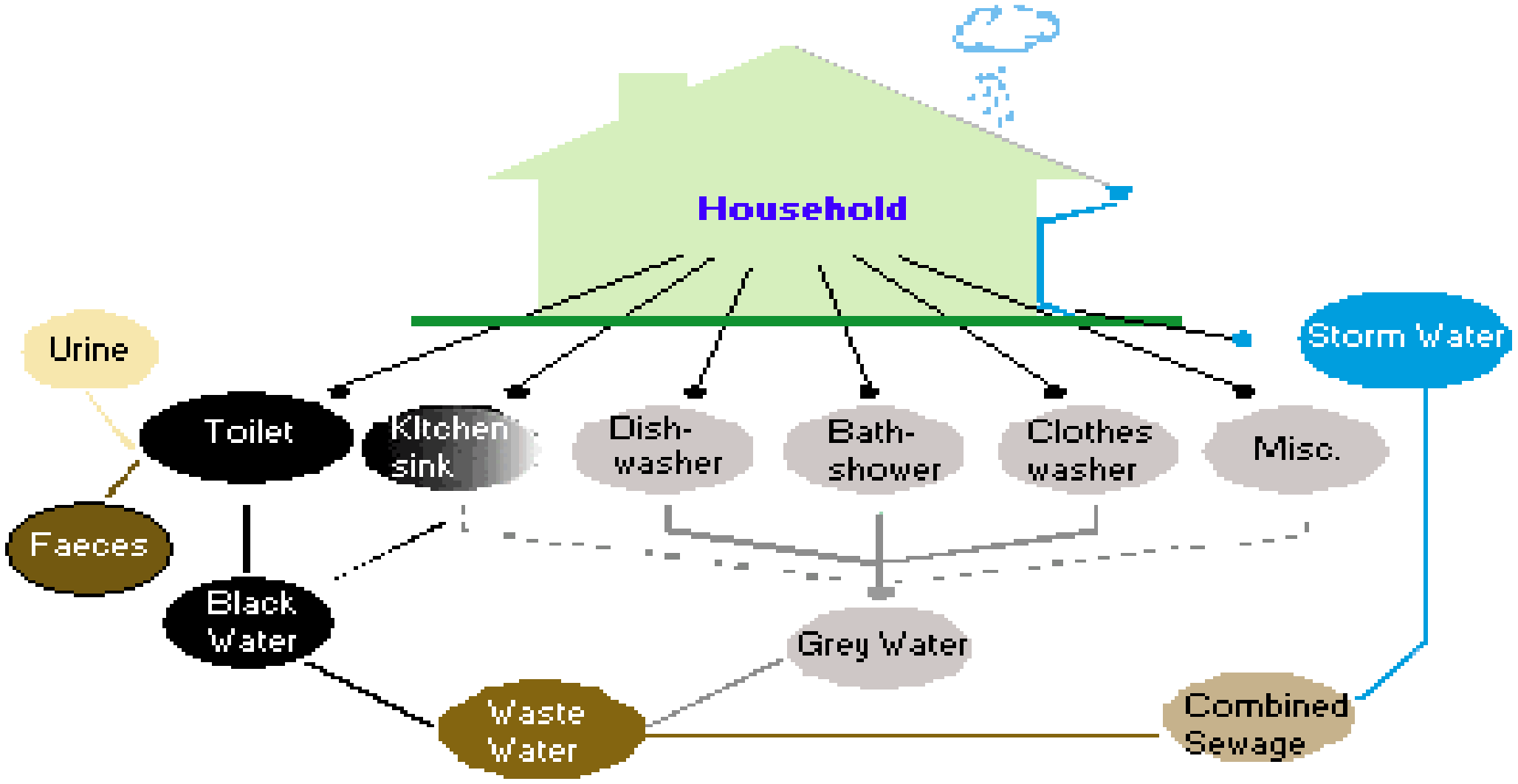


Figure 1: A range of possible sources of household wastewater showing wastewater from toilet, kitchen, bathroom, laundry and others

Surface and Ground Water Pollution

Discharge of untreated industrial effluent into a surface water body

Crude Oil spill in a swampy area

Marine litter -Dumping Plastics & other waste into Lagos Lagoon, Nigeria

Marine litter including Plastics on Atlantic Ocean beach in Lagos Nigeria

According to *Ocean Atlas 2017* - Nigeria ranks among the top twenty countries with the Worst plastic waste management. At high and low estimates, Nigeria is world's Number eleven among countries with the largest share of plastic waste that ends up in the ocean. Nationwide, over 200,000 metric tonnes of plastic waste is discharged into the Atlantic Ocean each year.

School children swimming in the leachate pond at the Lalupon dumpsite Ibadan

An adjacent stream into which the pond overflows

Fishery

Poultry

Piggery

PLATE 1

A section of dumpsite A used for the construction of house.

Products of IT Age

Hazardous e-Waste Constituents

- ***Toxic Metals***

  Lead, Cadmium, Mercury, Beryllium, Selenium, Lithium, Antinomy, Arsenic

- ***Brominated Flame Retardants***

  TBBA (tetrabromo-bisphenol-A)
  PBDE (polybrominateddiphenyl) etc.

- ***Other Halogenated Hydrocarbons***

  PVC (polyvinyl chloride)
  CFCs (chloroflourocarbons)

- ***Rare Earth Elements***

  Yttrium, Europium, Americium

Open Burning of E-waste In Nigeria

Challenges in E-waste management in Africa: Environmental Aspects

GeSI & StEP E-waste Academy

- **Major environmental and human health impacts result from crude dismantling, material recovery and final disposal through release of hazardous substances into soil, water and air**
- **Impacts during collection, refurbishment and repair of EEE could be less significant with appropriate safety measures adopted.**
- **Cable burning is a major source of POPs dioxin emissions**
- **Environmental monitoring in Ghana and Nigeria have provided scientific evidence of gross contamination of soil, plants, ground water, surface water and sediments U threshold limit of 1000mg/kg (RoHS) Portend risk factors to attainment of sustainable development and MDGs**

Table X.4 *Some Toxic and hazardous components of e-waste*

Item	Hazardous Components
Cathode Ray Tube	Lead, antimony, mercury, phosphorous
Liquid Crystal Display	Mercury
Circuit Board	Lead, beryllium, antimony, brominated flame retardants (BFR)
Fluorescent Lamp	Mercury, phosphorous, flame retardants
Cooling systems	Ozone depleting substance (ODS)
Plastic	BFRs, phthalate plasticizer
Insulation	Ozone depleting substances in foam, asbestos, refractory ceramic fibre
Rubber	Phthalate plasticizer, BFRs, lead
Electrical Wiring	Phthalate plasticizer, BFRs
Batteries	Lead, lithium, cadmium, mercury

Source: UNEP, 2007; MoEF, 2008; ENVIS, 2008.

MAJOR Groups of endocrine disrupting chemicals Released into Water Bodies

- *Metals*
- Pb, Cd, Hg, As
- Pb – used in smelting and in several other industries (battery, paint, plastics, textiles
- Cd – occur as impurities in fertilizers and used in electroplating, Ni-Cd batteries and paint pigment industries
- Hg - fused with other metals as alloys (amalgams) used in the manufacture of NaOH and chlorine by electrolysis of brine; used in advertising signs, in Hg switches and other electrical appliances; used for making thermometers, barometers, diffusion pumps and paint pigments.
- As – used in bronzing, for hardening shots, as doping agent in semi conductors (gallium arsenide) for solid state devices; used for making special glass and for preserving wood

MAJOR Groups of endocrine disrupting chemicals Released into Water Bodies

- **Organics**
- Phthalates,
- Phenols,
- Pesticides,
- Polycyclic Aromatic Hydrocarbons (PAHs),
- Organotins,
- Brominated Flame Retardants (BFRs) – e.g. - PBDES
- Dioxins and Furans *
- Perflourinated compounds (PFOS and PFOA)*
- Human and Veterinary Pharmaceuticals
- Personal Care Products
- **Persistent Organic Pollutants (POPs)***

WHAT ARE POPs ?

Persistent organic pollutants (POPs) comprising of the " dirty dozen" and "nasty nine" are organic chemicals that are resistant to environmental degradation through chemical, biological and photolytic processes with the following features :

(i) possess toxic characteristics;

(ii) are persistent – long half lives up to 16 years;

(iii) bio-accumulate in human and animal tissue;

(iv) bio-magnify in food chains

(v) are prone to long-range transboundary - atmospheric transport and deposition

Initial List of 12 Persistent Organic Pollutants (POPs)

Chemical	Pesticides	Industrial Chemicals	By-products or UPOPs
Aldrin	+		
Chlordane	+		
DDT	+		
Dieldrin	+		
Endrin	+		
Heptachlor	+		
Mirex	+		
Toxaphene	+		
HCB	(+)	+	
PCBs		+	
Chlorinated Dioxins			+
Chlorinated Furans			+

9 +1 new POPs (added to the Convention)

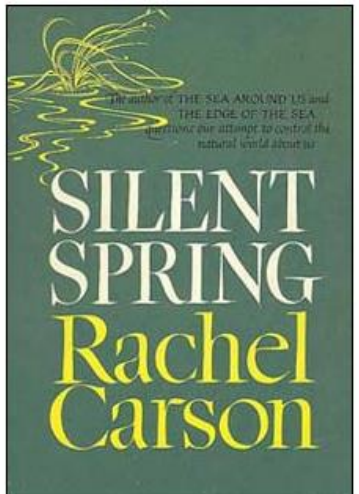
Chemical	Pesticides	Industrial chemicals	Unintentional production	Annex
Chlordecone	+			A
Lindane	+			A
Alpha hexachlorocyclohexane	+		By-product of lindane	A
Beta hexachlorocyclohexane	+		By-product of lindane	A
Endosulfan	+			A
Commercial pentabromodiphenyl ether		+		A
Commercial octabromodiphenyl ether		+		A
Hexabromobiphenyl		+		A
Perfluorooctane sulfonic acid (PFOS), its salts and	+	+		B

Uncontrolled Chemical Production lead to Global Chemical Pollution

Chemical production and release have resulted in global pollution with negative effect on human health and the ecosystems. The best known and globally addressed chemical group are persistent organic pollutants (POPs).

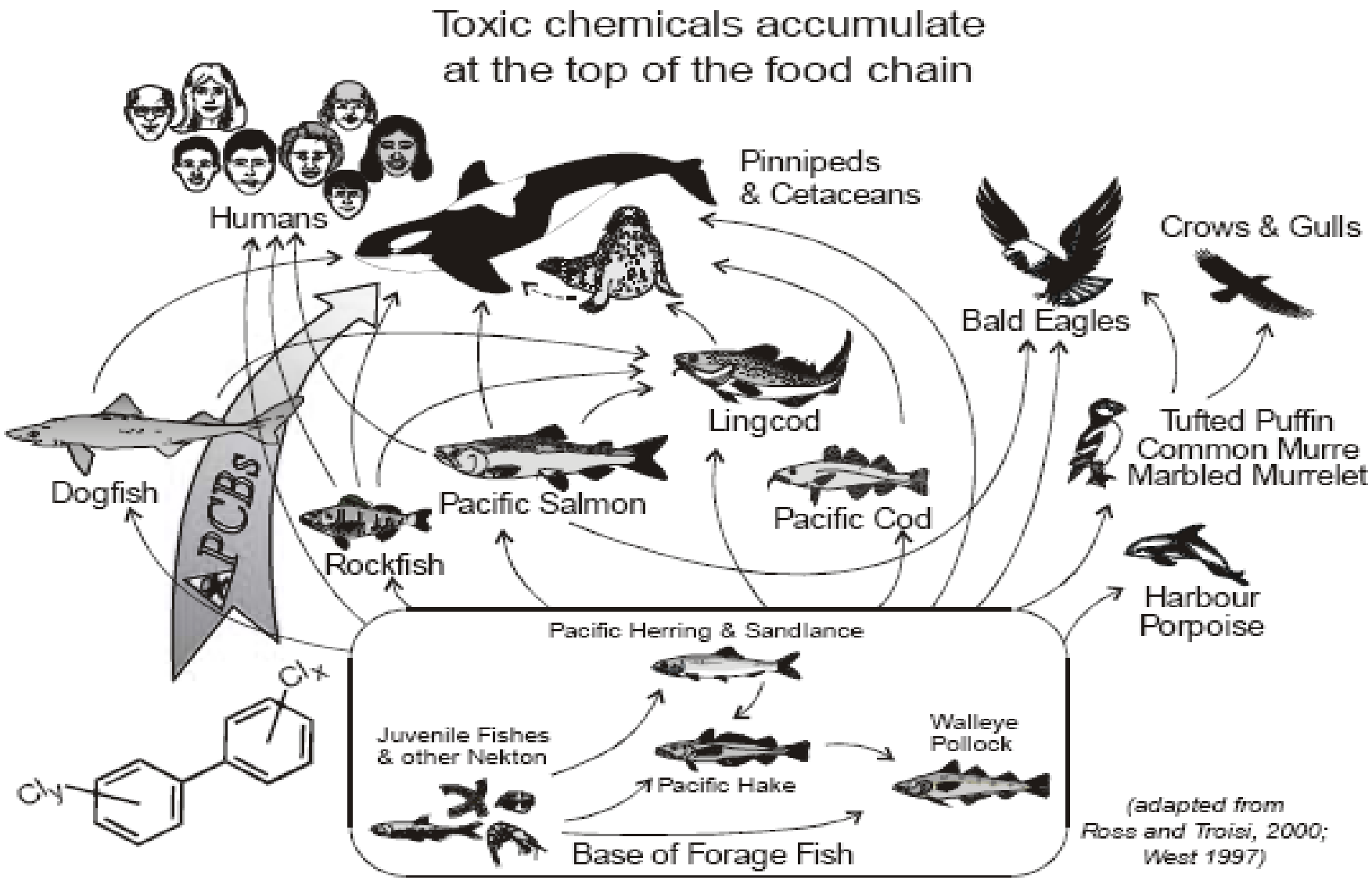
Persistent Organic Pollutants

- Persistent in environment & in organism/body
- Toxic to humans/biota
- Mobile in environment



Human Exposure to POPs?

- **Exposure to POPs along its life cycle can cause serious health problems including the following :**
  - **Certain cancers**
  - **Birth defects**
  - **Dysfunctional immune and reproductive systems**
  - **Greater susceptibility to disease and**
  - **Even diminished intelligence**


Toxic chemicals accumulate
at the top of the food chain
Humans
Pinnipeds
& Cetaceans
Bald Eagles
Crows & Gulls
Lingcod
Tufted Puffin
Common Murre
Marbled Murrelet
Dogfish
PCBs
Pacific Salmon
Pacific Cod
Rockfish
Harbour
Porpoise
Pacific Herring & Sandlance
Juvenile Fishes
& other Nekton
Walleye
Pollock
Pacific Hake
Base of Forage Fish
(adapted from
Ross and Troisi, 2000;
West 1997)

"Life-Cycle" POPs/PTS and Human Exposure

Emission Sources

Reservoirs (e.g. **landfill, contaminated sites, stockpiles, soil, sediments**)

Products (e.g. pesticides, PCB in transformers, **BFRs and PFCs** in EEE, textiles, carpet, plastic etc., PVC)

Environmental Transport

Atmosphere

Land

Plants

Animals/ Cattle

Aquatic

Fish & Shellfish

Exposure Routes

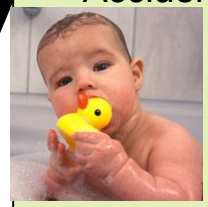
Inter-generational

Inhalation

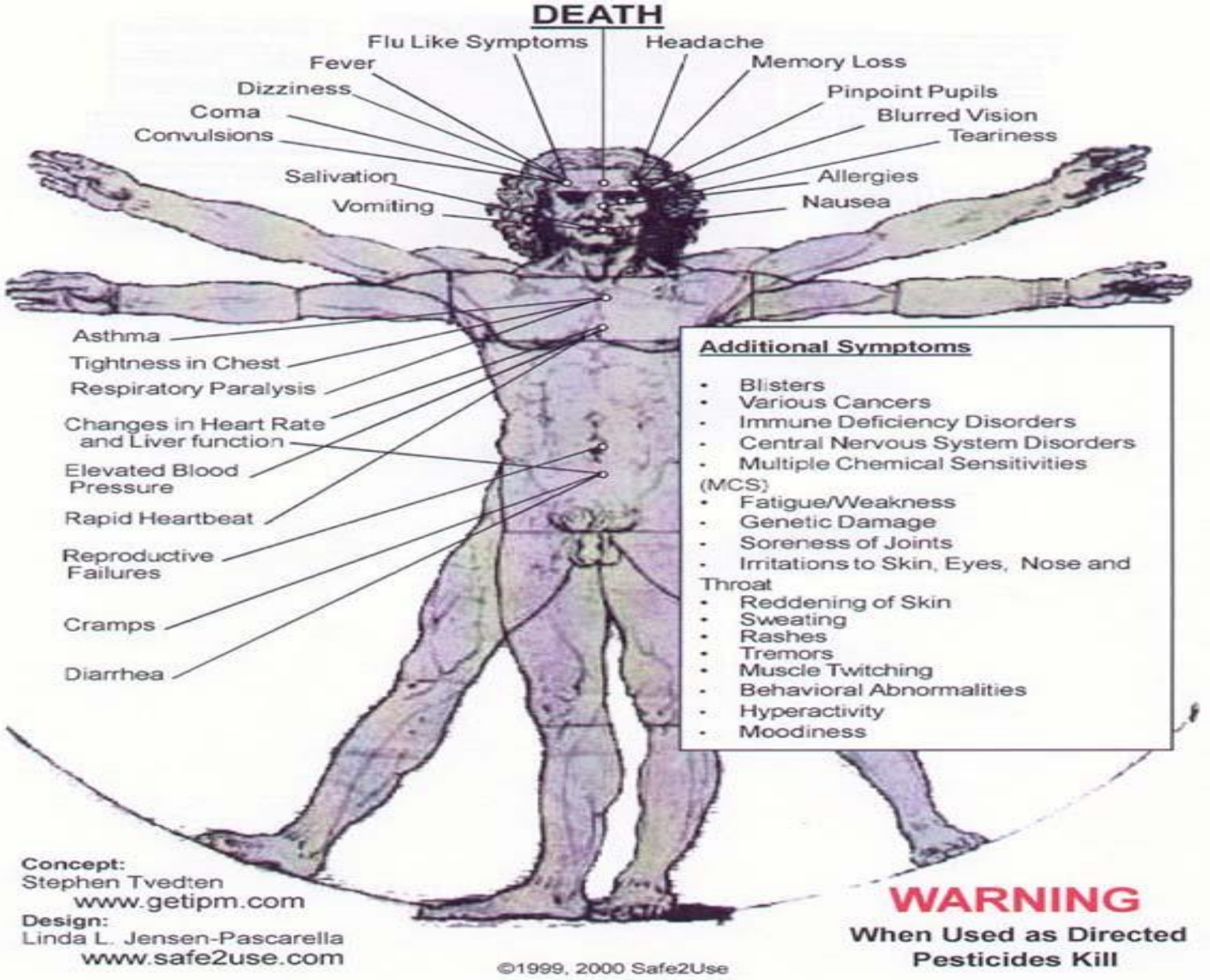
Food ingestion

Occupational

Accidental



Consumer (Indoor)


DEATH
Flu Like Symptoms
Headache
Fever
Memory Loss
Dizziness
Pinpoint Pupils
Coma
Blurred Vision
Convulsions
Teariness
Salivation
Allergies
Vomiting
Nausea
Asthma
Tightness in Chest
Respiratory Paralysis
Changes in Heart Rate and Liver function
Elevated Blood Pressure
Rapid Heartbeat
Reproductive Failures
Cramps
Diarrhea
Additional Symptoms
• Blisters
• Various Cancers
• Immune Deficiency Disorders
• Central Nervous System Disorders
• Multiple Chemical Sensitivities (MCS)
• Fatigue/Weakness
• Genetic Damage
• Soreness of Joints
• Irritations to Skin, Eyes, Nose and Throat
• Reddening of Skin
• Sweating
• Rashes
• Tremors
• Muscle Twitching
• Behavioral Abnormalities
• Hyperactivity
• Moodiness
Concept:
Stephen Tvedten
www.getipm.com
Design:
Linda L. Jensen-Pascarella
www.safe2use.com
©1999, 2000 Safe2Use
WARNING
When Used as Directed
Pesticides Kill

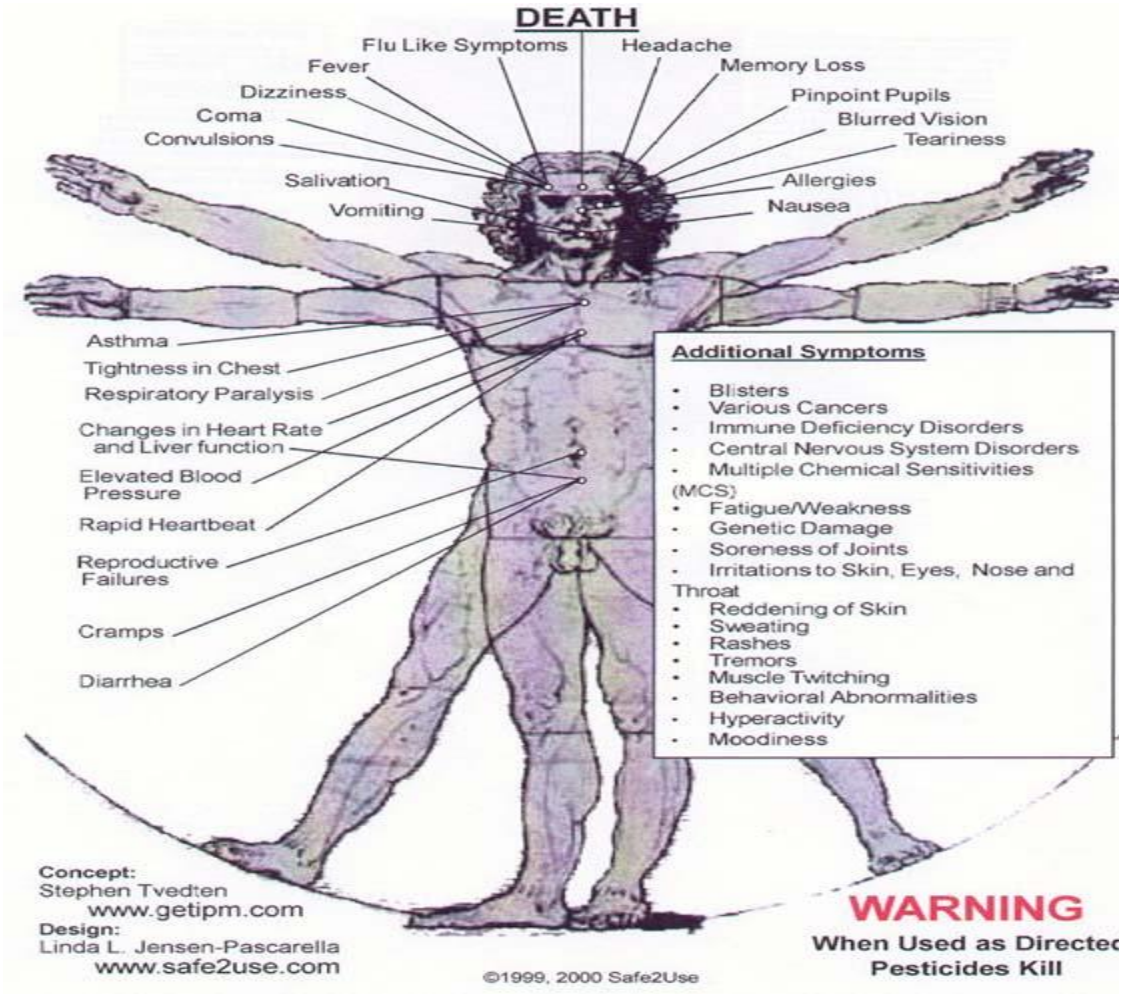
Yusho Patient - Victim of PCB Poisoning in Japan

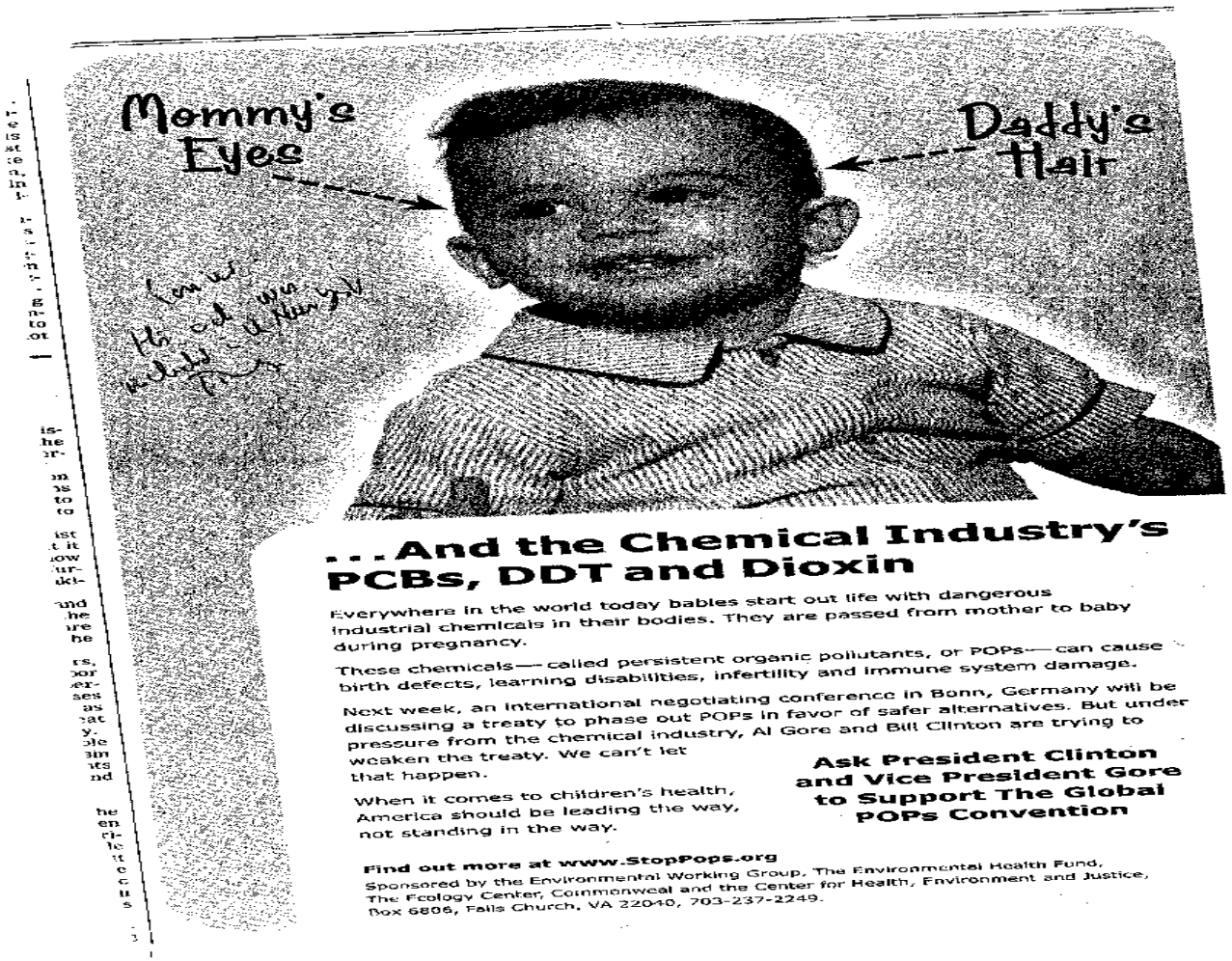
Yusho disease; From the incidence of PCB oil poisoning

(Dermal and ocular lesions; depressed immu response; irregular menstrual cycle etc.)

PCB Contaminated rice bran oil sold to the consumers in Kyusu, Northern Japan 1968

ENVIRONMENTAL HEALTH CHALLENGES





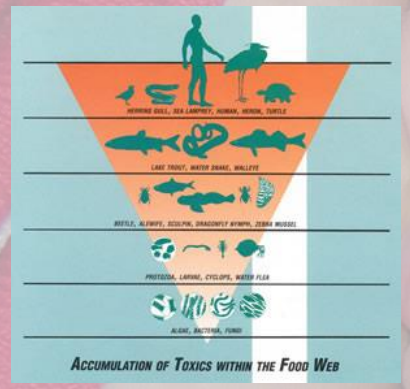
Brominated Fire Retardants

endocrine disrupters

linked to thyroid and liver damage

cancer of the digestive and lymph system

neurotoxic effects



Top of the Foodchain:

Women accumulate POPs during their life and pass them to their baby during pregnancy and by breast milk

- Still best to use mothers milk the first 6 month! (WHO)?

Table: General contaminants found in dumpsite leachate and their health effects

Class of contaminants	Significance
Trace Elements	Health, aquatic biota, toxicity
Heavy metals	Health, aquatic biota, toxicity
Organically bound metals	Metal transport
Radionuclide	Toxicity
Inorganic pollutants	Toxicity, aquatic biota
Asbestos	Human health
Algal nutrients	Eutrophication
Acidity, alkalinity, salinity (in excess)	Water quality, aquatic life
Trace organic pollutants	Toxicity
Polychlorinated biphenyls	Possible biological effects
Pesticides	Toxicity, aquatic biota, wildlife
Petroleum wastes	Effect on wildlife, esthetics
Sewage, human and animal wastes	Water quality, oxygen levels
Biochemical oxygen demand	Water quality, oxygen levels
Pathogens	Health effects
Detergents	Eutrophication, wildlife, esthetics
Chemical carcinogens	Incidence of cancer
Taste, odour, and colour	Aesthetic

FACT SHEET ON WATER AND ''SICK WATER ''

- **Globally, 2 million tons of sewage, industrial and agricultural waste is discharged into the world's waterways and *at least 1.8 million children under 5 years-old die every year from water related disease, or one every 20 seconds.***

- **Over 50% of the world's hospitals beds are occupied with people suffering from illnesses linked with contaminated water and *more people die as a result of polluted water than are killed by all forms of violence including wars*.**

- **An estimated *90 % of all wastewater in developing countries including Nigeria is discharged untreated directly into rivers, lakes or lagoons or the oceans*. Such discharges are part of the reason why de-oxygenated dead zones are growing rapidly in the seas and oceans.**

- **World Bank Report 1991 indicated about *60% of Nigerians are at risk from water related diseases.***

- ***Most rivers if not all. in Lagos are non-drinkable, non-fishable, non-swimmable. A case of Water ! Water! Everywhere , yet Non to Drink !!!.***

- ***Hence the popularity of '' Pure Water '' or is it ''Poor Water ''.***

- ***It is cheaper to fuel your car in Nigeria than to drink clean fresh water !!!!!!***

- **The world is facing a global water quality crisis.**

- **This presents a global threat to human health and wellbeing, with both immediate and long term consequences for efforts to reduce poverty whilst sustaining the integrity of some of our most productive ecosystems**

Pollution Studies On Nigerian Rivers : Water Quality Assessment of Some Nigerian Rivers

- **A study of 26 rivers in North Central including River Kaduna and River Niger in Lokoja, and South western Nigeria were studied for their background physico-chemical quality characteristics during 1977/78.**
- ***17 of the rivers were found to be unpolluted. 6 of these were found to be of high quality and clean***
- ***The remaining 9 were found to be polluted naturally***
- **(S.O. Ajayi and O. Osibanjo 1981)**

- **A Review of Heavy metals in African Rivers, Lakes and coastal environment was undertaken on behalf of FAO (Biney, Osibanjo et.al 1994)**
- **Hg showed the lowest concentration**

(<1.0 ug/L) followed by Cd(0.2 -21.0 ug/L).

- *Fe gave the highest concentrations in most rivers with a considerable wide range of variation, from 2.5 ug/L in River Nile, Egypt to 1440 ug/L in Shasha stream, Nigeria.*
- **The abundance of the other metals were : Mn>Zn>Pb>Cu>As.**
- **The very high concentration of certain metals found in specific rivers were as a result of acute pollution.**

Pollution Studies On Nigerian Rivers : Water Quality Assessment of Some Nigerian Rivers

- **A study of 26 rivers in North Central including River Kaduna and River Niger in Lokoja, and South western Nigeria were studied for their background physico-chemical quality characteristics during 1977/78.**
- ***17 of the rivers were found to be unpolluted. 6 of these were found to be of high quality and clean***
- ***The remaining 9 were found to be polluted naturally***
- **(S.O. Ajayi and O. Osibanjo 1981)**

- **A Review of Heavy metals in African Rivers, Lakes and coastal environment was undertaken on behalf of FAO (Biney, Osibanjo et.al 1994)**
- **Hg showed the lowest concentration**

(<1.0 ug/L) followed by Cd(0.2 -21.0 ug/L).

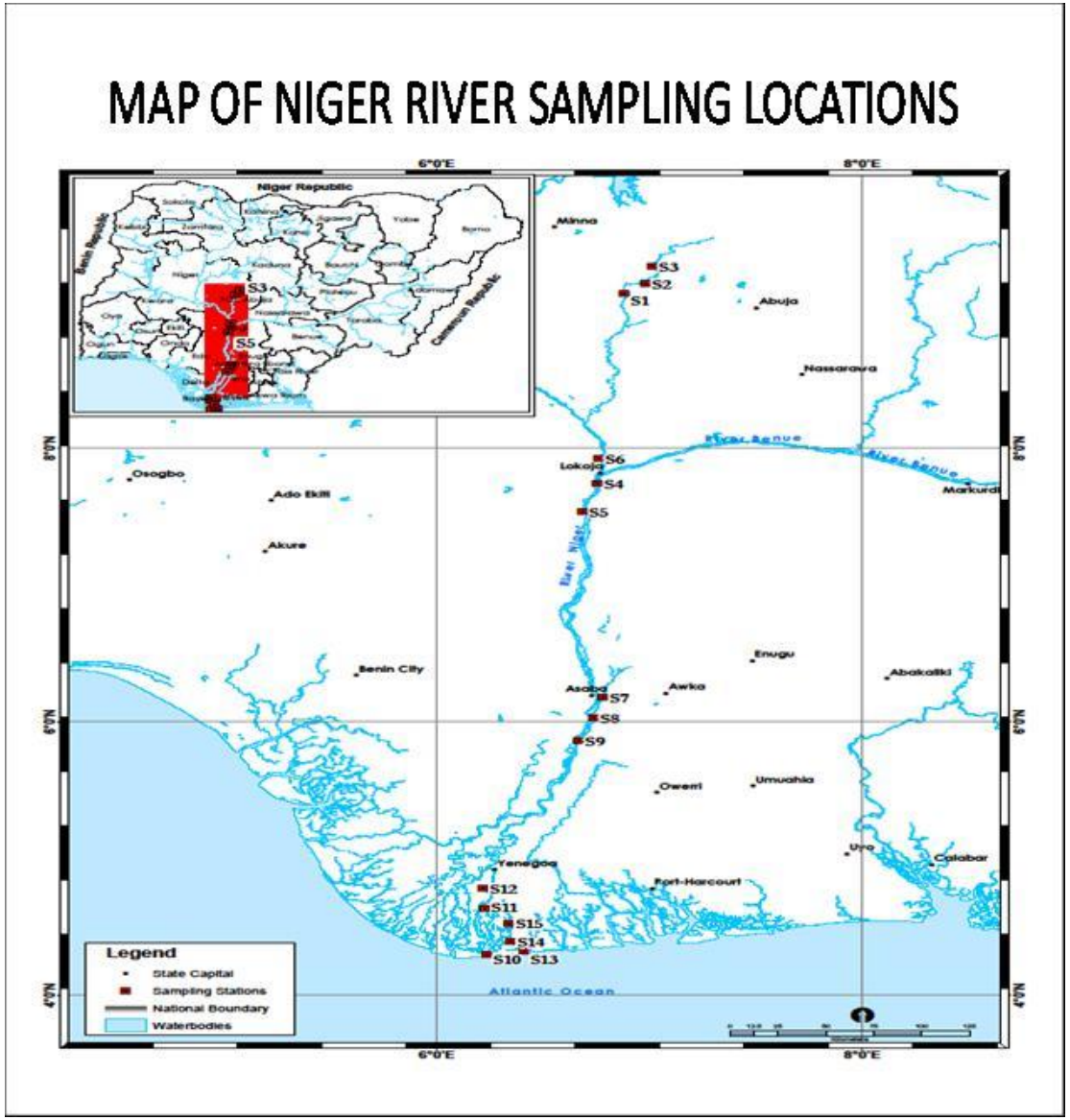
- *Fe gave the highest concentrations in most rivers with a considerable wide range of variation, from 2.5 ug/L in River Nile, Egypt to 1440 ug/L in Shasha stream, Nigeria.*
- **The abundance of the other metals were : Mn>Zn>Pb>Cu>As.**
- **The very high concentration of certain metals found in specific rivers were as a result of acute pollution.**

Some Physico-chemicals results of River Niger (2012)

- **Highlights :**
- **pH value range : 7.93 -8.01 (within WHO limit of 6.5 – 9.5)**
- **Lead; Cadmium and Chromium concentrations (Not detectable)**
- **Copper : concentration range (ND-0.16 ug/ml)**
- **Iron concentration range ND -4.91 ug/ml (WHO/SON limit – 0.3 ug/ml)**

Assessment of POPs Concentrations Along River Niger, Nigeria

- **The River Niger traverses different ecological zones in its 1080 km journey from Kebbi State to the Niger Delta, drains about 60% of the nation's land mass,**
- **OCPs and PCBs (POPs) were determined in water, sediments and fish along the course of River Niger from Gurara River, Lokoja, Onitsha, Brass and Nicolas River.**
- **The levels of POPs in River Niger environment is high when compared to global levels.**
- **The results showed that there was more impact of agricultural effluents compared to industrial effluents as the source of POPs was agriculture and not industrialisation.**
- **(John Paul Unyimadu PhD thesis 2015)**



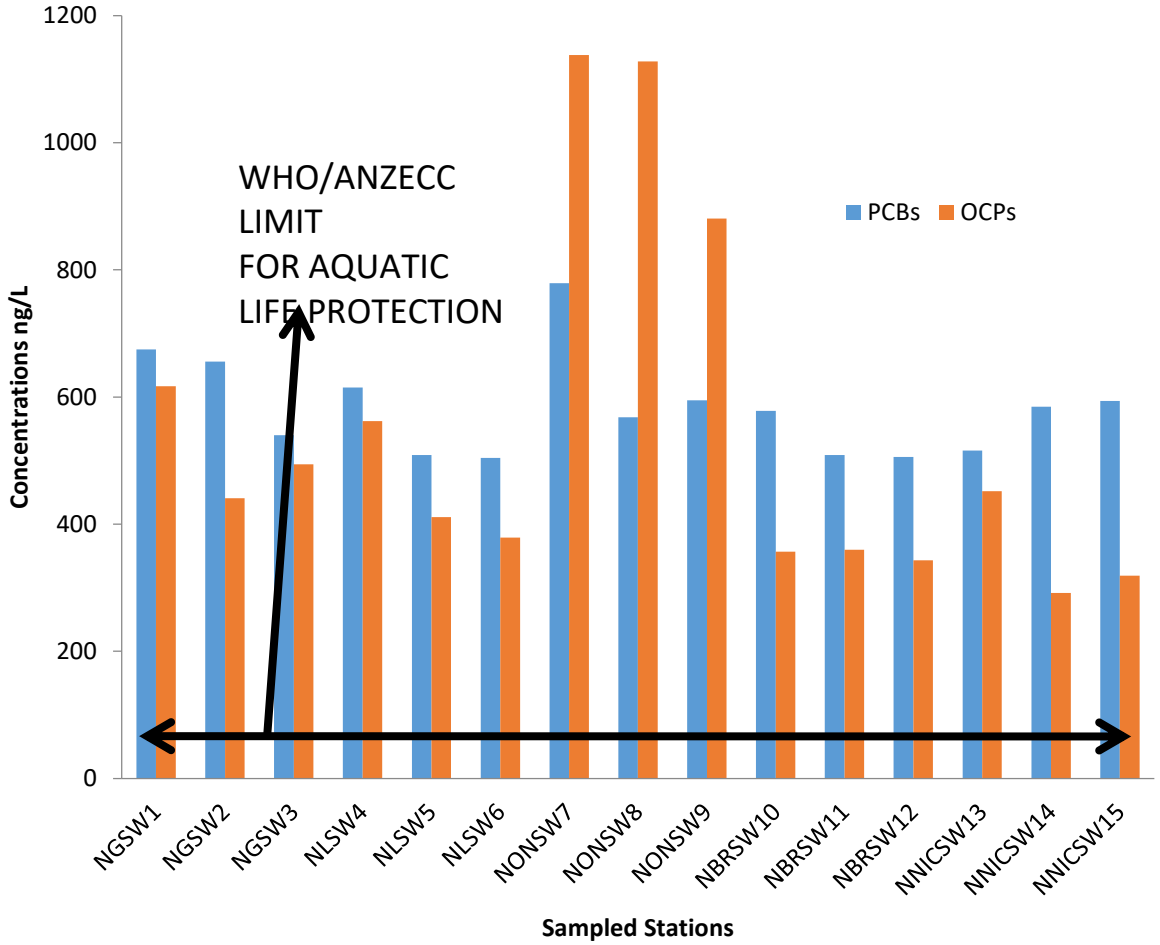
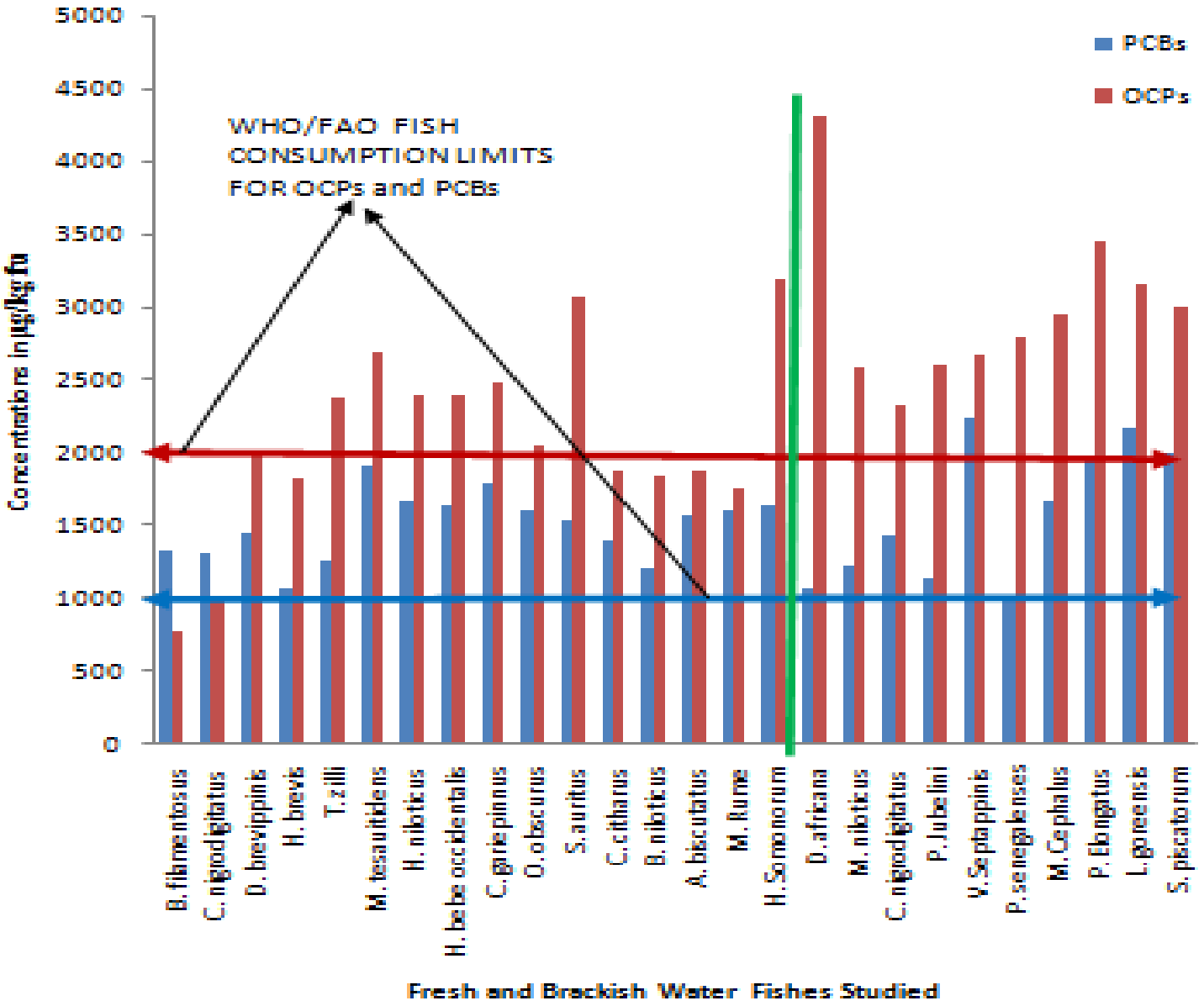


Fig. 4. Concentrations of OCPs and PCBs in Water Samples



5000
4500
4000
3500
3000
2500
2000
1500
1000
500
0
Concentrations in µg/kg fu
PCBs
OCPs
WHO/FAO FISH
CONSUMPTION LIMITS
FOR OCPs and PCBs
B. filamentosus
C. nigrodigitatus
D. brevippinis
H. brevis
T. zilli
M. tesauitidens
H. niloticus
H. bebe occidentalis
C. gariepinnus
O. obscurus
S. auritus
C. citharus
B. niloticus
A. biscutatus
M. Rume
H. Somonorum
D. africana
M. niloticus
C. nigrodigitatus
P. Jubelini
V. Septappinis
P. senegalenses
M. Cephalus
P. Elongatus
L. goreensis
S. piscatorum
Fresh and Brackish Water Fishes Studied

Evaluation of Groundwater Quality Characteristics near Dumpsites In Ibadan and Lagos

- Assessment of Groundwater Quality around dumpsites in Orita Aperin Ibadan and Oworonsoki Lagos.

  (Ikem, Osibanjo, et al 2002)
- 30 well samples in Ibadan and 21 well samples in Lagos were studied over 2 seasons.
- Some of the groundwater quality parameters exceeded WHO Guideline for drinking water and would require treatment to make them suitable for drinking by humans.

- Assessment of Groundwater Quality around dumpsites in Olusosun and Solous In Lagos.

  (Majolagbe , Adeyi, Osibanjo 2015)
- 480 ground water samples were analysed.
- Concentration of metals lower than WHO allowable limits, even from wells with close proximity to dumpsites
- Some parameters exceeded the allowable limit (Table 3). Mg > Fe> Cd > NO_3^- >Pb (Olusosun), Mg > Fe> Cd > Pb > NO_3^- (Solous)

Sustainable Development Goals (SDGs) & Clean Water

- Nigeria and in fact most developing countries ,from the foregoing . have water quality and quantity challenges and should therefore implement effectively the new United Nations Sustainable Development Goals(SDGs)
- The Ri0+20 document '' The Future We Want '' also recognized that *water is at the core of sustainable development as it is closely linked to a number of key global challeng*es. It therefore reiterated the importance of integrating water in sustainable development and underline the critical importance of water and sanitation within the three dimensions of sustainable development
- Hence the United Nations General Assembly (UNEA) in September 2014 adopted the Sustainable Development Goals(SDGs), otherwise known as the Global Goals, which build on the Millennium Development Goals (MDGs), eight anti-poverty targets that the world committed to achieving by 2015.
- The MDGs, adopted in 2000, aimed at an array of issues that included slashing poverty, hunger, disease, gender inequality, and target **to reduce by 50% those without in 2015** access to water and sanitation, . How did Nigeria fare under MDG ???
- The new **SDGs with 17 Goals and 169 targets**, go much further than the MDGs, addressing the root causes of poverty and the universal need for development that works for all people.
- SDG 6 is on Water - Ensure availability and sustainable management of water and sanitation for all by 2030.

Environmental Advocacy Deployment as a tool for improving Environmental Health and Curbing Water Epidemics

- The gap between water demand and water supply in Africa Nigeria inclusive is growing fast as water demand is increasing at a higher rate than population growth (3.9 %, the highest in the world). This is mainly due to the Improving living standards and related changing consumption patterns, increase of income levels of urban dwellers and due to the demands for better services.
- On the other hand, safe water availability is decreasing due to competing demands from agriculture, mining and industry and from deteriorating water quality. Large numbers of people are dependent on groundwater as their primary or alternate source of water, but pollution threatens groundwater sources (World Bank, 20132).
- Extant water governance structures have not been effective enough to make clean water available for all citizens . People generally rely on ground water sources in urban areas some of which are polluted thereby worsening water epidemics.

Environmental Advocacy Deployment as a tool for improving Environmental Health and Curbing Water Epidemics

- **Intense Environmental Advocacy and Advocacy encompassing public awareness ; education ; and training on the importance of water as a life sustainer is important.**

- **Environmental Advocacy is about influencing people, policies, structures and systems in order to bring about sustainable positive change at the local; state and national levels. The latter could entail enactment of new legislation. It is about communicating with those in power and persuading them to act in more just and equitable ways.**

- **It is about building relationships. It is about tackling the root causes of environmental pollution; poverty and promoting justice. Advocacy can be done by, with, or on behalf of, those affected by injustice or neglect. Anyone can carry out advocacy work – it should not be left to professionals or experts.**

Environmental Advocacy Deployment as a tool for improving Environmental Health and Curbing Water Epidemics

- **NATURE OF ADVOCACY :**

■ Tackles root causes of poverty ; neglect and injustice and brings long-term change

■ sees people as agents of change in their own communities■ can help to generate more resources for development work

■ Can change power structures and systems of injustice

Advocacy also involves action or processes that can complement other development work. It is critical in relation to environmental issues because many environmental problems cannot simply be addressed by good development practice within communities.

Examples of Advocacy Methods

- Direct Influencing (Otherwise known as Lobbying)
- -This is about increasing the awareness of someone in a position of power about an issue and suggesting potential solutions. It is important to provide them with information and evidence to support your argument .

- Mobilising the people (called Campaigning)
- This is about telling the public about a situation – the problem and the potential situation – so that they are encouraged to take action. Sometimes this involves telling people about how a situation may affect them. It could include arranging public meetings, taking part in demonstrations or marches, writing newsletters, asking people to sign petitions, or preaching.

Examples of Advocacy Methods

- MEDIA
- This is about informing people about a problem, identifying those who are responsible, and suggesting solutions for those who have the power to change the situation.
- Media work could take various forms such as :
- Writing an article or letter for a newspaper or magazine,
- talking on the radio or TV, telling journalists about the situation or producing a press release.
- PRAYER : Prayer should support every kind of action’

Conclusion and Recommendations

- **"Upstream" pollution prevention to protect drinking water sources and keep toxic and polluting ingredients out of consumer products and drinking water should be accorded high priority consistent with the SAICM 2020 goal and the SG 2030 goal**
- **Need for research and development of substitutes and alternatives to harmful chemical pollutants in water and wastewater by focusing on Sustainable Chemistry or Green Chemistry Research**
- **Intense capacity building on Water Quality and Assessment is required**
- **Regulatory framework on water resource and quality protection should be strengthened including the enactment of a SAFE WATER ACT FOR NIGERIA**
- **Energy choices that protect water and create jobs, along with stronger protections from fossil fuel development activities and**

Getting Involved in Advocacy on Natural Resource Management

- **Advocacy on natural resource management can be an effective area of advocacy work for local communities who may be affected by problems such as the management of surface or ground water, or deforestation.**
- **Deployment of Environmental advocacy as a tool for improving Environmental Health and curbing water epidemicshas not developed sufficiently**
- **Whereas social media expansion as a tool in highlighting and addressing social issues has been exponential ; the same is not true for its application in environmental advocacy in particular the management of surface and ground water ‘**
- **Advocacy is usually undertaken by non-profit Environmental non-governmental organisations (NGOs)**

Volunteerism : A tool for improving Environmental Health and Curbing Water Epidemics

- Volunteering in environmental advocacy and research is an emerging phenomenon in Nigeria . The culture is not as common in developed countries which have well recognised vounteer organisations while there are enthusiastic volunteers looking for the excitement of exposure o field research work without payment and hoping the experiences gained can lead to future employment opportunities
- The motivation is for volunteers could also be interest in environmental issues and helping to promote and achieve sustainable development.
- Most environmental NGOs in Nigeria are on biodiversity; climate change issues ; there are only a few on brown issues such as chemicals management and water and waste-water issues.
- There is the need to exploit present youth unemployment in the country by promoting Volunteerism drive for improving environmental health and curbing water epidemics more so as there is prediction of future water scarcity due to increasing demand for clean water due to population expansion; rapid urbanisation and demand for water use in agriculture' etc.

Conclusion and Recommendations

- **Controls on pollution from farms and from paved surfaces and lawns in suburbs and cities should be rigorous**
- **Smarter water systems and green infrastructure to manage and conserve water should be explored**
- **Improved drinking water protection and treatment, and stronger**
- **protections for drinking water sources should be accorded.**
- **Intense ENVIRONMENTAL ADVOCACY AND VOLUNTEERISM encompassing public awareness and education on the importance of water as a life sustainer is important**
- **Federal Government should implement the SDGs and in particular SDG 6 on water and sanitation**
- **Some multinational companies have already introduced technological innovations in reduction of wastewater generation by treating a portion of wastewater to recover clean water which is recycled with generation of biogas which energy is utilised in the production process thereby making the process climate friendly.**

Thank You

THANK YOU

- **Correspondence Address :**

- **Prof. Oladele Osibanjo**
- **President**
- **Waste Management Society of Nigeria (WAMASON)**
- **130 Obafemi Awolowo Way**
- **Ikeja; Lagos ;**
- **Nigeria**
  TeL: +234 803 301 3378
- **E mail: oosibanjo@yahoo.com**
- **Skype : oladele.osibanjo10**
- **Website : www.wamason.org**