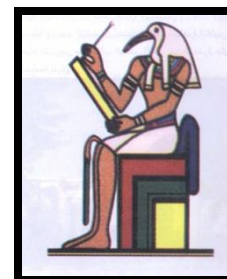
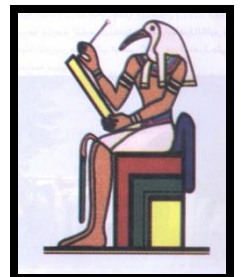


*Cleaner Production
and
Safer Environment
from
Analytical Chemistry
Point of view
By
M.M. Khater*

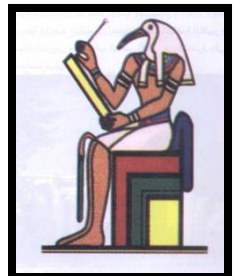




Our planet comprising about 7 billion people & 200 countries is in urgent need for a global sustainable management .

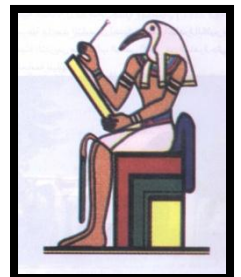
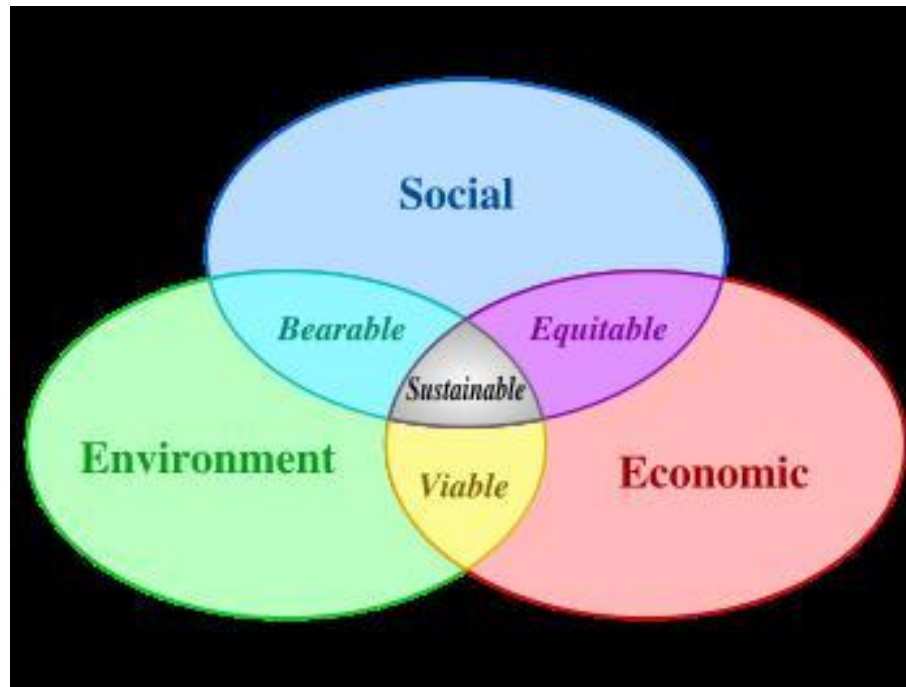


Sustainable Development is a global top priority issue, that all Scientists, Decision makers, Governmental, Nongovernmental Organizations both Nationally and Internationally are concerned with and are trying to find the best way to attain.



UN Act 21

Sustainable Development



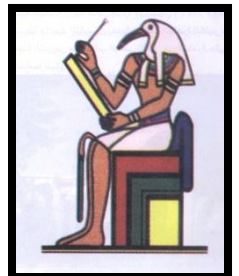
**TO UNDERSTAND THE ROLE
OF CHEMISTRY IN
SUSTAINABILITY,
WE WILL LOOK AT THE
FIRST TWO POINTS...**

- **The environment and human health.**
- **A stable economy that uses energy and resources efficiently.**

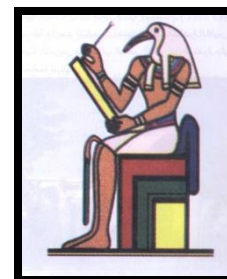


**MANY COUNTRIES HAVE
ALREADY ENACTED LAWS AND
SIGNED INTERNATIONAL
TREATIES TO REDUCE POLLUTION
LEVELS, INCLUDING:**

- **Montreal Protocol to Protect the Ozone Layer**
- **Global Treaty on Persistent Organic Pollutants**
- **Rio Declaration on Environment and Development**

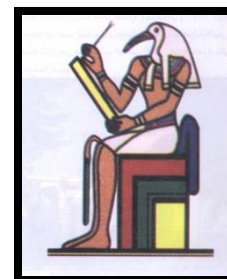


Chemistry has an important role to
play in achieving a sustainable
civilization on earth



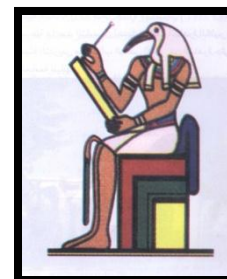
First, let's consider chemistry's benefits.....

The chemical industry produces many products that improve our lives and upon which we depend.

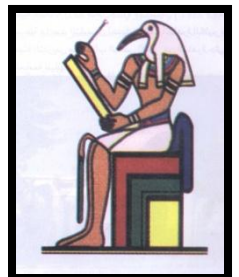
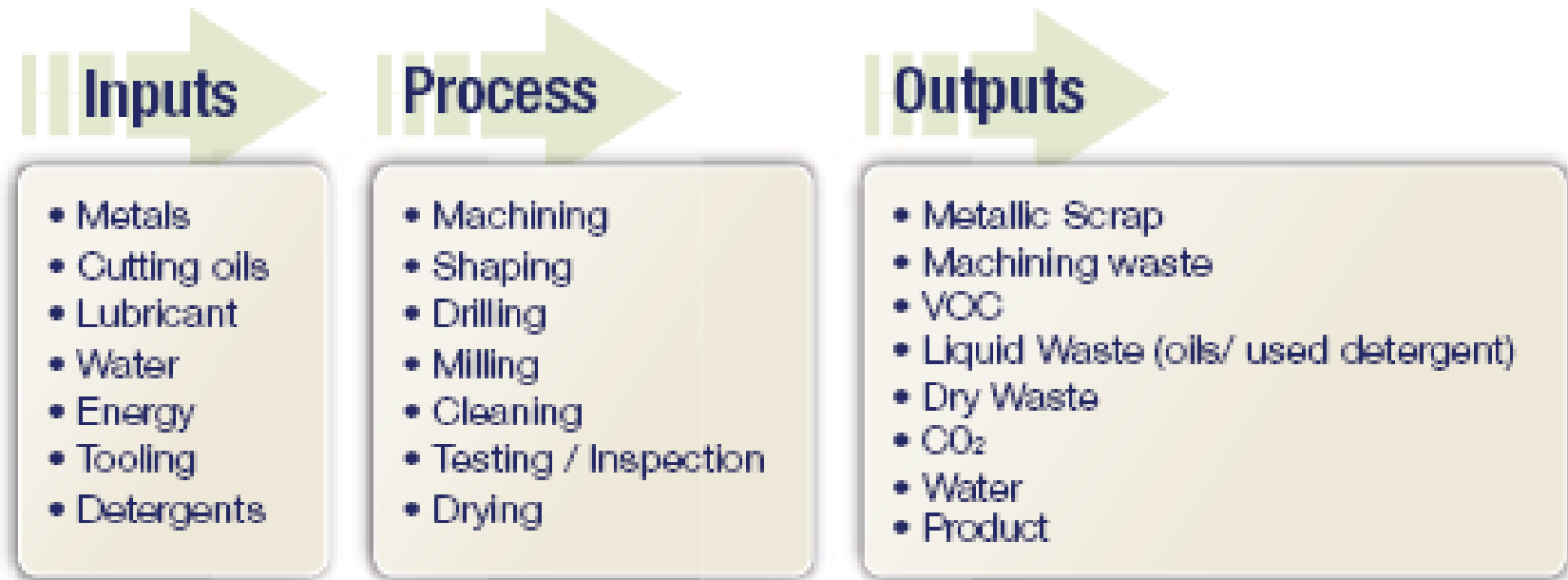


Benefits of Chemical Industry:

- Medicines.
- Fertilizers and Insecticides.
- Dyes.
- Plastics, etc.....



Inputs and Outputs

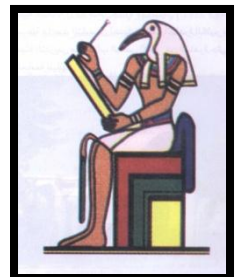


Processes That have Aspect Can cause Impacts

Machining

Raw Materials
Energy Use
Waste
Oils

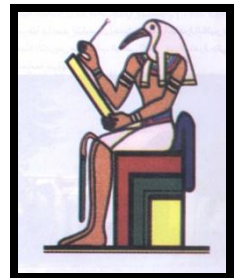
Depletion of Natural Resources
Depletion of Natural Resources /
CO₂ Production
Land contamination / Use of
valuable landfill space / Liquid
waste
Depletion of Natural Resources /
Liquid waste handling



There are other considerations that may need to be factored in when completing the analysis.

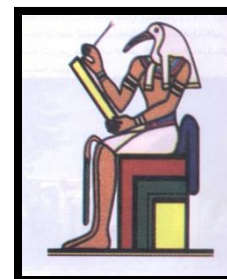
For example:

- - Does the process have any license or legal requirements attached to it?
- - Does the process use any hazardous materials?



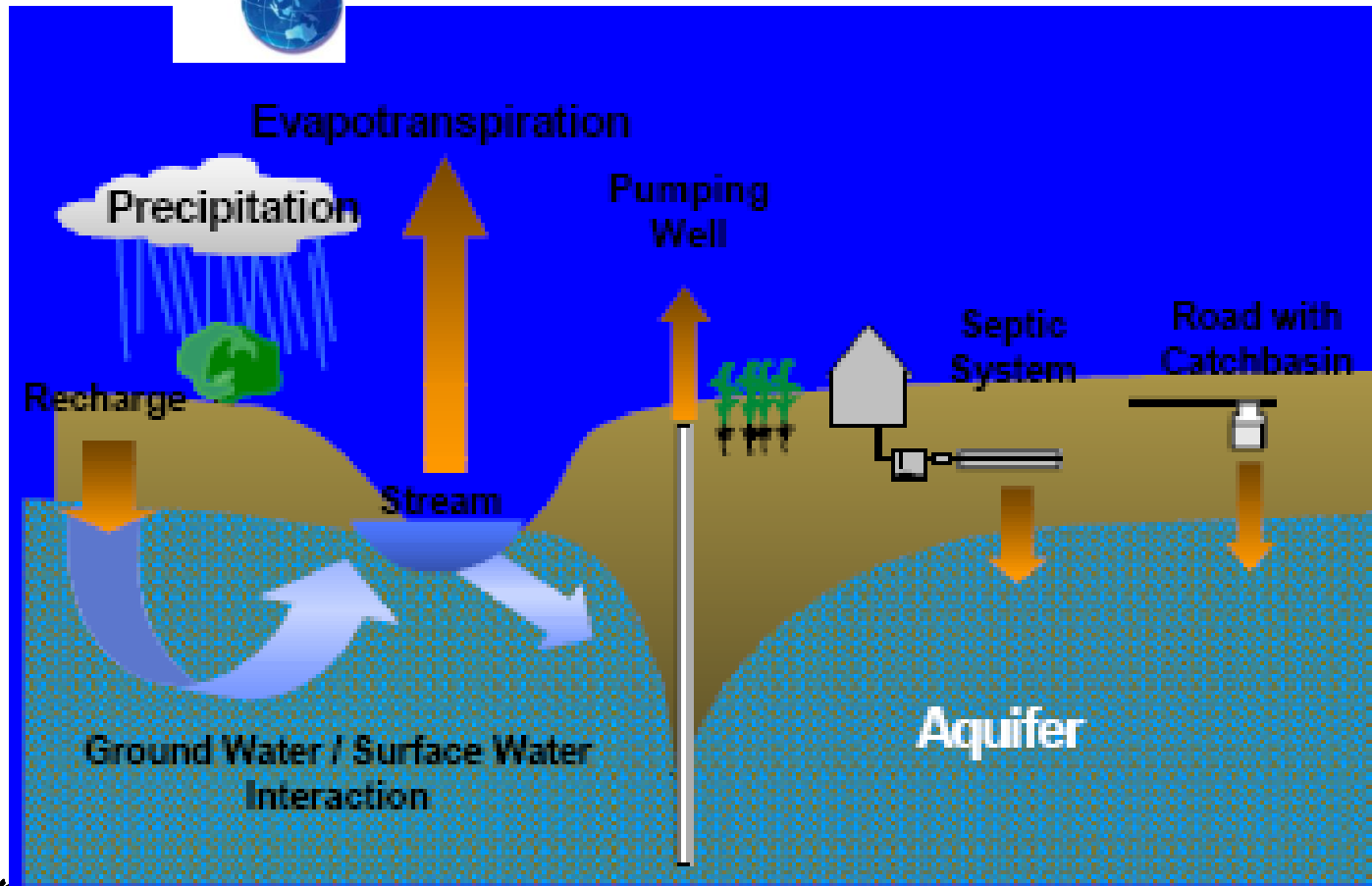
Although the positive contributions of chemistry and the chemical industry are many, some pollution problems have also resulted.

✓ Many of these problems can now be solved.





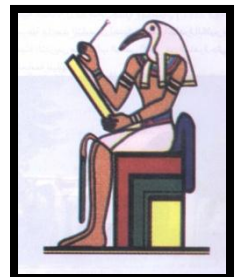
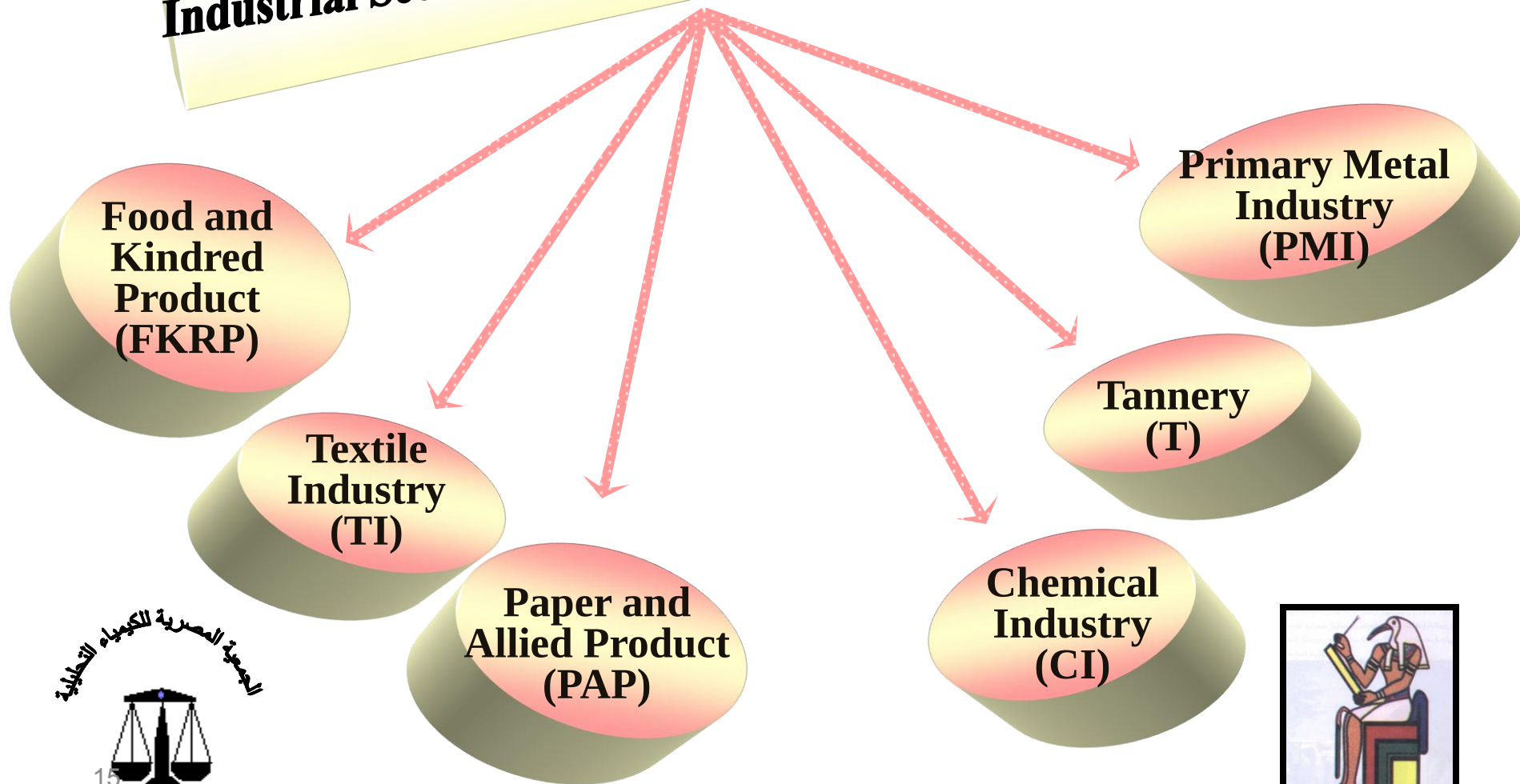
Water Cycle

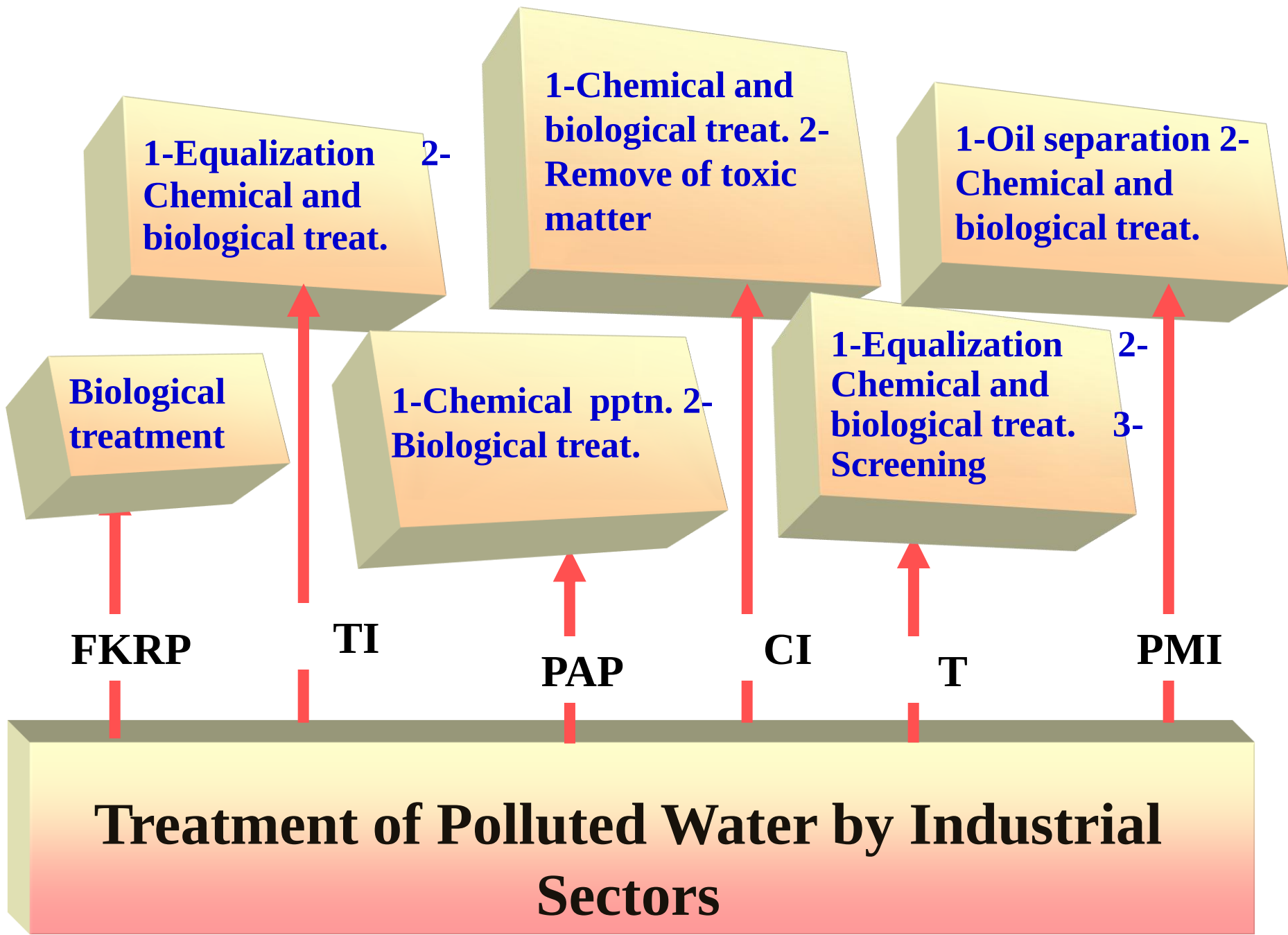


الجمعية المصرية للكيمياء التحليلية



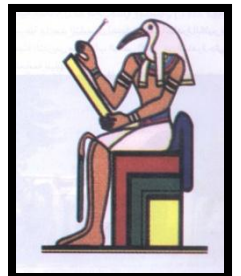
Water Pollution from different Industrial Sectors and Their Methods of Treatment





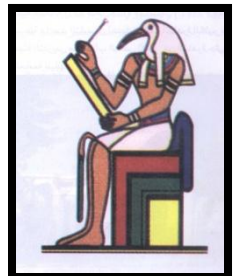
Population and Health

- Chemical toxicity.
 - Acute , short term , poisons and asthma gas
 - Chronic , long term , carcinogens and reproductive
- Factors affecting Health problems caused by chemicals: Genetics, life style, dose, concentration, duration, protection control used and environment



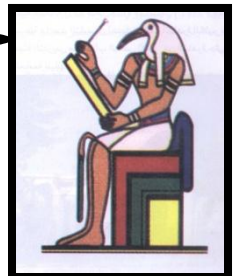
Industrial Hygiene

Anticipation , recognition , evaluation ,
control of health hazards in the work
environment to protect worker health
and to safe guard the community and
environment

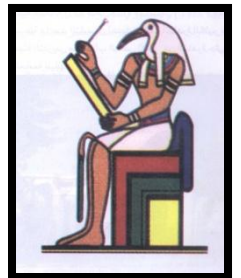


Government regulations: Chemical security

- Differ from country to country
 - Legislation needed to fulfill requirements under the Chemical Weapons Convention
 - Each country passes appropriate laws
 - Each country must declare and track certain chemicals
- UN Resolution 1540**
Other export control legislation

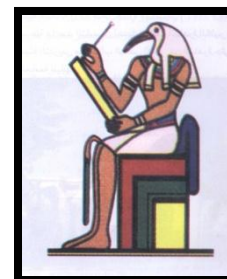


National and International policy developments aimed at encouraging renewable non-polluting energy-sources in response to climate change, rural development and energy security.

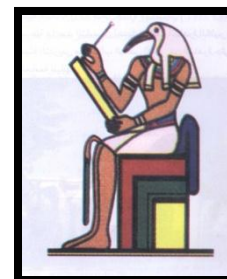


Analytical chemistry

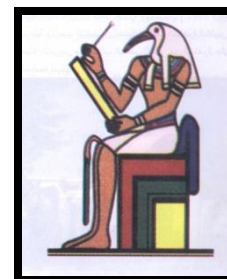
- Analytical Chemistry is the Science that helps in solving environmental problems, develop & optimize processes in order to:
- a-Determine the nature of pollutants & contaminants.
- b-Assess the degree & extent of contamination.



- c-Decide if clean up is needed & how.
- d-Plan for future monitoring.
- e-Predict environmental fate& degradation pathways of pollutants.
- f-Enhance environmental remediation (Air, Water & Soil)



Chemical Analysis Influences all aspects of life in
modern societies, Many Political, Economical,
Social, Medical and Legal decisions are based
on its findings



Types of analysis

Sample Analysis

- 1- Macro moles
- 2- Nano range
- 3-Single mole

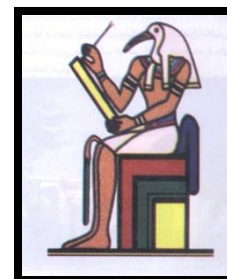
Remote Analysis

- 1-Water
- 2- Soil
- 3-Air
- 4-Astro Analysis
(satellite nanoscope)

Non-destructive



Destructive



Structure will change through:

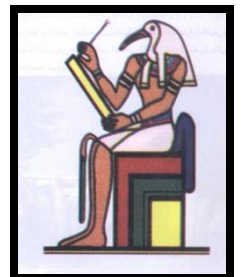
- Methodological:

Automation, miniaturization, simplification

- Strategic: Quality System

(GLP-Six Sigma)

(National and International Recognition)

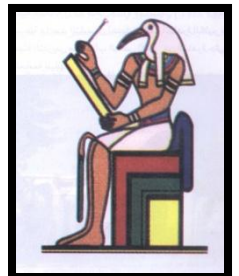


In A Sustainable Civilization

- Manufacturing processes are either designed so as not to produce waste products,

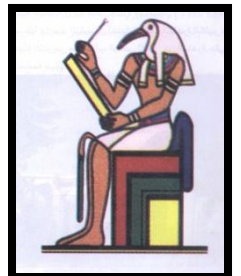
OR

- Waste products are recycled or biodegradable.



We should consider this Question from Several viewpoints

- **The environment and human health.**
- **A stable economy that uses energy and resources efficiency.**
- **Social and political systems that lead to a just society.**

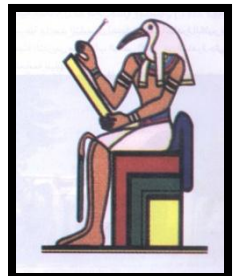


Basic Principles

- 1- Environmental Management System (EMS) and Analysis :
- EA should reflect the scope of the organization's EMS

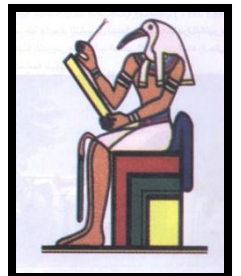
Scope

Will it cover the whole organization or part of it only?



Levels of environmental analysis

- The organization must decide at which level analysis will be carried
- This can be done at several levels:
 - 1-Activity based
 - 2-Department based.
 - 3-Process based

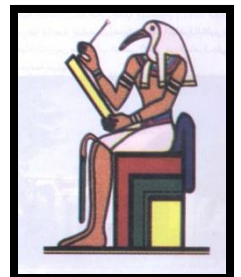


ISO 14001 Requirements

The organization shall establish, implement and maintain a procedure(s):

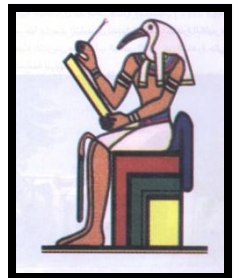
1-To identify the environmental Aspects of its activities, products and services within the EMS

2-To determine aspects that have or can have impact on the environment



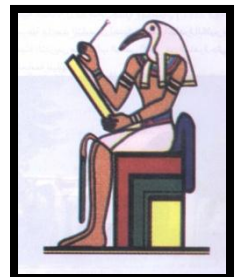
The main areas of consideration for the analysis should be:

- Emissions to air
- Releases to water
- Releases to land
- Use of energy
- Energy emitted, for example: heat, radiation, vibration
- Noise (that can be heard off site)
- Waste in all forms, and by-products

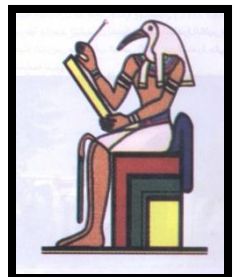


Aspects and Impacts

- An Environmental Aspect is an element of an organization's activities, products or services that can interact with
- the environment.
- An Environmental Impact refers to any change to the environment, whether adverse or beneficial, wholly or partially
- resulting from an organization's activities, products or services.

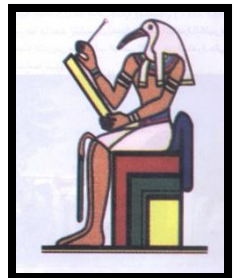


- Is the level of employee awareness sufficient to enable them to control the environmental aspect?
- - Are there technical solutions available that can reduce / control the environmental aspect?

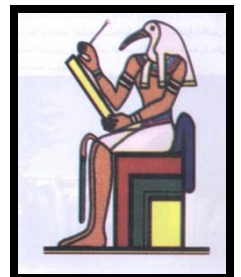


.. Are raw materials used in the most efficient way (within the process requirements and quality issues)?

•- Are the work instructions being followed, can they be improved?

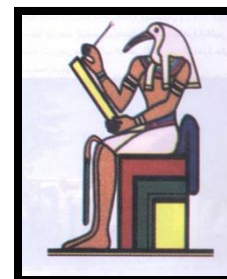


- Has the organization been the only tenant on the land?
- - Have processes used in the past and no longer implemented contaminated the land being used?
- - Is the land used as part of a leasing agreement?
- - Is a history available on the previous users of the land?



Managing Chemical products

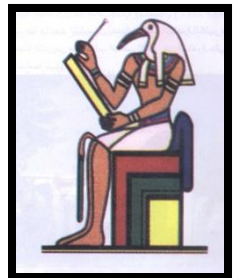
- Safety training programme, learning, applications, challenges improvements in workplaces, communities & governments



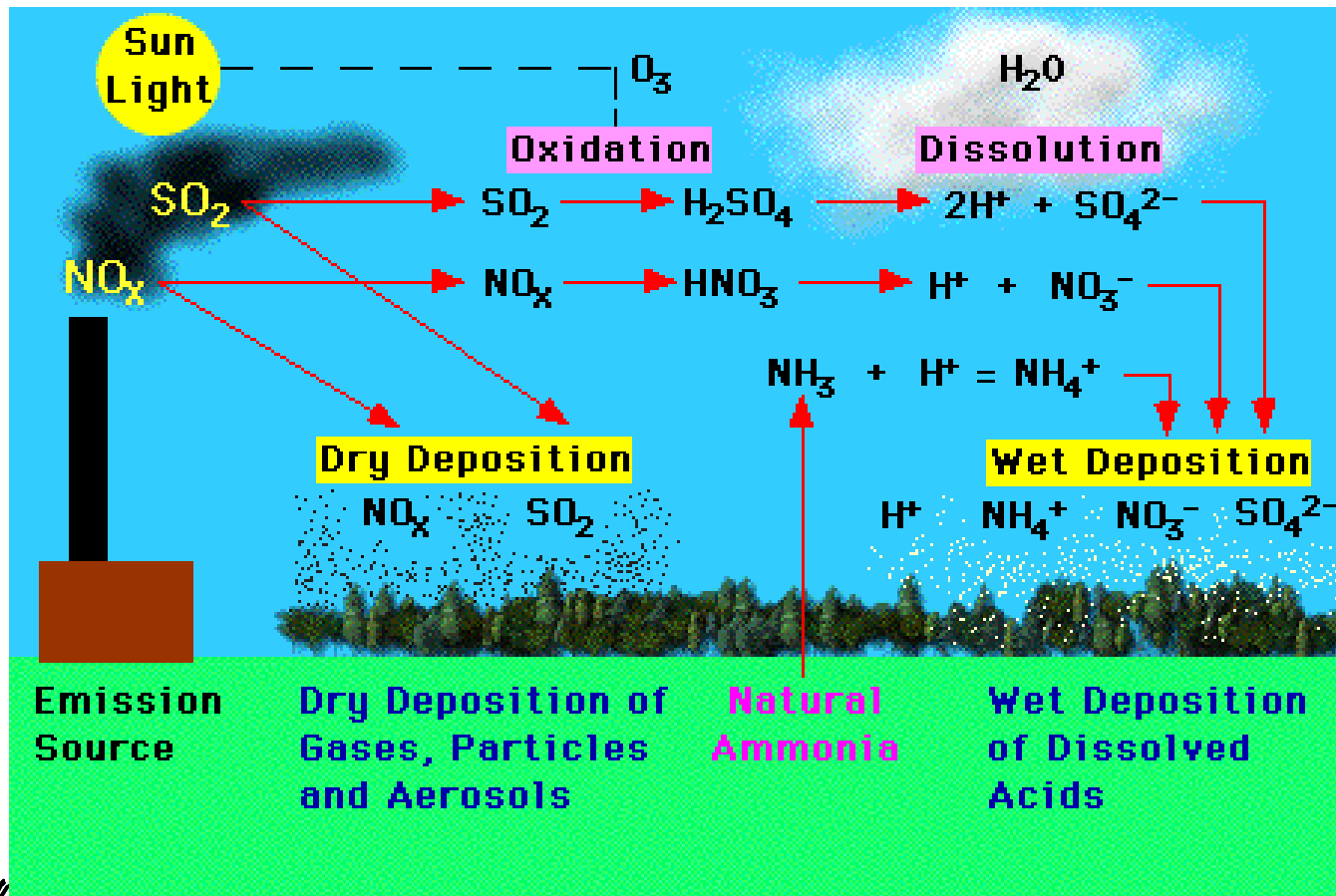
Laboratory certification :

- State certification programs
- Laboratory certification manual
- Certification officer training
- Proficiency testing studies

Terms relating to sampling, testing and analysis



Acid Rains



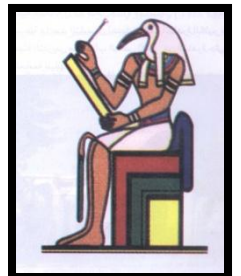
**Determine Product
Hazards & Exposure**



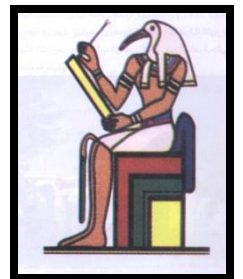
**Assess Product
Risks**



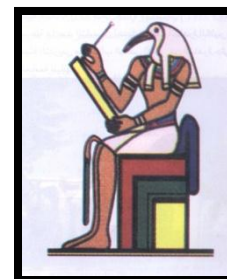
Take Actions



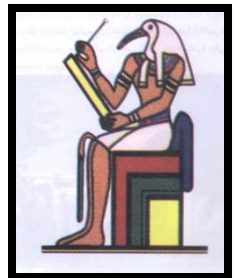
- Change over from a throw economy to recycling economy to raw materials, energy and reduce waste.
- Avoidance of dangerous technologies and products in order to prevent damage.
- Enhance research and development of low waste technologies.



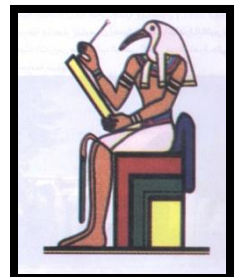
- Reduction of manmade emissions.
- Enlarged and improved application of chemical technology to solve problems in order to protect the cultural heritage and to ensure a safe and prosperous future of mankind.



Collaboration of industry,
universities and
government for upgrading
occupational health and
safety concepts



- Introducing quality systems and quality management concepts.
- Costs and benefits of applying quality systems.
- Types of quality standards.
- Good laboratory scheme and requirements (validation & Accreditation.
- Safety measures





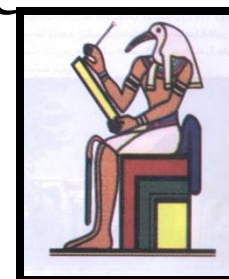
IYC 2011

International Year of
CHEMISTRY

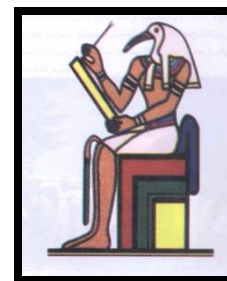
Objectives

- Increase the public appreciation of chemistry in meeting world needs
- Increase the interest of young people in chemistry
- Generate enthusiasm for the creative future of chemistry
- Celebrate the role of women in chemistry or major historical events in chemistry, including the centenary of Mme. Curie's Nobel Prize

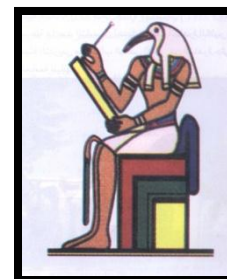
الجمعية المصرية للكيمياء التحليلية

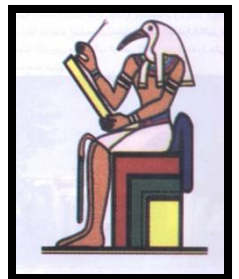


- Improve the understanding and appreciation of chemistry by the public.
- Enhance international cooperation by serving as a focal point or information source for activities by national chemical societies, educational institutions,



- industry, governmental and non-governmental organizations.
- Promote the role of chemistry in contributing to solutions to global challenges.
- Build capacity by engaging young people with scientific disciplines,
especially the scientific method of analysis
developed by hypothesis,
experiment, analysis and conclusions.







THANK YOU

