Food & Water Hygiene and Sampling Techniques

Ahmet SALTIK, MD

Professor of Public Health

LLM, Health Law

BSc, Public Administration & Political Sciences

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www.ahmetsaltik.net

Learning objectives….

At the end of this lecture, students are expected to;

For a 2-hour lecture titled "***Food & Water Hygiene and Sampling Techniques***" for medical students in Phase 1,

the learning objectives could be designed to ensure that students

- understand the importance of hygiene in food and water sources,

- the impact of contamination, and

- the methods used in sampling and analysis.

Here are some suggested learning objectives:

Learning objectives….

At the end of this lecture, students are expected to;

- *Understand the Global Food System: Recognize the challenges of the global food system, including undernutrition and overconsumption of unhealthy foods*
- **Identify Nutritional Issues**: Learn about the prevalence of undernourishment and the importance of nutrient-rich foods
- ***Recognize Food and Water Safety Hazards**: Identify common contaminants in food and water and understand their health impacts*.
- **Sampling Standards and Legislation**: Gain knowledge of the standards and legislation that govern food and water sampling.
- *Develop a **Sampling Plan**: Learn how to create an effective sampling plan that ensures **representative and unbiased samples**.*

Learning objectives….

- Master **Sampling Techniques**: Understand various sampling techniques and methods for collecting samples from different sources.
- ***Sample Preparation for Analysis****: Learn the correct procedures for preparing samples for analysis to avoid contamination or degradation.*
- **Analyze the Impact of Sampling** on Results: Evaluate how sampling methods can affect the analytical results and the interpretation of data.
- ***Case Study Analysis****: Apply knowledge to a case study, analyzing the* ***sampling method*** *and results for a real-world scenario.*
- **Food Quality Analysis**: Understand the factors determining **food quality**, including sensory properties, and ***learn analytical methods*** for assessing food quality.

Global Targets for 2030

The global food system is broken!

- Millions of people aren't getting enough to eat, and millions of others are eating too much of the wrong foods.

- *Many families can't afford enough 'nutrient rich foods' like fresh fruit and vegetables, beans, meat and milk, while foods and drinks high in fat, sugar and salt are cheap and readily available.*

- **Undernutrition** and **overweight** are now problems affecting people within the same communities at the same time period.

https://www.who.int/nutrition/topics/WHO_FAO_announce_ICN2/en/ 22.3.19

https://youtu.be/-HPNrPQNTR

The global food system is broken!

Stunting	Overweight	SDGs
151 million	**1.9 billion**	**12 of 17**
Children are stunted	Adults 18 years and older	SDGs require good nutrition in order to be met
Joint malnutrition estimates	Double burden of malnutrition	Sustainable Development Goals (SDGs)

The global epidemic of overweight and obesity - "**globesity**" - is rapidly becoming a ***major public health problem*** in many parts of the world. Paradoxically co-existing with undernutrition in developing countries, the increasing prevalence of overweight and obesity is associated with many diet-related chronic diseases including DM (diabetes mellitus), cardiovascular disease, stroke, hypertension and certain cancers.

http://www.who.int/campaigns/world-health-day/2015/en/, 7.4.15

World hunger falls to under 800 million, eradication is next goal

"The near-achievement of the MDG hunger targets shows us that we can indeed eliminate the scourge of hunger in our lifetime. We must be the **Zero Hunger generation**."

FAO Director General José Graziano da Silva, 27.5.2015

http://www.un.org/en/zerohunger/#&panel1-1, 5.6.15

Obesity is most commonly measured using the body mass index (**BMI**) scale.
The WHO define BMI as:
"a simple index of weight-for-height that is commonly used to classify underweight, overweight and obesity in adults."[1]
BMI values are used to define whether an individual is considered to be ***underweight, healthy, overweight or obese***.
The WHO defines these categories using the cut-off points:
an individual with a BMI between 25.0 and 30.0 is considered to be '**overweight**';
a BMI greater than 30.0 is defined as '**obese**'.[2]

$$BMI = \frac{\text{Weight (Kg)}}{(\text{Height in metres})^2}$$

OR

$$BMI = \frac{703 \times \text{Weight (lb)}}{(\text{Height in inches})^2}$$

Obesity is responsible for 4.7 million premature deaths each year!

Obesity is one of the world's largest health problems, one that has shifted from being a problem in rich countries, to one that spans all income levels.

Obesity - Our World in Data 27.4.23

Obesity and overweight

- Obesity is one of the leading risk factors for premature death. It was linked to 4.7 million deaths globally in 2017.
  ↓ jump to section
- 8% of global deaths were attributed to obesity in 2017.
  ↓ jump to section
- There are large differences – 10-fold – in death rates from obesity across the world. ↓ jump to section
- 13% of adults in the world are obese. ↓ jump to section
- 39% of adults in the world are overweight. ↓ jump to section
- One-in-five children and adolescents, globally, are overweight. ↓ jump to section
- Obesity is determined by the balance of energy intake and expenditure. Rates have increased as the calories have become more readily available. ↓ jump to section

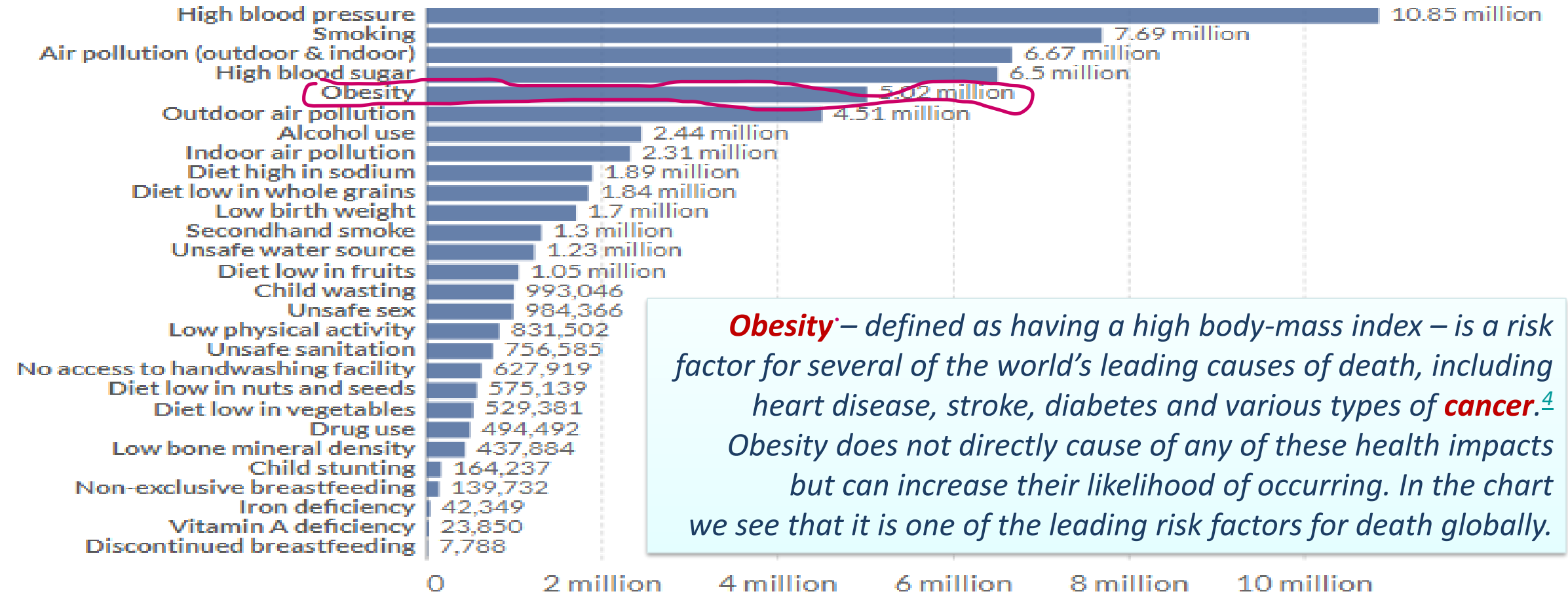
Obesity - Our World in Data 27.4.23

Number of deaths by risk factor, World, 2019

Total annual number of deaths by risk factor, measured across all age groups and both sexes.

Our World in Data

Change country



Obesity *– defined as having a high body-mass index – is a risk factor for several of the world's leading causes of death, including heart disease, stroke, diabetes and various types of* ***cancer***.[4] *Obesity does not directly cause of any of these health impacts but can increase their likelihood of occurring. In the chart we see that it is one of the leading risk factors for death globally.*

Source: IHME, Global Burden of Disease (2019)

OurWorldInData.org/causes-of-death • CC BY

1990 2019

Eating too little

Malnourished and weak

Eating moderately

Healthy Body

Eating in excess and not moving

Overweight or Obese

Percentile Ranking	Weight Status
Less than 5th percentile	Underweight
5th percentile to less than 85th percentile	Healthy weight
85th percentile to less than 95th percentile	Overweight
Equal to or greater than the 95th percentile	Obese

Wasted, Stunted, Underweight & Normal

Wasted	No	Yes	No
Stunted	No	No	Yes
Underweight	No	Yes	Yes

How are samples taken?

- **Food samples** are always taken in accordance with prepared ***protocols*** and under ***guidelines*** set out in the Food Safety Act codes for sampling.
- *Occasionally food samples are purchased 'under cover'; i.e. over the counter in the same way as a member of the public would buy them.*
- This is so we can test standards at the point of sale.
- *On other occasions sampling officers will make themselves known to the person selling food, particularly when we need to sample one part of a food product before other ingredients are added.*

How are samples taken?

- For example, we may want to examine a sandwich filling before it has been subjected to handling during the sandwich making process.
- *Once the sampling officer has taken a food sample from your premises it is transported under temperature-controlled conditions to an approved laboratory within* ***four hours****.*
- The sampling officer should be able to answer any questions you may have about why a food sample(s) has been taken from your business premises.

Laboratory analysis and microbiological standards

- On arrival at the laboratory food samples will be tested for a range of different types of bacterial micro-organisms, the presence and/or quantity of which will be use to judge the ***quality and safety of a food***.

- Certain foods are required by law to meet prescribed microbiological criteria, established by the ***Public Health Laboratory*** Service, that give guidance to food enforcing authorities as to whether or not a given set of results are acceptable or likely to constitute a risk to health.

Laboratory analysis and microbiological standards

❖Indicator organisms :

❖These are organisms that, although not ***harmful*** in themselves, indicate ***unhygienic processing*** procedures or post preparation contamination when high levels are detected in ready-to-eat foods.

❖Post process contamination may be from staff, dirty kitchen equipment or packaging, and airborne particulates as a result of unprotected environmental exposure.

❖***Enterobacteriaceae*** is a family of microorganisms that live in the intestines of man and animals. Included in this family is a bacteria known as E. coli, a strain of which, E. coli 0157, is harmful and can cause severe illness in humans.

❖**Listeria species** can also be found in the intestines of animals and are widespread in the environment. All these organisms in food are used as an indication of ***faecal contamination*** via hands, bird droppings, infected water, contaminated ingredients or equipment. Pathogens are bacteria that are capable of causing illnesses such as ***food poisoning*** and ***gastro-enteritis*** following gastrointestinal infection in man and animals. Thus, if ***indicator organisms*** are found in food samples it also suggests that pathogenic bacteria may also be present.

Laboratory analysis and microbiological standards

❖**Pathogens :**

❖These are organisms that are capable of causing illnesses such as food poisoning.

❖They include bacteria such as *Salmonella, Campylobacter, E. coli 0157, Clostridium perfringens, Clostridium botulinum, Staphylococcus aureus, Bacillus cereus, Listeria monocytogenes*.

❖All food samples will be tested for the presence of one or all of these bacteria. Based on the results of laboratory tests, ready-to-eat food will be classified into one of the following categories – 'satisfactory', 'acceptable', 'unsatisfactory', or 'unacceptable/potentially hazardous'. (See table 1)

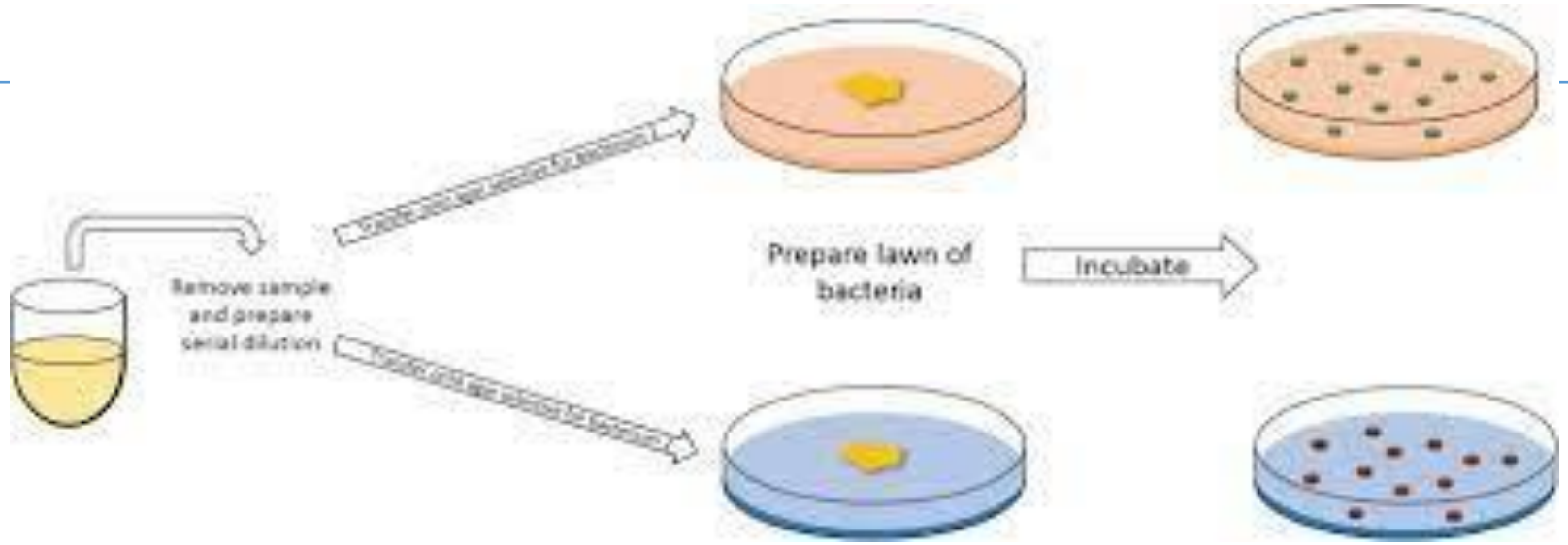
Satisfactory	Good microbiological quality
Acceptable	Borderline limit of microbiological quality
Unsatisfactory	Further sampling may be necessary and officers may undertake further inspection of the premises to check if hygiene practices are adequate
Unacceptable/potentially hazardous	Urgent attention is required to locate the source of the problem. Such results may form the basis of prosecutions when they occur in more than one sample

Microbiological Specifications

❖**Microbiological guidelines for ready-to-eat foods**

❖The type of microorganisms that the laboratory will look for in a sample depends on the food that is being tested and how it is produced. There are several different tests used for ready-to-eat foods and these are outlined below.

❖**<u>Aerobic colony count</u> :** This is a count of bacteria and includes those that occur naturally in most foods and others present as a result of contamination. The bacterial count increases significantly over time in response to poor product temperature control. The count is used to indicate quality and keeping potential (freshness) of the product.



How can I improve the quality and safety of the food?

- Are you handling food properly at every stage from delivery to point of sale?
- *Does the way you handle food avoid contamination?*
- Do you keep food in conditions that inhibit the growth of bacteria?
- *Try asking yourself these and the following questions and see if there is anything else you could be doing to improve the microbiological quality of the food you sell.*
- **Delivery** :
  Are you checking temperatures, date codes and condition of packaging and storage?
- **Storage :** *Are you checking fridge and freezer temperatures?*
- Do you have an efficient ***stock rotation system***? Are products kept covered and stored in a way that prevents contamination of any kind?

How can I improve the quality and safety of the food?

❖**Preparation :**

Do staff understand and practice good ***personal hygiene***?

Are your products prepared in a way that avoids contact with potentially ***contaminated equipment*** and raw foods? Is equipment cleaned often enough and with the ***correct cleaning*** materials?

❖**Cooking :**

*Are the products cooked for the correct amount of **time** at the correct **temperature**?*

Are temperatures checked using a probe thermometer?

❖**Cooling :**

Are products cooled in an area free from contamination? Are products cooled within 1½ hours?

❖**Display :**

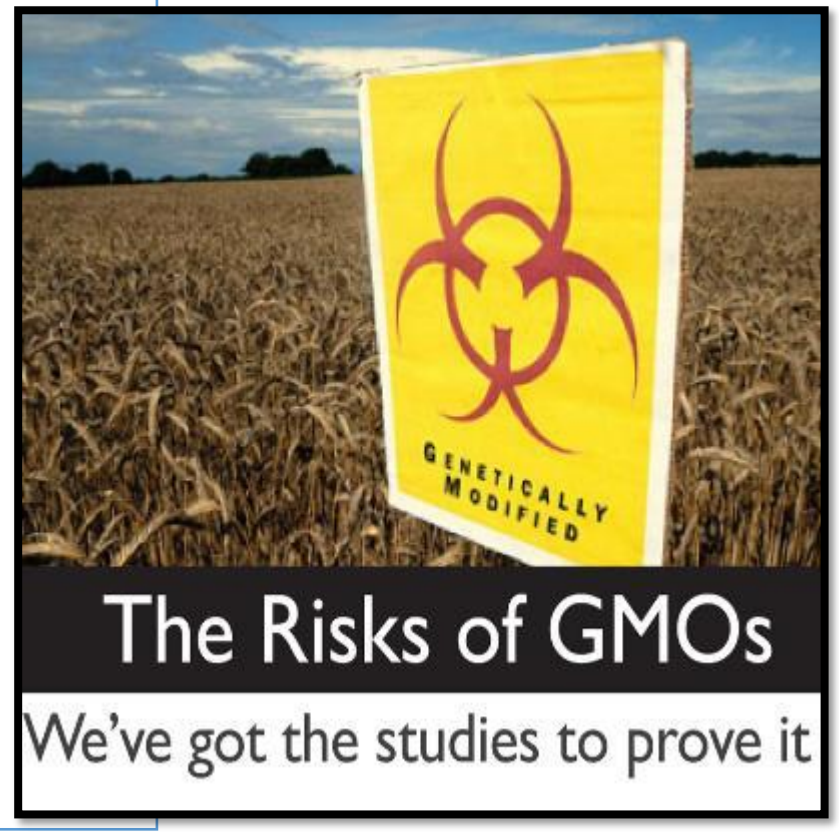
*Do your staff **wash their hands** after handling raw foods? Are separate utensils and cutting boards used when handling cooked meat? Are your products covered with food grade quality wrapping to prevent **environmental contamination**?*

❖**Training :**

Are all your staff properly **trained**? Do your staff report illness to you?

Genetically modified (GM) foods

- Another issue that has created a considerable degree of controversy is the use of ***biotechnology*** to produce ***genetically modified (GM) foods***.
- **Genetic modification** of food crops can be used to reduce food losses by increasing resistance to drought, frost, diseases, and pests and help control weeds and reduce post-harvest losses.
- **Biotechnology** can improve the nutritional value of foods, for example, by increasing protein or micronutrient content or by reducing saturated fat content. *(Oxford Textbook of Public Health, 6th ed. p. 196)*



Genetically modified (GM) foods

- They could help slow down ripening so that foods retain their quality much longer.
- ***Biotechnology*** *can increase both the yield and the quality of crops grown on existing farmland and thereby reduces pressure on wildlife habitats.*
- In the West, particularly in the UK and Europe, the opposition to GM foods is based largely on arguments that raise concerns with ***ecological damage*** that may follow large-scale use of GM crops.

(Oxford Textbook of Public Health, 6th ed. p. 196)

Genetically modified (GM) foods

- In developing countries the concerns are more related to the use of the '***terminator gene***' technology
- *and the dependence on the large multinational agro-companies (MNC) for seeds and chemicals that the small farmers will inherit.*
- At the heart of this controversy and the raging debate is the gulf between plant breeders, seed and agrochemical industries who promote biotechnology, and the campaigners who argue that ***GM technology may have hazardous consequences on the environment***. *(Oxford Textbook of Public Health, 6th ed. p. 196)*

- Allergenicity: We already have allergies to peanuts and other foods. Introducing gene may create more allergies.
- Unknown effects on human health
- However, proposal to introduce a gene from Brazil nuts into Soyabeans was abandoned.

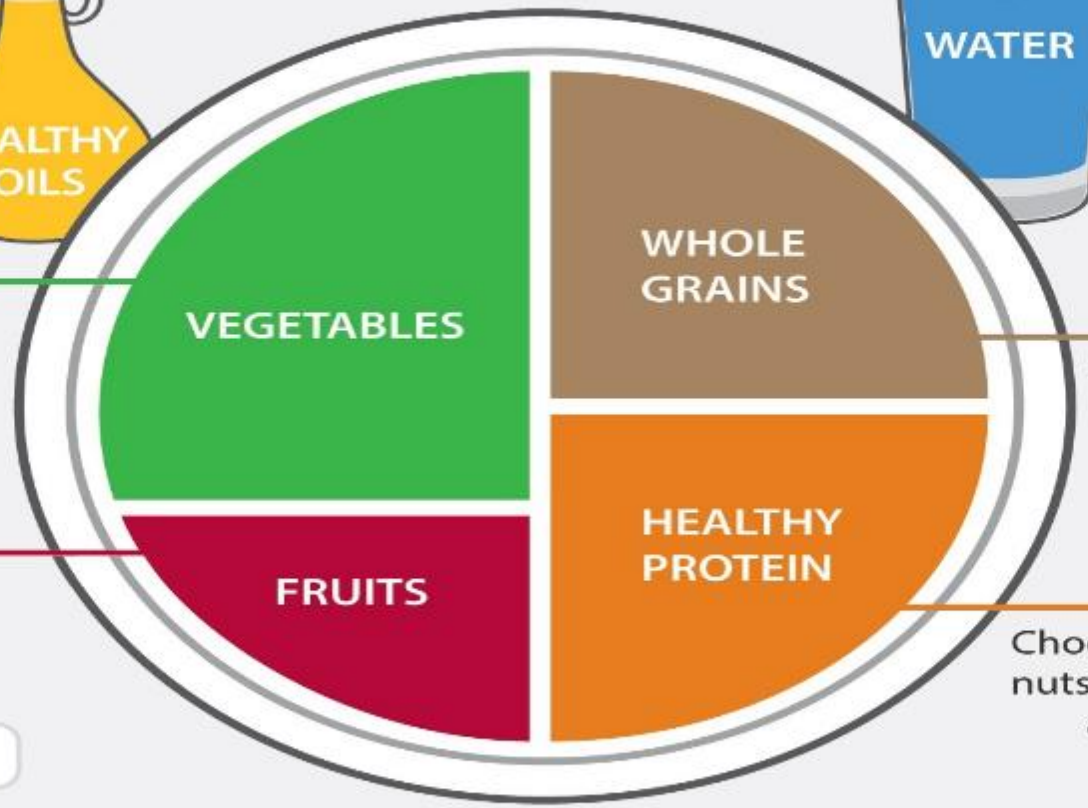
On the whole, with the exception of possible allergenicity, cientists believe that GM foods do not present a risk to human health!

HEALTHY EATING PLATE

Use healthy oils (like olive and canola oil) for cooking, on salad, and at the table. Limit butter. Avoid trans fat.

The more veggies – and the greater the variety – the better. Potatoes and French fries don't count.

Eat plenty of fruits of all colors.



Drink water, tea, or coffee (with little or no sugar). Limit milk/dairy (1-2 servings/day) and juice (1 small glass/day). Avoid sugary drinks.

Eat a variety of whole grains (like whole-wheat bread, whole-grain pasta, and brown rice). Limit refined grains (like white rice and white bread).

Choose fish, poultry, beans, and nuts; limit red meat and cheese; avoid bacon, cold cuts, and other processed meats.

STAY ACTIVE!

Harvard School of Public Health
The Nutrition Source
www.hsph.harvard.edu/nutritionsource

Harvard Medical School
Harvard Health Publications
www.health.harvard.edu

Food labelling

- An important source of information for the consumer about the food on the supermarket shelf is the label on a food product.
- **Food labels** provide information that may be of interest to the consumer, especially with regard to the added chemicals *(additives, pesticide residues, colouring and flavouring agents, and preservatives)*, fats, sugars, and energy content. *(Oxford Textbook of Public Health, 6th ed. p. 196)*

Nutrition Facts

Serving Size ½ cup (125 g)
Servings Per Container 3

Amount Per Serving

Calories 100	Calories from Fat 10
	% Daily Value*
Total Fat 4g	**7%**
Saturated Fat 0g	**0%**
Cholesterol 0mg	**0%**
Sodium 250mg	**10%**
Potassium 530mg	**15%**
Total Carbohydrate 8g	**3%**
Dietary Fiber 1g	**4%**
Sugars 7g	
Protein 8g	

Nutrition Facts

Serving Size ½ cup (125 g)
Servings Per Container 3

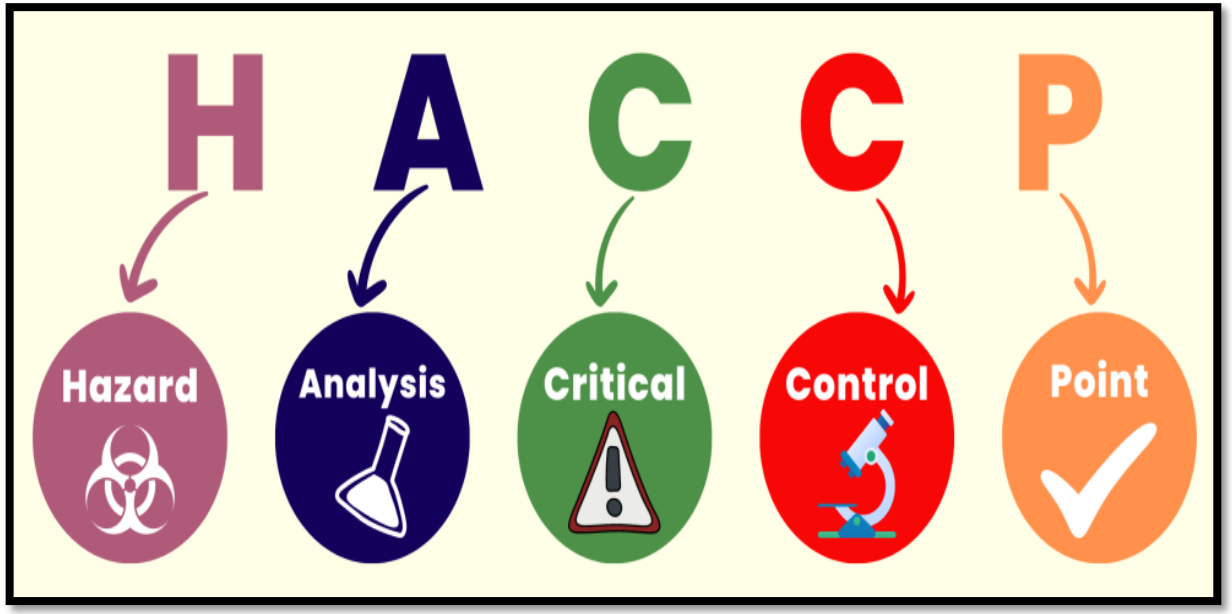
Amount Per Serving

Calories 152	Calories from Fat 0
	% Daily Value*
Total Fat 0g	**0%**
Saturated Fat 0g	**0%**
Cholesterol 0mg	**0%**
Sodium 250mg	**10%**
Potassium 530mg	**15%**
Total Carbohydrate 30g	**10%**
Dietary Fiber 1g	**4%**
Sugars 29g	
Protein 8g	

Meat trafficking from neighboring Georgia to Turkiye!

HACCP : The Hazard Analysis Critical Control Point System

- HACCP is a process control system that identifies where food safety hazards may occur in a food production process and puts into place stringent controls to prevent the hazards from occurring.
- By strictly monitoring and controlling each step of the process, there is less chance for hazards to occur and in this way a food business is able to assure the safety of the food products they produce.



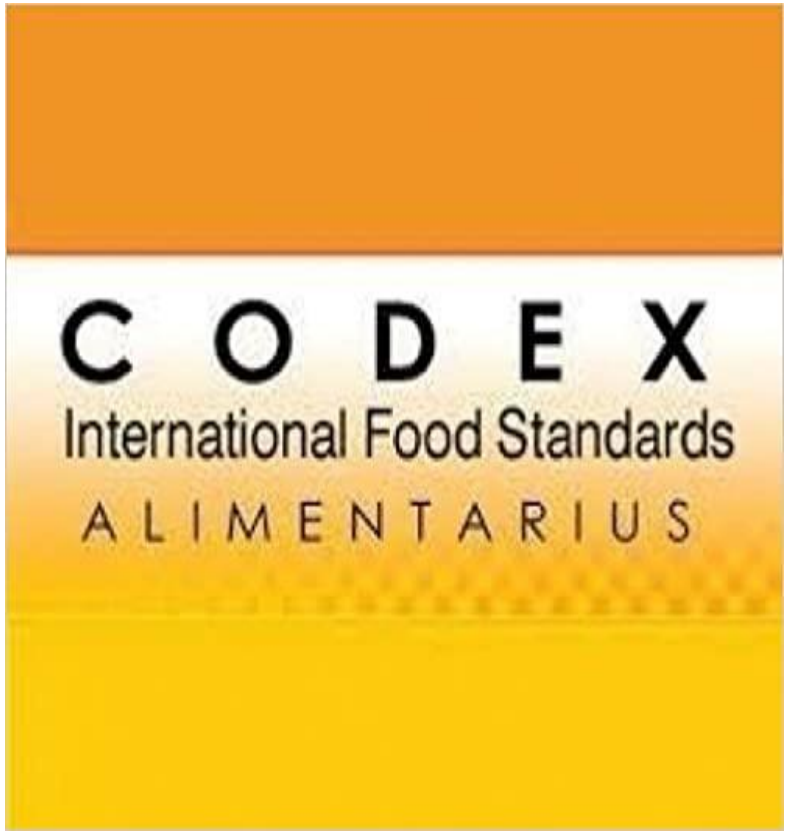
Food Contamination and Poisoning

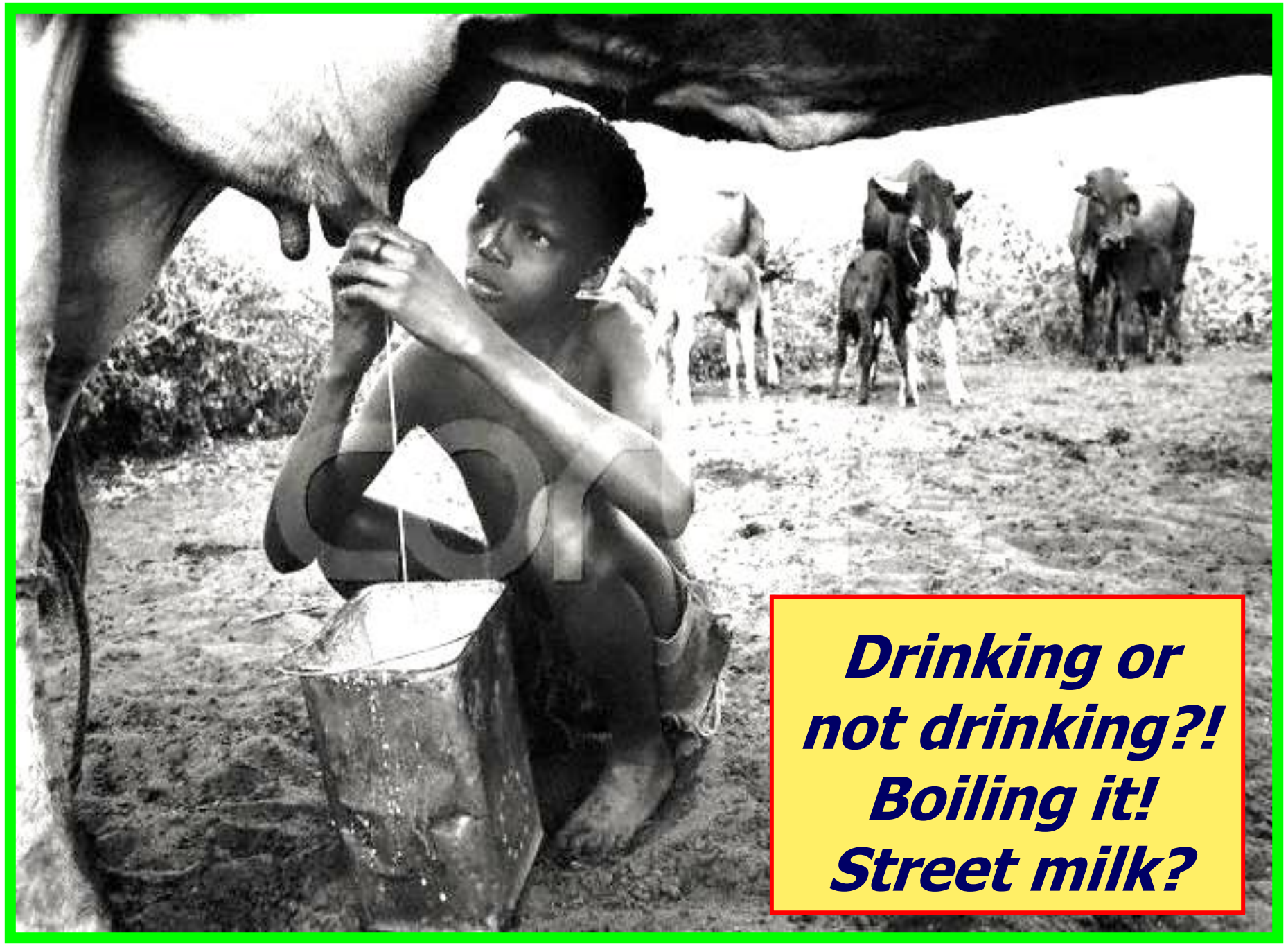
- Most food-related illnesses can be avoided by **washing fresh fruits and vegetables**, **cooking meat thoroughly**, **drinking only pasteurized milk**, and ***common-sense hygiene***.
- Microbial contamination is the most common cause of food-borne illnesses. Pesticides, heavy metals, and other chemical agents that enter the food supply can also cause gastro-intestinal, as well as neurologic and respiratory symptoms. *(http://topics.nytimes.com/top/news/health/diseasesconditionsandhealthtopics/foodcontaminationandpoisoning/index.html, The New York Times, 09.10.05)*

CODEX ALIMENTARIUS : GLOBAL STANDARDS

CODEX ALIMENTARIUS
International Food Standards
World Health Organization
Food and Agriculture Organization of the United Nations

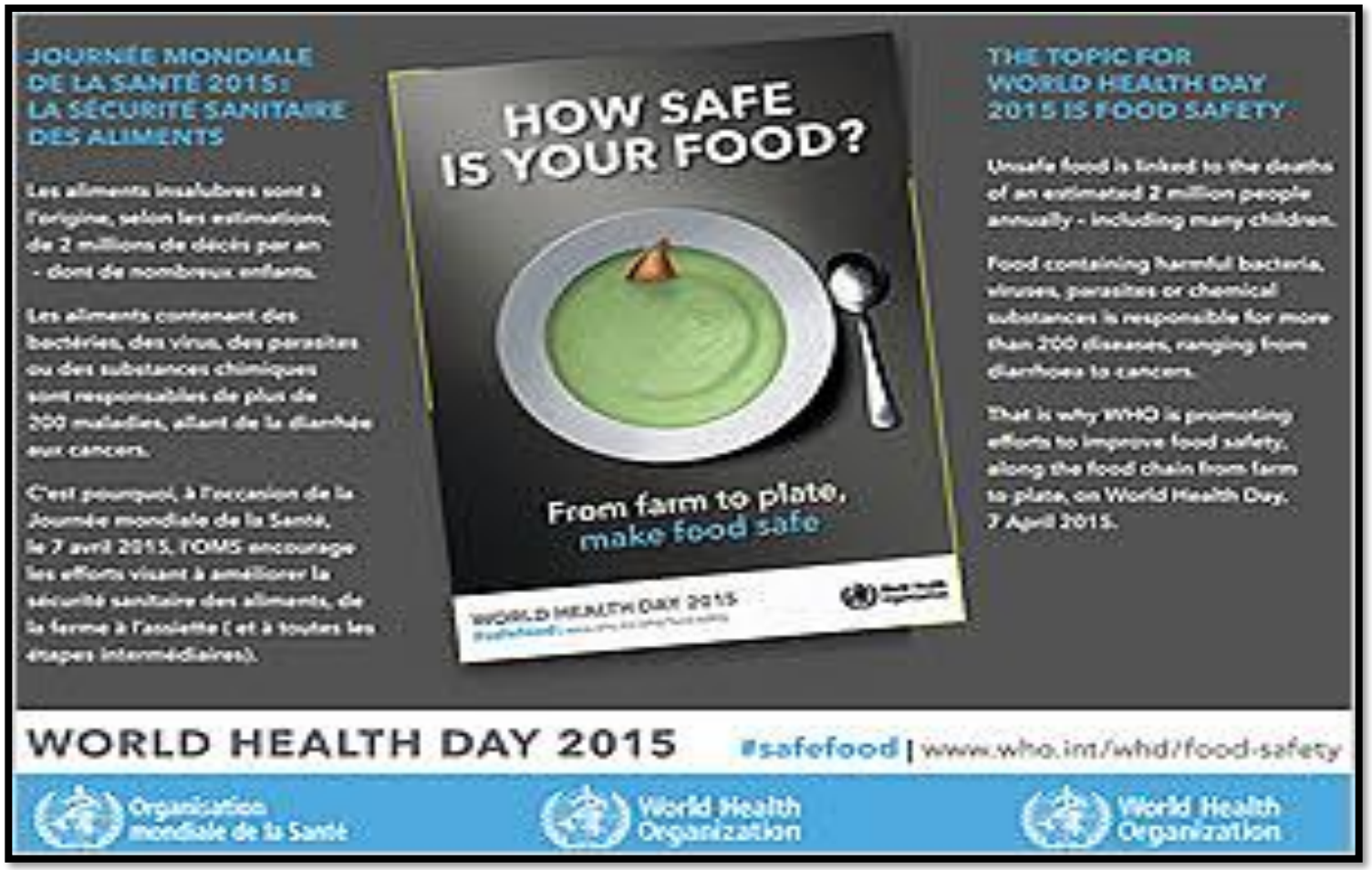
- **Since 1963, an international food code has been in place to ensure food safety worldwide.** *(Codex Alimentarius Commission)*
- **Codex Alimentarius**, jointly administered by **FAO** and the **World Health Organization :**
- Sets standards for pesticide and veterinary drug residues, additives, food imports, inspections and food sampling methods, among other issues.
- It serves as the basis for many national food standards. *(**Türk Gıda Kodeksi**'nin de kaynağıdır.)* WHO : Single medicine and single health!
  www.fao.org/worldfoodsummit/english/fsheets/fsafety.pdf, p2, 21.10.05




Drinking or
not drinking?!
Boiling it!
Street milk?

http://www.who.int/campaigns/world-health-day/2015/en/, 7.4.15

Immunization saves 2-3 million lives every year yet, globally, 19 million children are still missing out on basic vaccines. When people ensure that their families and communities are protected with vaccines, we are all protected together. ***#VaccinesWork*** (www.who.int 30.04.2018)

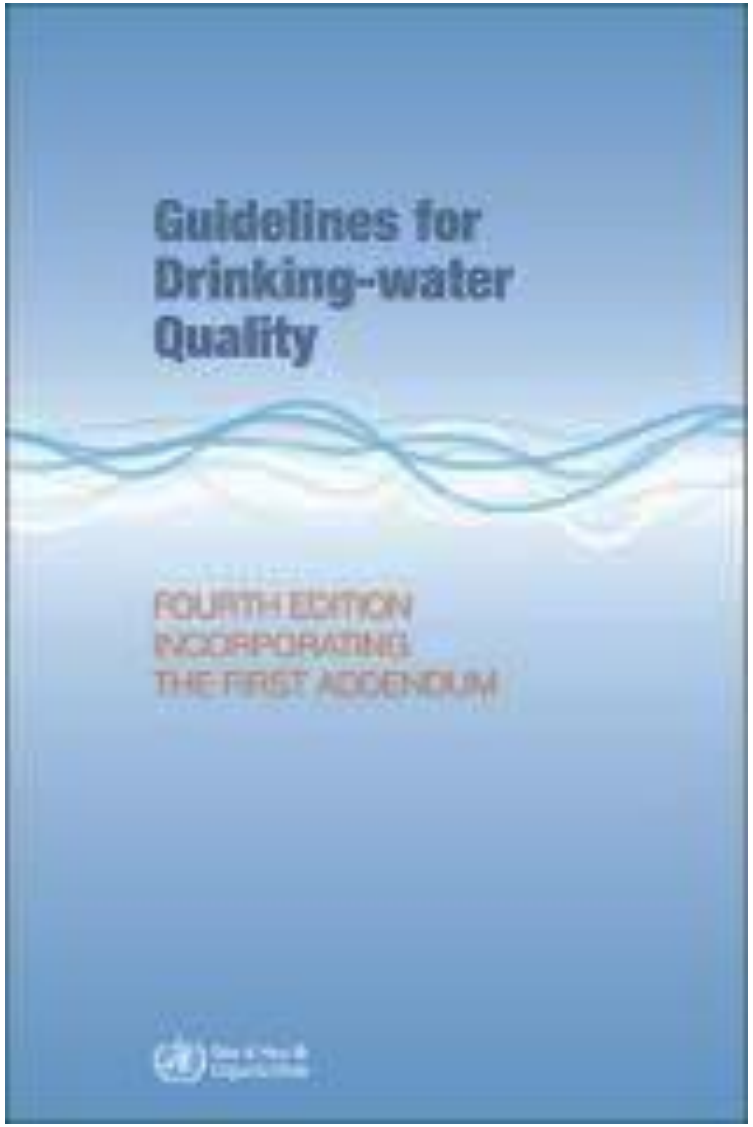


http://www.who.int/campaigns/world-health-day/2015/en/, 7.4.15

10 minutes

In the 25th anniversary of the Chernobyl disaster, German people protest on the streets.

Guidelines for drinking-water quality, 4th edition by WHO



Overview

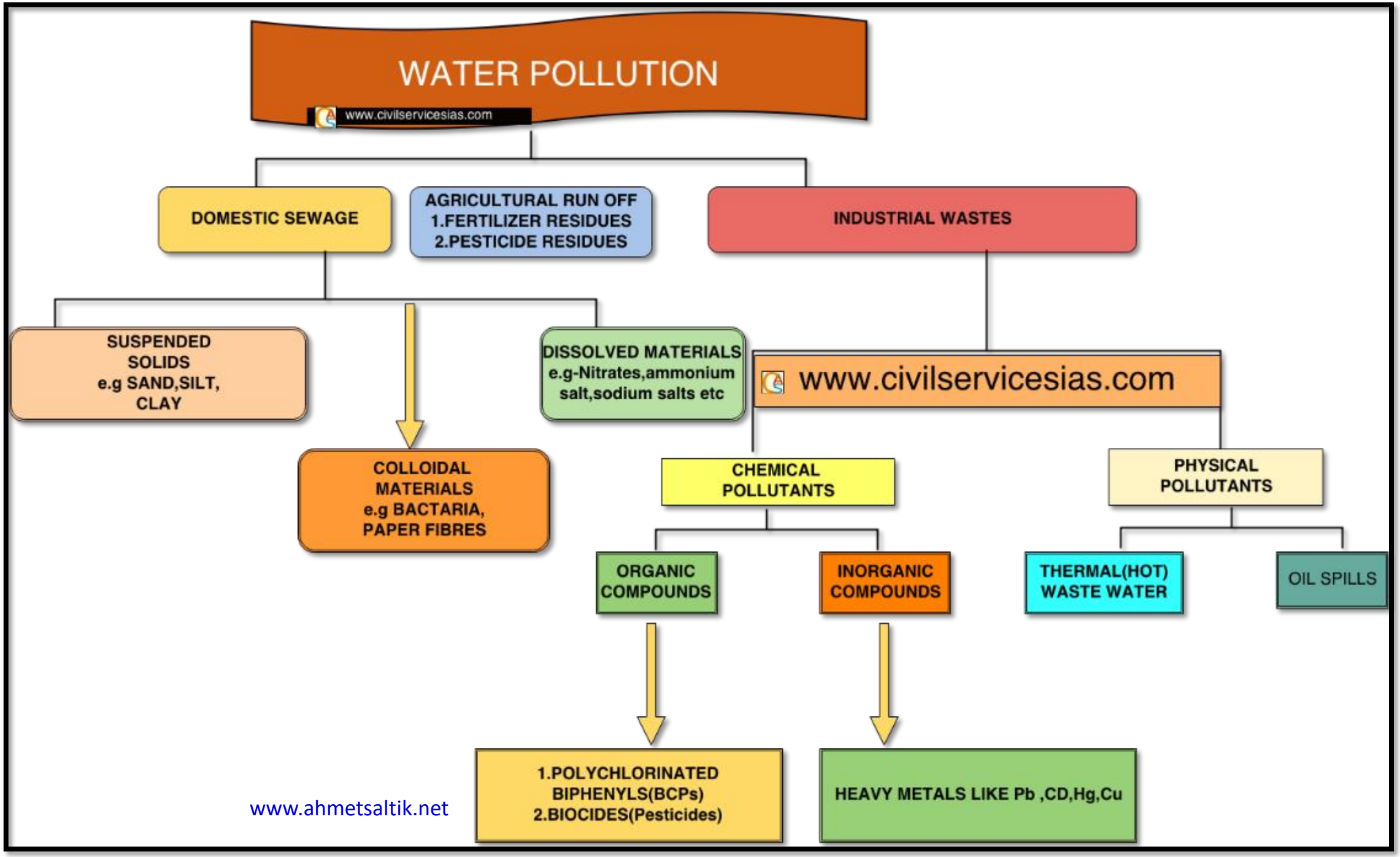
- The 4th edition of the ***World Health Organization's (WHO) Guidelines for drinking-water quality (GDWQ)*** builds on over 50 years of guidance by WHO on drinking-water quality, which has formed an authoritative basis for the setting of national ***regulations and standards for water safety*** in support of public health.
- It is the product of significant revisions to clarify and elaborate on ways of implementing its recommendations of contextual ***hazard identification*** and ***risk management***, through the establishment of health-based targets, catchment-to-consumer ***water safety plans*** and independent ***surveillance***.

Guidelines for drinking-water quality, 4th edition, incorporating the 1st addendum (who.int)

Guidelines for drinking-water quality, 4th edition, by WHO

Parameter	Mean± sd	WHO	WHO Bangladesh	EU
pH	7.180 ± 0.19	6.5-9.2	6.5-8.5	-
EC (µS cm^{-1})	0.496 ± 0.32	250	500	250
TDS (ppm)	194 ± 15.77	-	1000	-
As (ppm)	0.0071 ± 0.005	0.01	0.05	0.01
Fe (ppm)	0.255 ± 0.09	-	0.3-1	0.2
Pb (ppm)	0.307± 0.15	0.01	0.05	0.01
E. Coli	0	0	0	0
(Source: World Health Organization; 2011.Guidelines for Drinking-water Quality, 4th Edition.)				

Guidelines for drinking-water quality, 4th edition, incorporating the 1st addendum (who.int)



Water safety plans (WSP)

- In addition to ***testing of water quality***, verification should include
- Audits of WSPs to demonstrate that the plans have been properly designed, are being implemented correctly and are effective.
- **Factors to consider include the following:**
  - all significant hazards and *hazardous events* have been identified;
  - *appropriate control measures have been included;*
  - appropriate *operational monitoring* procedures have been established;
  - *appropriate operational limits have been defined;*
  - corrective *actions have been identified;*
  - *appropriate verification monitoring procedures have been established.*

Guidelines for drinking-water quality, 4th edition, incorporating the 1st addendum (who.int)

Water Quality Analysis

- **Physical Factors** including suspended materials (called suspended solids) and dissolved substances (dissolved solids)
- **Chemical Factors** including concentrations of ions, pollutants, etc…
- **Biological Factors** including presence of organisms, plankton, macroinvertebrates, fish, nutrients, etc…

General Requirements

1- Meat the requirements of the sampling program.

2-Handle sample so that it does not deteriorate or become contaminated or compromised before it analyzed.

3- Ensure sampling equipments are clean and quality assured before use.

4-Use sample containers that are clean and free of contaminants.

Guidelines for drinking-water quality, 4th edition, by WHO

Table 4.4 Recommended minimum sample numbers for faecal indicator testing in distribution systems[a]

Type of water supply and population	Total number of samples per year
Point sources	Progressive sampling of all sources over 3- to 5-year cycles (maximum)
Piped supplies	
< 5000	12
5000–100 000	12 per 5000 population
> 100 000–500 000	12 per 10 000 population plus an additional 120 samples
> 500 000	12 per 50 000 population plus an additional 600 samples

[a] Parameters such as chlorine, turbidity and pH should be tested more frequently as part of operational and verification monitoring.

Guidelines for drinking-water quality, 4th edition, incorporating the 1st addendum (who.int)

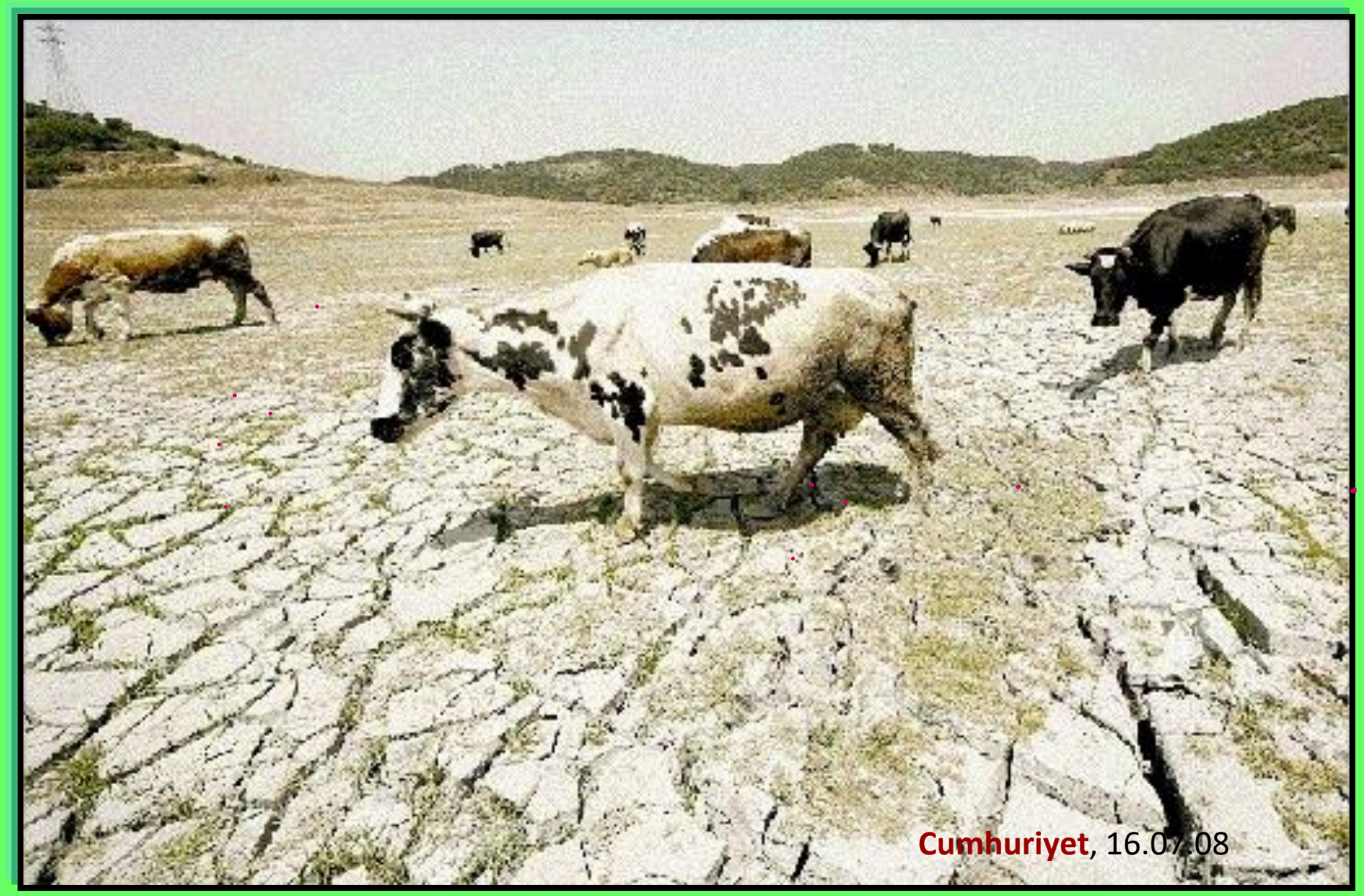
Guidelines for drinking-water quality, 4th edition, by WHO

Table 5.2 Example of categorization of drinking-water systems on the basis of population size and quality rating in order to prioritize actions (see also Table 7.10)

Quality of drinking-water system[a]	Proportion (%) of samples negative for *E. coli*		
	< 5000 population	5000–100 000 population	> 100 000 population
A	90	95	99
B	80	90	95
C	70	85	90
D	60	80	85

[a] Quality decreases from A to D.

Guidelines for drinking-water quality, 4th edition, incorporating the 1st addendum (who.int)



Alibeyköy dam = Non existency of water!

Konya, Turkiye sinkholes!

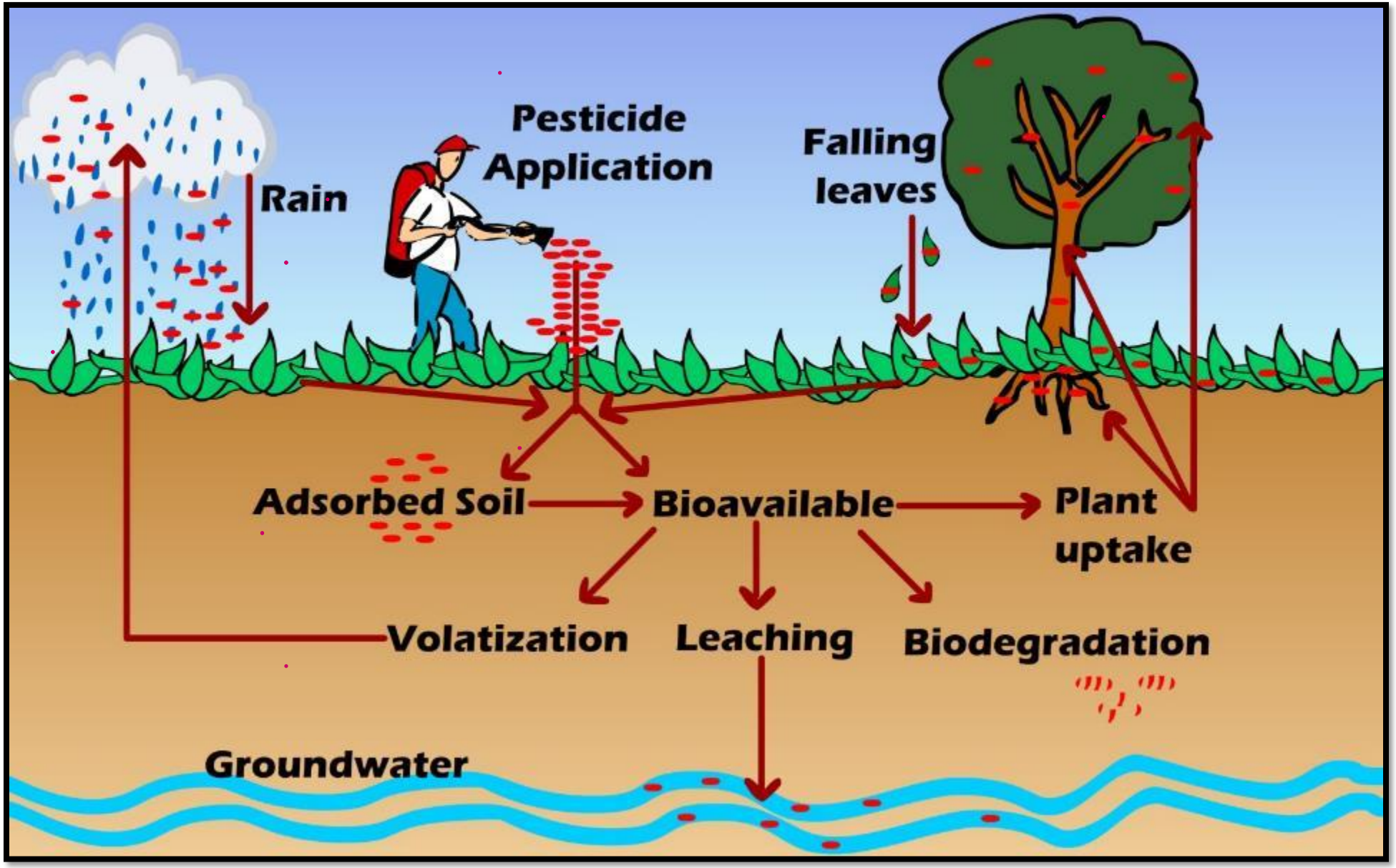
(photo by AA)

Cumhuriyet, 26.08.08

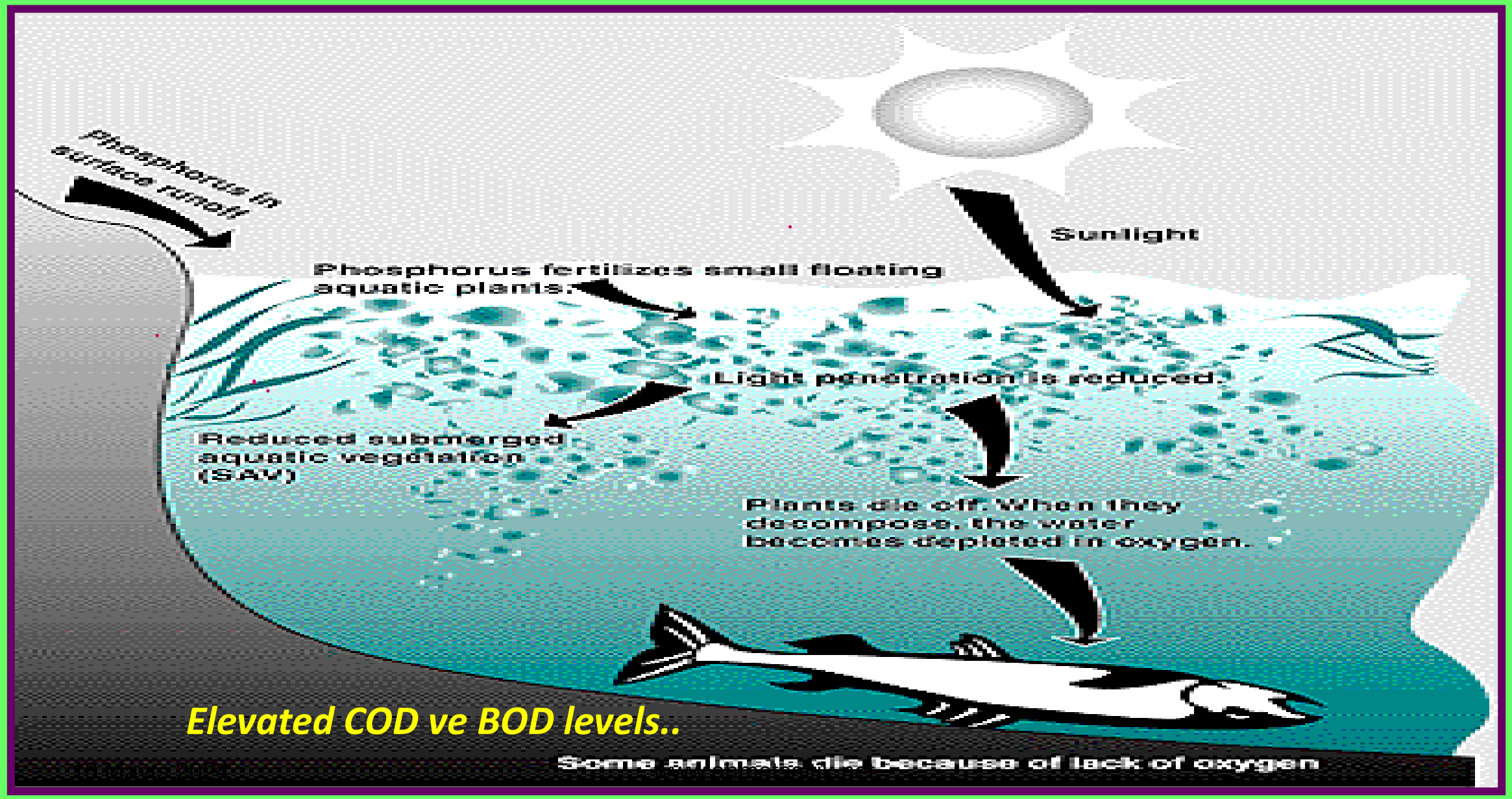
Droughts and competition for water compound problems for farmers in dry regions..

www.fao.org / 16.02.07

Persistent Organic Pollutants (POPs)



Fishes are sinking in the water!?



Elevated COD ve BOD levels..

Secure environment is a must;
for sustainable human life..

E-waste mountains in Africa!

UNEP warning : Rich countries pour their electronic waste and toxic chemicals to poor countries! *www.ntvmsnbc.com/news/ 28.11.06*

These hazardous wastes pollute agricultural products and groundwater.

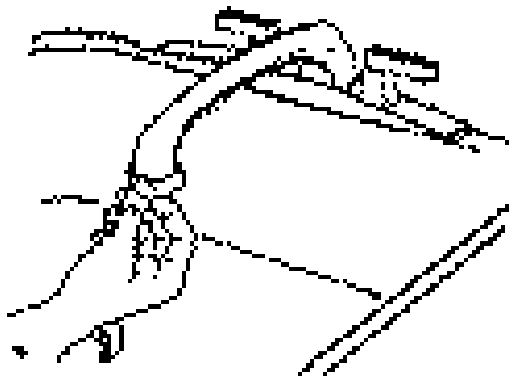
The Millennium Ecosystem Assessment-2005

- In 2005, the largest ever assessment of the Earth's ecosystems was conducted by a research team of over 1,000 scientists. The findings of the assessment were published in the multi volume ***Millennium Ecosystem Assessment***, which concluded that ***in the past 50 years humans have altered the earth's ecosystems more than any other time in our history***.

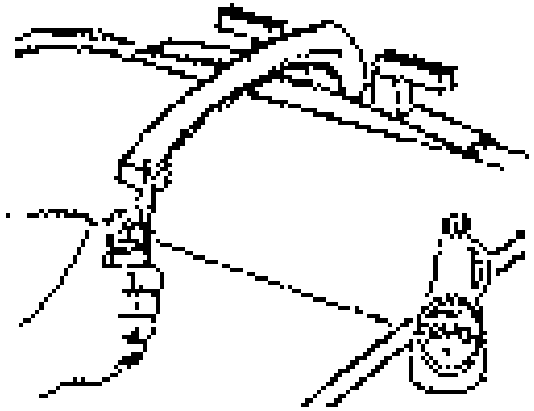
- ***Due to :*** Environmental toxic - carcinogen - mutagenic - genotoxic ... chemicals accumulated in the human body, threshold values were exceeded. These chemicals are experiencing over-threshold (stochastic) adverse effects and we are in a face with an increasing amount of environmental diseases (epidemic, pandemic)!


BOTULISM
Analysis
Laboratory Test

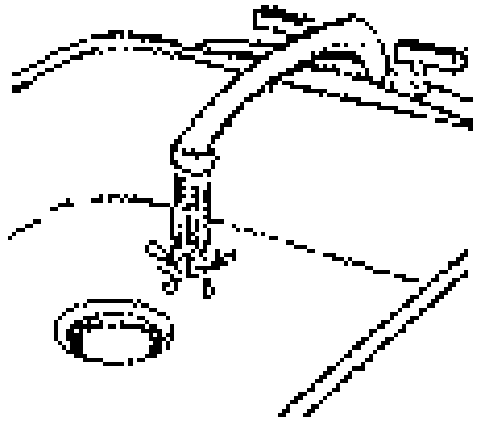
How To Take A Water Sample



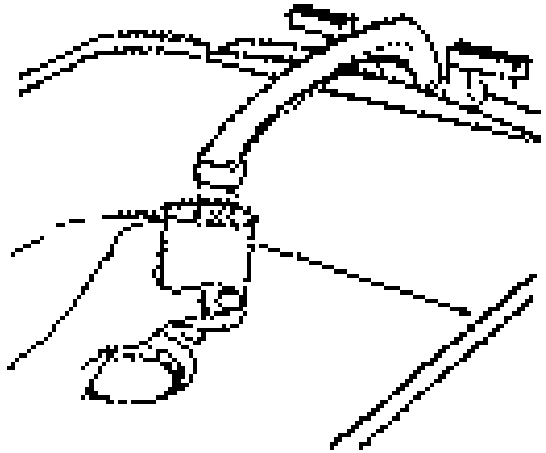
1. Remove the aerator



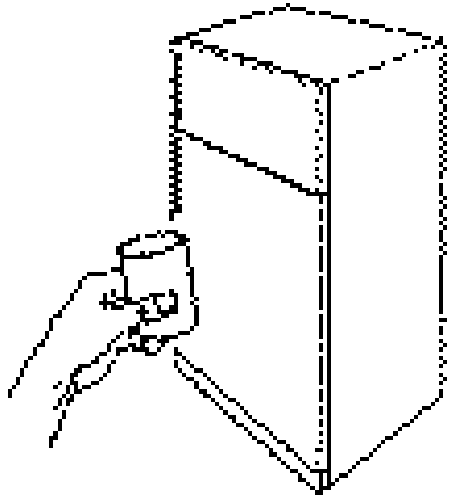
2. Disinfect the faucet



3. Run the water several minutes

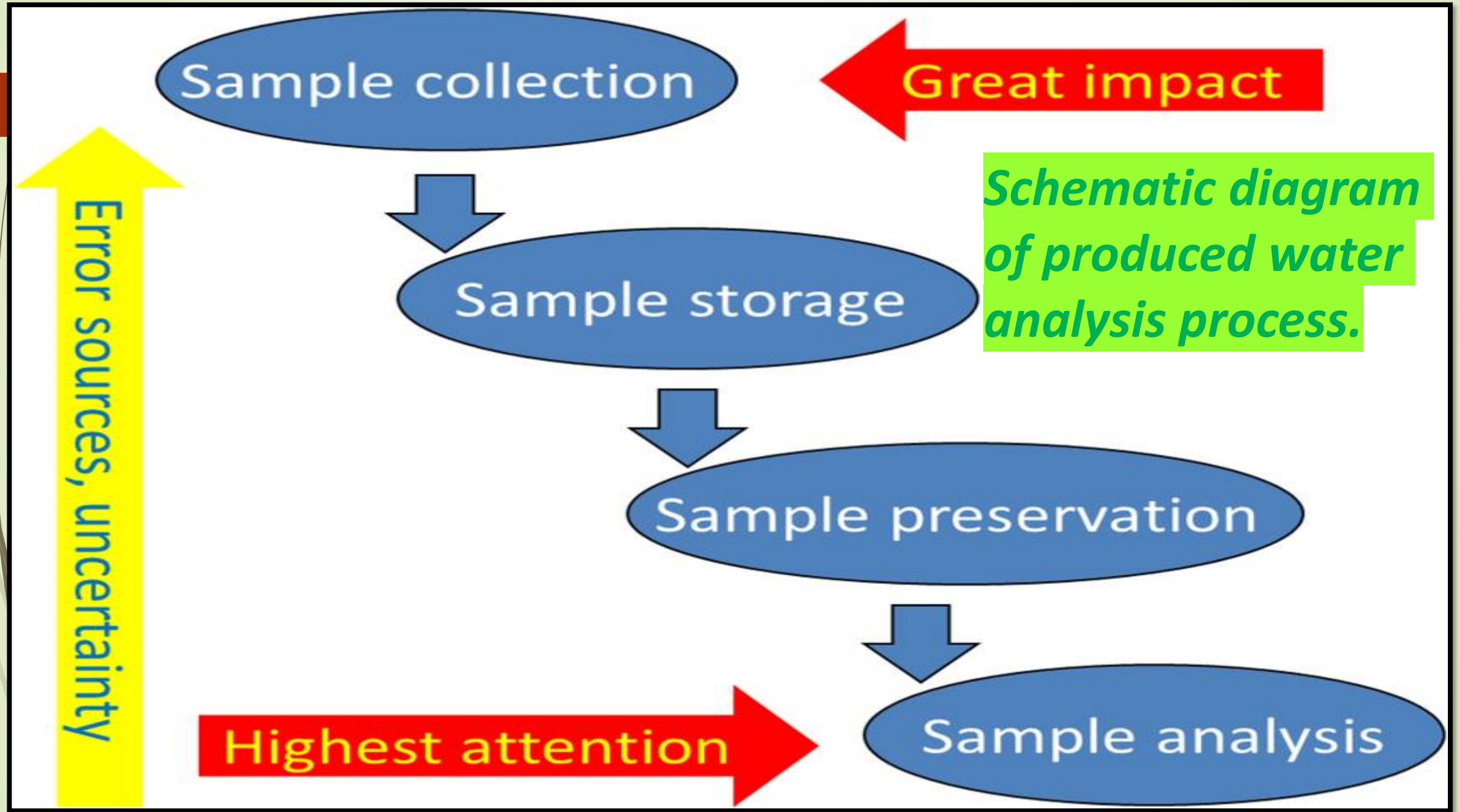


4. Do not touch the inside of the bottle



5. Store sample in refrigerator

https://www.extension.purdue.edu/extmedia/wq/wq-3.html, 9.5.24


Sample collection
Great impact
Sample storage
Schematic diagram of produced water analysis process.
Sample preservation
Error sources, uncertainty
Highest attention
Sample analysis

Remove shrink band before filling the bottle

Fill to "shoulder" of bottle

100 ml line etched on bottle

Drinking Water Sample Drop-off

Contact Name
Company Name
Address

LABORATORY CHEMICAL ANALYSIS REPORT

Site:

Date Sample Received:
Date of Sampling:
Sampled by:

a) **SAMPLE DETAILS**

Sampler's Ref:	Lab. Sample Code No.	System/Sample	Treatment in Use	Visual Observations

b) **RESULTS OF ANALYSIS**

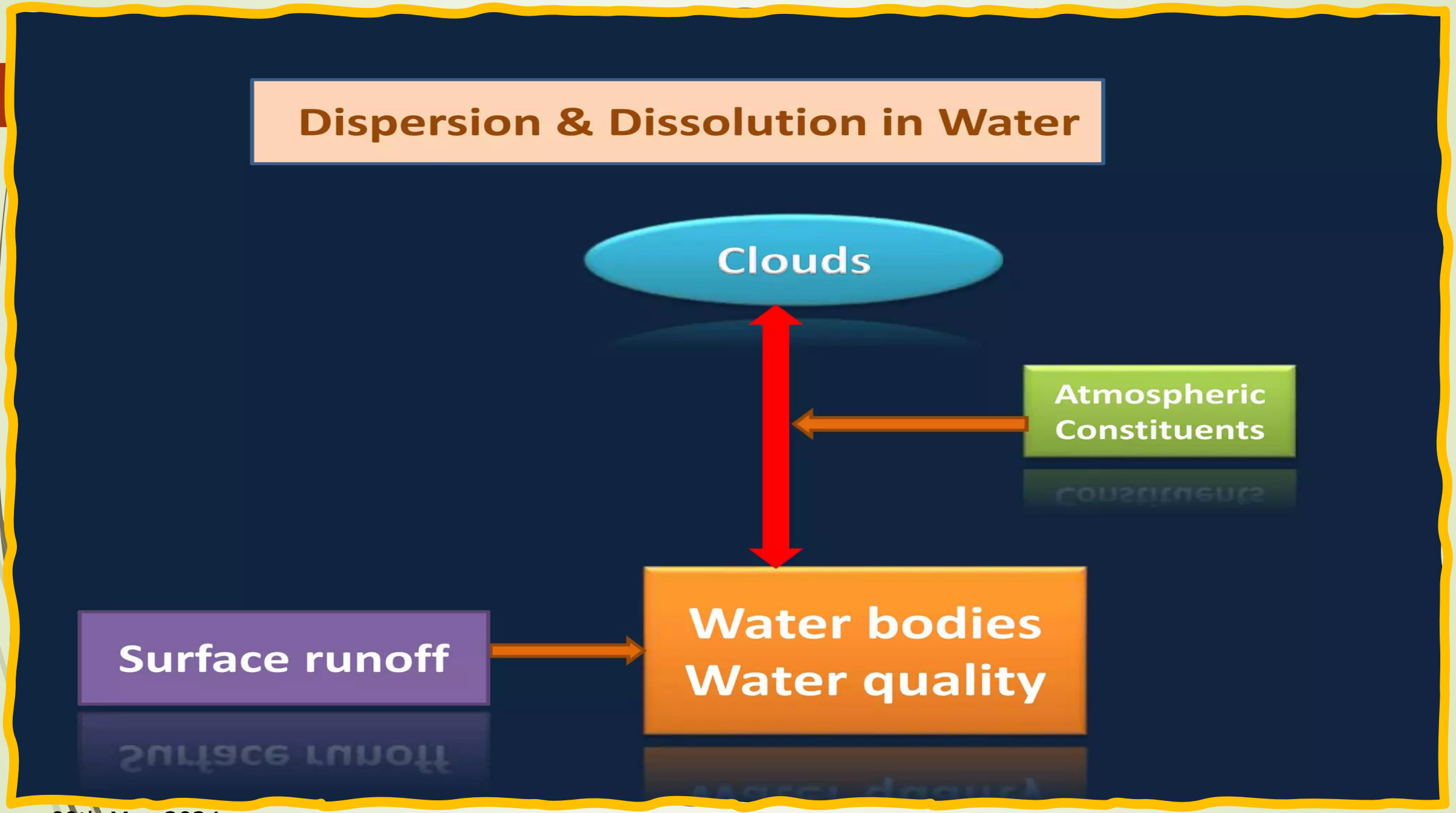
	Units	Lab. Sample Code No.	Lab. Sample Code No.	Lab. Sample Code No.
Aluminium, Dissolved	µg/l			
Antimony, Dissolved	µg/l			
Arsenic, Dissolved	µg/l			
Boron, Dissolved	µg/l			
Cadmium, Dissolved	µg/l			
Chromium, Dissolved	µg/l			
Copper, Dissolved	µg/l			
Iron, Dissolved	µg/l			
Lead, Dissolved	µg/l			
Manganese, Dissolved	µg/l			
Mercury, Dissolved	µg/l			
Nickel, Dissolved	µg/l			
Selenium, Dissolved	µg/l			
Sodium, Dissolved	mg/l			
pH	-			
Orthophosphate as PO4	mg/l			

c) **COMMENTS:**

System	Parameter	Suggested Limits	RECOMMENDATIONS

Example Report

Good Sampling Technique Essential for Accurate Water Analysis


Dispersion & Dissolution in Water
Clouds
Atmospheric Constituents
Surface runoff
Water bodies
Water quality

MEDICAL SCHOOLS MUST PREPARE STUDENTS TO WORK IN A WORLD ALTERED BY CLIMATE CHANGE-1

BY ANNA GOSHUA, MARCH 19, 2019

*A*S A MEDICAL STUDENT FUMBLING WITH THE FUNDAMENTALS OF INTERVIEWING PATIENTS AND TAKING MEDICAL HISTORIES, THE REALITIES OF BEING A DOCTOR SEEM LIKE A FAR-OFF DREAM. MY COLLEAGUES AND I WORK HARD TO PREPARE OURSELVES TO BE EQUIPPED TO ADDRESS THE INCREASINGLY COMPLEX HEALTH CARE ISSUES THAT WILL AFFECT THE LIVES OF OUR FUTURE PATIENTS, FROM ***INEQUITIES*** *IN ACCESS TO QUALITY CARE* TO MULTIDRUG RESISTANCE…

MEDICAL SCHOOLS MUST PREPARE STUDENTS

TO WORK IN A WORLD ALTERED BY CLIMATE CHANGE-2

CLIMATE CHANGE IS THE CONTEXT IN WHICH TODAY'S
MEDICAL STUDENTS WILL PRACTICE MEDICINE.
THIS THREAT WILL INTERSECT WITH EVERY FACET OF OUR PATIENTS' LIVES
AND IMPOSE BARRIERS TO HEALTH DELIVERY WE WILL HAVE TO NAVIGATE.
MEDICAL STUDENTS CAN'T AFFORD THE LUXURY OF CHOOSING TO BE INTERESTED
IN CLIMATE CHANGE THE WAY WE WILL SELECT OUR MEDICAL SPECIALTIES.
IT IS AN ***URGENT REALITY*** WE MUST CONFRONT WITH THE KNOWLEDGE AND SKILLS
WE ACQUIRE IN ORDER TO INNOVATE, ADVOCATE, AND CARE FOR PATIENTS
AND COMMUNITIES AFFECTED BY CLIMATE CHANGE.

ANNA GOSHUA is a 1st year medical student at Stanford University
School of Medicine. **agoshua@stanford.edu**, **@annagoshua**
https://www.statnews.com/2019/03/19/climate-change-medical-school/

Moving away from coal and oil

Angela Merkel, the German chancellor, has been one of the biggest advocates for working on climate on the world stage overall. Currently, she's the only major global politician still in the game who helped strategize the original global warming agreement at Kyoto in 1997.

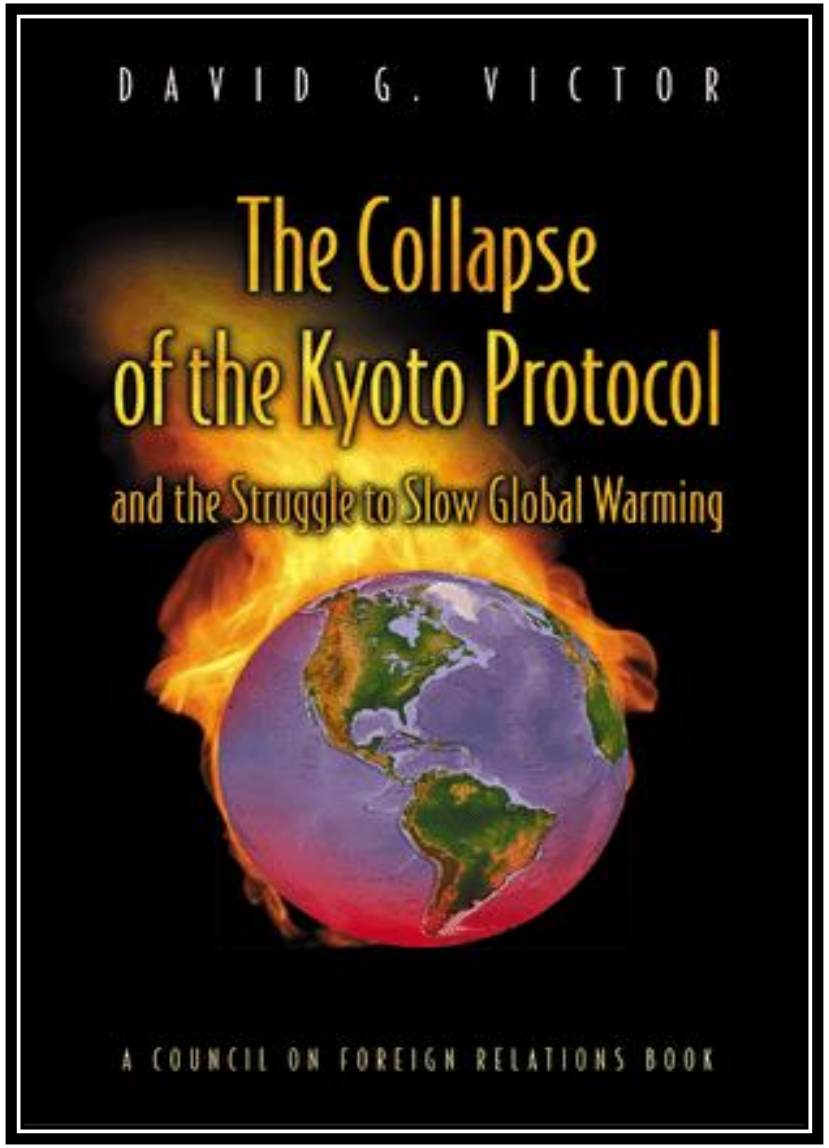
Germany is also the leading country in moving away from coal and oil, and has set high targets for emission cuts. Merkel has helped ensure that German energy efficiency is set to be improved by 3% a year for 20 years, with the solar market growing by 40% a year.

- *"Unabated climate change will slash prosperity by between 5% and 25%. Rigorous climate protection will cost only 1% of this prosperity and makes economic sense,"* **Merkel** has said.

https://www.msn.com/tr-tr/haber/gundem/almanya-.. 28.4.20

1 out of 9 people struggles with hunger. 1 out of every 5-6 deaths is HUNGER!

Globalisation = New Imperialism, main cause of increasing hunger!



DAVID G. VICTOR
2001, Princeton Univ.

Crisis and Opportunity (pp. 3-24)

- Worldwide, legislatures are beginning the long process of deciding whether to ratify and implement the December 1997 "**Kyoto Protocol**." Widely hailed as a first serious step towards slowing **greenhouse warming**, the protocol requires each industrialized nation to cap its emissions at specific target levels.
- Those targets apply to the "budget period" of 2008-12 and the protocol also envisions that nations will agree on caps for future budget periods.
- Although public pressure to do something about **global warming is growing**, legislators will weigh the cost of compliance before they ratify the **Kyoto deal**. One factor will loom large in the debate...

Greta Thunberg said she would not have wasted her time talking to D. Trump about the dangers posed by climate change at a United Nations summit.

https://www.independent.co.uk/environment/greta-thunberg-trump-un-summit-climate-crisis-radio-4-today-a9265386.html, 01.01.2020

Don't let COVID-19 become a hunger game!


NATIONAL GEOGRAPHIC
TRAVELER
"Lost in Cornwall," National Geographic Traveler Magazine, July/August 2004. Photograph by Jim Richardson.
© 2004 National Geographic Society. All rights reserved. See more at nationalgeographic.com/traveler

S U M M A R Y….

- ✓ 8.9 %of the world's population are undernourished
- ✓ *This means they have a caloric intake below minimum energy requirements.*
- ✓ 663 million people globally are undernourished.
- ✓ *22% of children younger than five are 'stunted'*
- ✓ They are significantly shorter than the average for their age, as a consequence of chronic poor nutrition or repeated infection as a vicious circle.

S U M M A R Y....

- ✓ *9% of the world population -around 697 million people- are severely **food insecure**.*
- ✓ One-in-four people globally -1.9 billion- are moderately or severely ***food insecure***.
- ✓ Learning objectives aim to provide :
  - *a comprehensive understanding of **food and water hygiene**,*
  - the significance of **proper sampling techniques**,
  - *and the analytical methods used to **ensure safety and quality**.*
- ✓ These are designed to equip students with the knowledge and skills necessary to address ***public health concerns related to food and water safety***.

Thank you for sincere co-operation

Article 25 of *The Universal Declaration of Human Rights*

Everyone has the right to a standard of living adequate for the health and well-being of himself and of his family, **including food**, clothing, housing and medical care and necessary social services, and the right to security in the event of *unemployment, sickness, disability, widowhood, old age or other lack of livelihood* in circumstances beyond his control.....

Thank You

Ahmet SALTIK, MD

Professor of Public Health

LLM, Health Law

BSc, Public Administration & Political Sciences