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United Nations
Educational, Scientific and
Cultural Organization

International
Initiative on
Water Quality

EMERGING POLLUTANTS IN NIGERIA: A CASE STUDY

World Water Week, session on “Addressing emerging pollutants to achieve SDGs”

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Objectives

- To identify existing scientific, policy and regulation information on Emerging Pollutants (EP) in Nigeria;
- To determine potential sources and occurrences of EPs;
- To evaluate the institutional capacity for handling EPs in Nigeria;
- To assess the level of awareness on EPs (public and private sector).

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Timeline and partnership

- Project duration
  - September 2015-March 2016
- Partners
  - UNESCO Abuja Office
  - Basel Convention Regional Coordinating Center for Africa (BCC-Nigeria)
  - Nigerian Federal Ministry of Science and Technology
  - Nigerian Federal Ministry of Water Resources
  - Department of Chemistry, University of Ibadan, Nigeria

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Methodology

- Selection of six experts:
  - UNESCO staff (wastewater, agriculture and desalination)
  - Professor of Analytical and Environmental Chemistry Basel Convention Regional Coordinating Center, Ibadan.
  - Researcher from the department of Chemistry University of Ibadan.
  - Biochemist from the policy sector, from the Environmental Science and Technology Department of the Federal Ministry of Science and Technology.
  - Policy expert on water quality, Federal Ministry of Water Resources.
- Design of and research tools (questionnaire and interviews) in collaboration with experts;
- Data collection/gathering;
- Data analysis and preparation of interim and final reports.

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Nigeria

- Surface: 923,768 km2
- Population (2015): 183 Million (1st in Africa)
- Projected population (2050): 440 Million
- MDG Target on Sanitation: Not met
  - Still 25% practices open defecation
- MDG target on Drinking Water: Met
  - 69% uses improved drinking water sources.
  - 56 Million have no access to improved drinking water sources
- Second economy in Africa
- Transitioning from Importing Economy to Producing Economy

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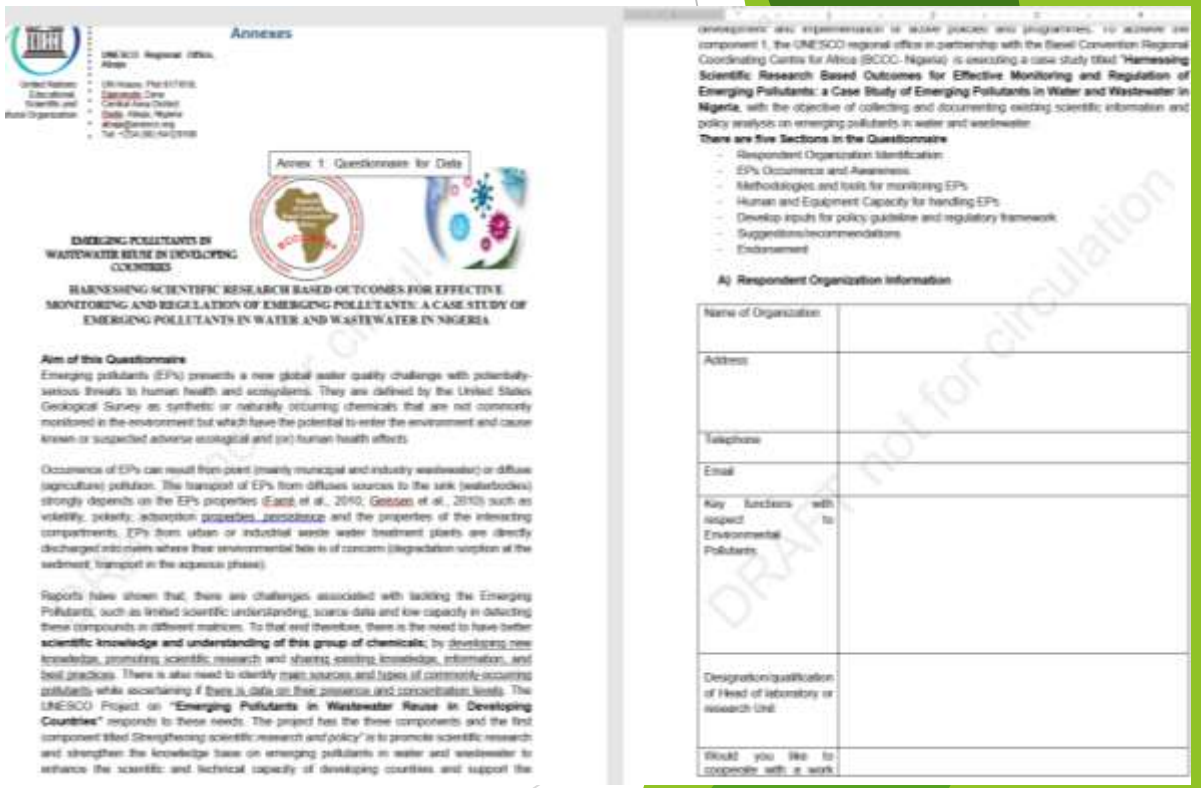
Primary data collection

- **Questionnaire** was used to elicit information from
  - Research agencies and institutes,
  - Certified laboratories,
  - Regulatory agencies and
  - Researchers.
- **Interviews** conducted with
  - Relevant researchers and
  - Federal Ministry of Water Resources.
- Aim to identify:
  - EPs occurrence and awareness,
  - Available methodologies and tools for monitoring EPs,
  - Human and equipment capacity for handling EPs,
  - Existence of policies and regulatory framework on EP,
  - Suggestions/recommendations.



Annexes

Annex 1: Questionnaire for Data

EMERGING POLLUTANTS IN WASTEWATER REUSE IN DEVELOPING COUNTRIES

HARNESSING SCIENTIFIC RESEARCH BASED OUTCOMES FOR EFFECTIVE MONITORING AND REGULATION OF EMERGING POLLUTANTS: A CASE STUDY OF EMERGING POLLUTANTS IN WATER AND WASTEWATER IN NIGERIA

Aim of this Questionnaire

Emerging pollutants (EPs) presents a new global water quality challenge with potentially-serious threats to human health and ecosystems. They are defined by the United States Geological Survey as synthetic or naturally occurring chemicals that are not commonly monitored in the environment but which have the potential to enter the environment and cause known or suspected adverse ecological and (or) human health effects.

Occurrence of EPs can result from point (mainly municipal and industry wastewater) or diffuse (agriculture) pollution. The transport of EPs from diffuses sources to the sink (waterbodies) strongly depends on the EPs properties (Farré et al., 2010; Geissen et al., 2015) such as volatility, polarity, adsorption properties, persistence and the properties of the interacting compartments. EPs from urban or industrial waste water treatment plants are directly discharged into rivers where their environmental fate is of concern (degradation sorption at the sediment, transport in the aqueous phase).

Reports have shown that, there are challenges associated with tackling the Emerging Pollutants, such as limited scientific understanding, scarce data and low capacity in detecting these compounds in different matrices. To that end therefore, there is the need to have better **scientific knowledge and understanding of this group of chemicals;** by developing new knowledge, promoting scientific research and sharing existing knowledge, information, and best practices. There is also need to identify main sources and types of commonly-occurring pollutants while ascertaining if there is data on their presence and concentration levels. The UNESCO Project on **"Emerging Pollutants in Wastewater Reuse in Developing Countries"** responds to these needs. The project has the three components and the first component titled *Strengthening scientific research and policy"* is to promote scientific research and strengthen the knowledge base on emerging pollutants in water and wastewater to enhance the scientific and technical capacity of developing countries and support the

There are five Sections in the Questionnaire

- Respondent Organization Identification
- EPs Occurrence and Awareness
- Methodologies and tools for monitoring EPs
- Human and Equipment Capacity for handling EPs
- Develop inputs for policy guideline and regulatory framework
- Suggestions/recommendations
- Endorsement

A) Respondent Organization Information

Name of Organization	
Address	
Telephone	
Email	
Key functions with respect to Environmental Pollutants	
Designation/qualification of Head of laboratory or research Unit	
Would you like to cooperate with a work	

Primary data collection-questionnaires

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- Ability to identify EP
  - Some analysis done on a non routine basis;
  - Mostly in academia for research purposes and not for monitoring;
  - Overall low understanding among private and public sector on EPs.
- Human and equipment capacity for handling EP:
  - Limited equipment
  - Limited human capacity
    - **National Environmental Standards Regulatory and Enforcement Agency** (NESREA) indicated no capacity for handling EPs and the 12 (6 existing and 6 under construction) water monitoring laboratories of FMWR have no human capacity.
- Policy
  - NESREA confirmed that there is no policy guidelines and regulatory framework for EP.

Primary data collection-interviews

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- Interview with Federal Ministry of Water Resources (FMWR), Department of Water Quality Control and Sanitation (DWCQ&S)
  - The wastewater management framework (including plans, strategies, regulations) is weak and almost non-existent;
  - There is no institutional awareness of the EPs and its challenges in water and wastewater;
  - FMWR is willing to collaborate with UNESCO and other supportive international agencies and donors in strengthening or developing adequate water and wastewater management framework (in the form of policy, strategies, masterplans, and inter-sectoral coordination) for Nigeria.
- Interview with researchers and pharmaceutical industries in Lagos:
  - Limited awareness on EPs presence and risks;
  - The very few researchers that work on organic pollutants either carry out the analytical work abroad

Secondary data collection- literature review

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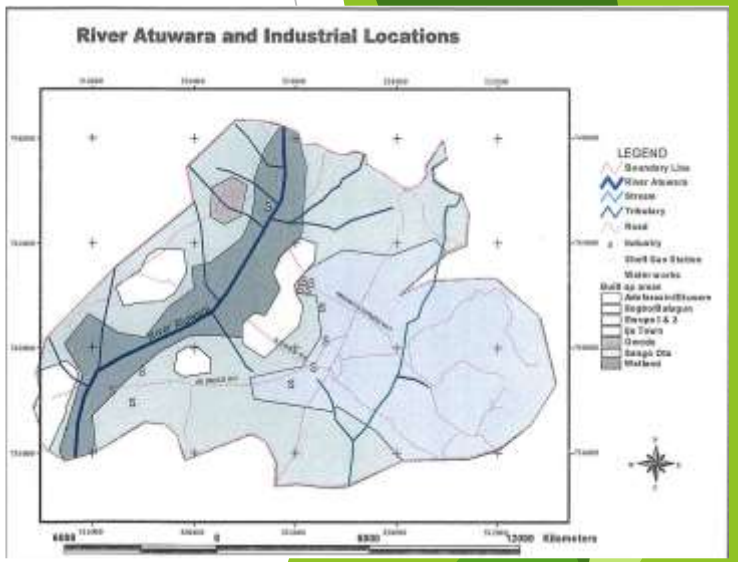
- Limited data available, mostly from academia;
- Surface water
  - Presence of a variety of EP, usually in proximity or downstream of towns, industries, markets, landfills, abattoirs.
  - River Niger, Rivera Atuwara, Ikpa River, River Ogun and River Ibeche.
- Groundwater
  - Organochlorine Pesticides (OCPs) and Polychlorinated Biphenyls (PCB) in groundwater within the vicinity of Agro pesticide stores and Power stations in Lagos, Oyo, Kano, Rivers and Benue states of Nigeria determined the levels of in seven groundwater locations spanning the five states mentioned previously.
- Wastewater
  - Little data available



Findings and recommendations

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- The data and information obtained in this study has shown that in Nigeria EPs occur in surface water and groundwater.
- Monitoring of surface and ground water in Nigeria is carried out mostly by individual researchers in the Universities, Research Institutes, Government. It is usually haphazard, short term and based on individual interest, on the reagents and equipment available to the scientist.
- Need for adequate database and a coordinated monitoring of pollutants, especially EPs and POPs in wastewater, surface and groundwater.
- Need to strengthen the few existing laboratory facilities, equip new ones and train personnel on analysis of EPs. There is also the need to adopt standard protocols and methodologies in EP analysis.

Findings and recommendations-2

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- There an existing gap in policy and regulatory framework, with respect to EPs in water and wastewater and there is need for the relevant agencies, FMWR and NESREA, to institute a coordinated action with the support of relevant stakeholders to bridge this gap.
- Need for elaborated awareness activities, targeted at decision makers inside and outside the water box, on the importance of EPs with respect to wastewater treatment, water pollution, heath risk and environmental implications.
- Need to harmonize the state and federal water laws.

Development of a project proposal

Thank you!

For questions and info

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