

Challenges in food safety

[Philippines]

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Outline

- A.) Food safety
- B.) Challenges in food safety
- C.) Sources and solution
- D.) Role of research and academe in food safety
- E.) Role of government in food safety
- F.) Take away message(s)



A. Food safety



Food Safety

- The handling, preparing and storage of food products the best way possible to reduce the risk of contracting foodborne illnesses.
- A joint effort starting from the handler, preparer, and consumer to ensure the implementation of practices for food safety.



Key facts

Food safety, nutrition and food security are inextricably linked (WHO, 2022).

An estimated 600 million – almost 1 in 10 people in the world – fall ill after eating contaminated food.

US\$ 110 billion is lost each year in productivity and medical expenses resulting from unsafe food in low- and middle-income countries.

Children under 5 years of age carry 40% of the foodborne disease burden.

Foodborne diseases impede socioeconomic development by straining health care systems and harming national economies, tourism and trade.

DRIVING FORCES SHAPING FUTURE FOOD SYSTEMS

SEVERAL EXTERNAL FACTORS ARE DRIVING STRUCTURAL CHANGES IN THE FOOD SYSTEM, PRESENTING OPPORTUNITIES & CHALLENGES FOR FOOD SAFETY, AS WELL AS OTHER INTER-RELATED ASPECTS, SUCH AS SUSTAINABILITY, AFFORABILITY, NUTRITION & INCLUSIVENESS.



FoodSafeR future-oriented Food Safety Hazard Management based on multi-criteria risk assessment for safer food:
 Co-benefits: consumer health and wellbeing, climate (mitigation and adaptation), environmental sustainability & circularity, dietary shift, sustainable healthy nutrition, food poverty reduction & empowerment of communities, and thriving businesses.



World Food Safety Day

- Yearly event that started 2019 and celebrated every June 7
- WHO uses this event to promote food safety to the public and reduce the number of illnesses that is caused by foodborne illnesses globally

Unsafe food affects us all, particularly vulnerable populations



Did you know an estimated **600 million** people around the world – almost **1 in 10** – fall ill after eating contaminated food and **420 000** die every year?



40% of the foodborne disease burden is on children under **5 years** of age

During a time of crisis, access to safe and healthy food is more at risk than at any other time. While food is not known to transmit COVID-19, food purchasing can be made safer with the following tips:



keep a physical distance (of at least 1m) between you and others while shopping



make sure your local food sellers are washing and sanitizing all surfaces used for food preparation and practicing good hand hygiene



ensure your hands are clean and when you get home wash your hands with soap and water before handling food



wash fruits and vegetables with water particularly if you are eating them raw

Together we can team up for food safety!

Food safety, everyone's business.

#WorldFoodSafetyDay

Share your food safety tips. To empower food safety day.

RA 10611 or the Food Safety Act of 2013

An Act To Strengthen The Food Safety Regulatory System In the
Country To Protect Consumer Health And Facilitate Market Access Of
Local Foods And Food Products, And For Other Purposes.



B. Challenges in food safety





Aquatic and Agricultural Resources

- Fish
- Shellfish
- Seaweeds
- Crops
- Produce





Food and water-borne diarrhea

Challenges in Food Safety



10 dead in diarrhea outbreak in S. Philippines

Source: Xinhua Published: 2018/2/20 10:52:31

The Broader Look

Salmonella summons PHL farm sector's strength

By Jasper Y. Arcalas - August 9, 2017



Health Research and Development Information Network

Herdin Record #: PCHRDP951028

Salmonella food poisoning in Benguet.

Researchers

Name	Role
¹ Janice B. Zabala	Author
² David A. Mendoza	Author
³ Florence Caput	Author
⁴ Ma. Concepcion Roces	Author
⁵ Mark E. White	Author
⁶ Manuel M. Dayrit	Author



Contaminants

— — —

- Something that makes a place or a substance (such as water, air, or food) no longer suitable for use or for consumption.
- **Microbiological contamination** refers to the non-intended or accidental introduction of infectious material or pathogens.

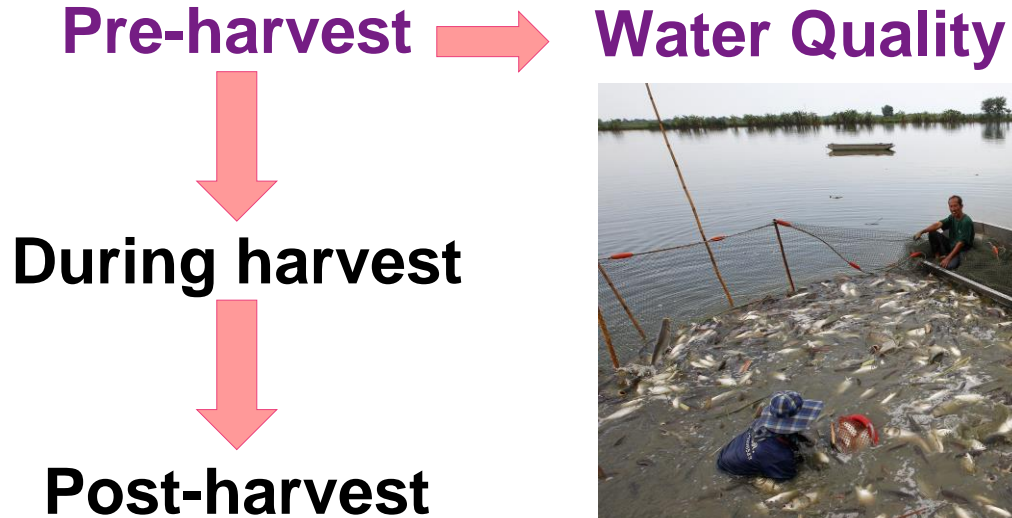


Pathogens

- an organism causing disease to its host
 - the severity of the disease symptoms referred to as “virulence”
- comprised of viruses and bacteria as well as unicellular and multicellular eukaryotes.



Sources of microbial contamination in agriculture and aquaculture



Hazards vs. Risk

HAZARD

Any agent in (biological, chemical, or physical) or condition of food having the potential to cause adverse health effects

RISK

A function of the probability of an adverse effect and the severity of that effect consequential to a hazard in food

Definitions according to Codex Alimentarius Commission



Commodities of Concern

Fish and other Aquatic Resources

Fresh Produce and other Crops

- Fish and shellfish, being live organisms, can become hosts and vector to parasites and pathogens
- Uncooked fresh produce can harbor pathogens
- Contamination occurs during pre-harvest, post harvest, processing, distribution, and preparation in food service or at home
- Improper handling and storage results to spoilage and contamination after harvest



Pathogen Sources

- Animal and Human Wastes
- Cross contamination



Common Pathogens

- Bacteria
- Protozoa
- Viruses
- Algae
- Fungi



Common Food Pathogens

Escherichia coli

- One of the most common causative agents of foodborne outbreaks around the world

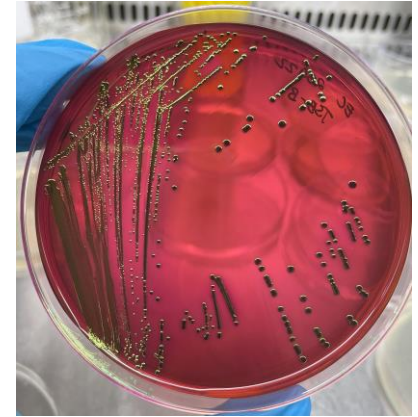
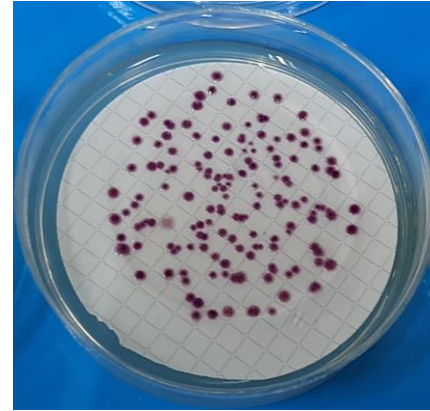


Gram stain slide showing *E. coli*

Common Food Pathogens

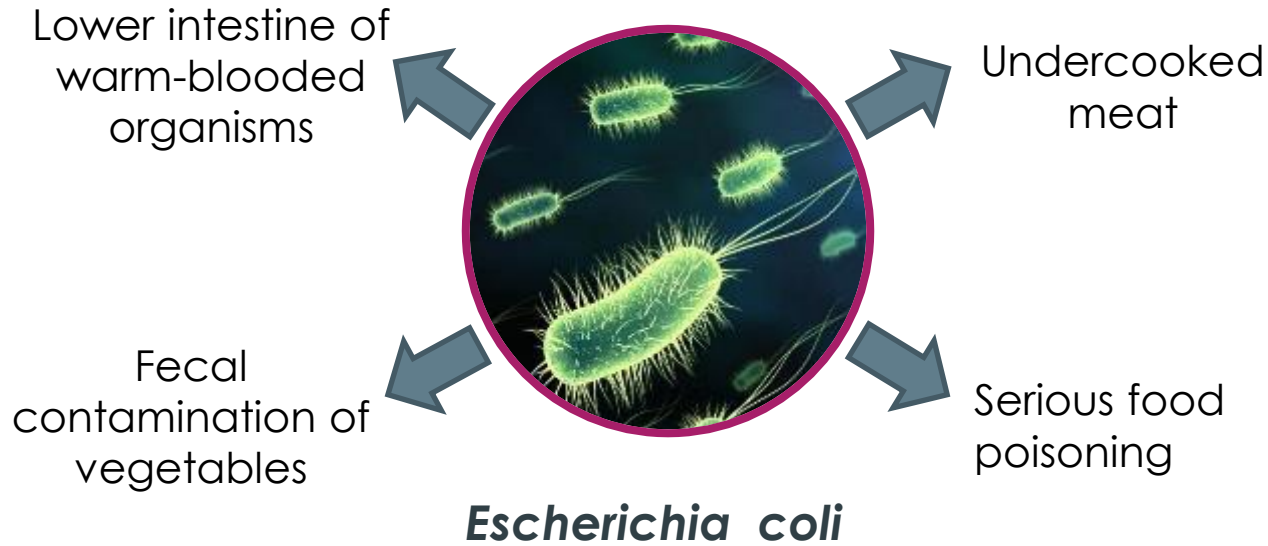
Escherichia coli

- Most *E. coli* strains do not cause severe illness, but some strains, such as the O157:H7 which causes severe complications (bloody diarrhea, kidney failure, death)



E. coli grown on agar plates

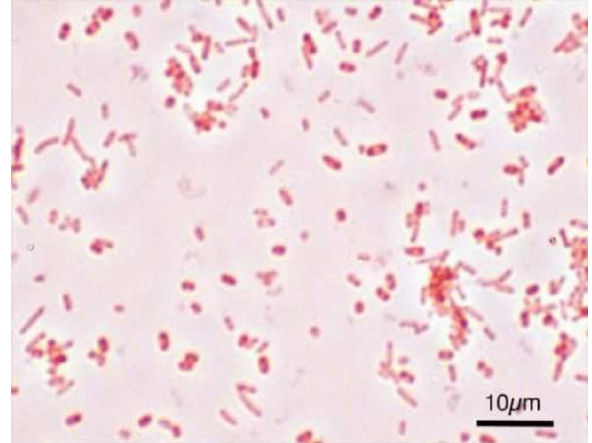
Mode of transmission



Common Food Pathogens

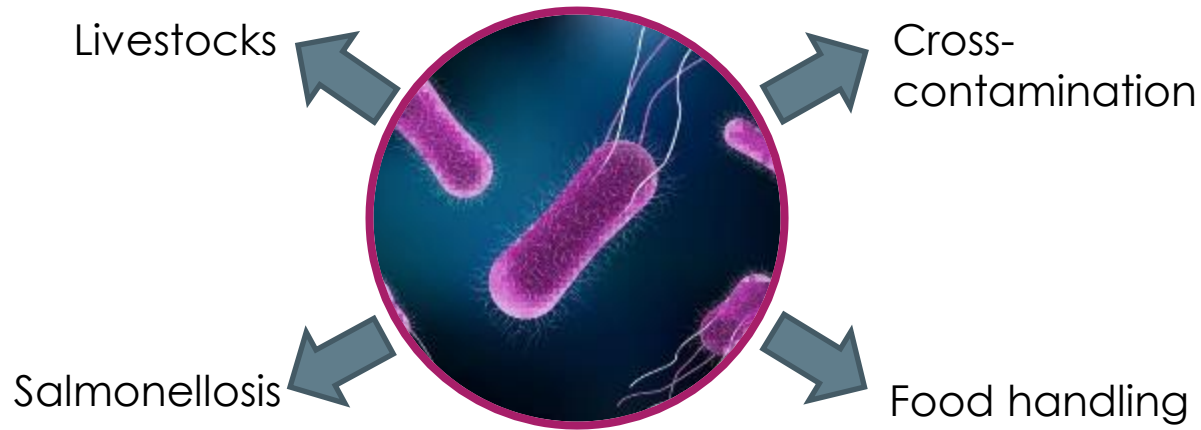
Salmonella

- 550 million people fall ill each year due to *Salmonella**
- Causes:
 - Salmonellosis
 - Enteric fever



Microscopic View of *Salmonella*

Mode of transmission



Salmonella

Common Food Pathogens

Vibrio spp.

- are abundant in aquatic environments, both in fresh and marine sources.
- These bacteria were also observed on the skin, gills, and the intestinal tracts of fish or shellfish.

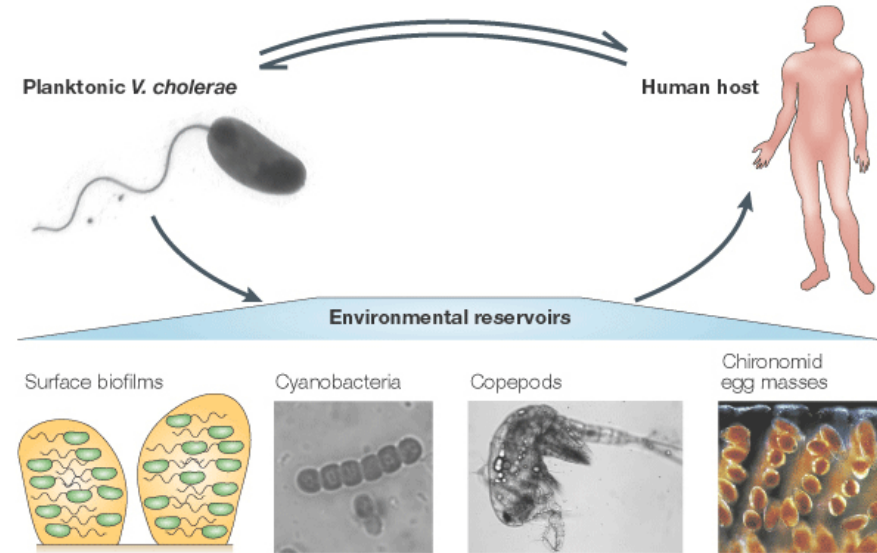


Gram stain slide showing *Vibrio cholerae*

Common Food Pathogens

Vibrio spp.

- Can contaminate fish and fish products during improper handling, long-time transport, evisceration, and also cross-contamination from raw materials.

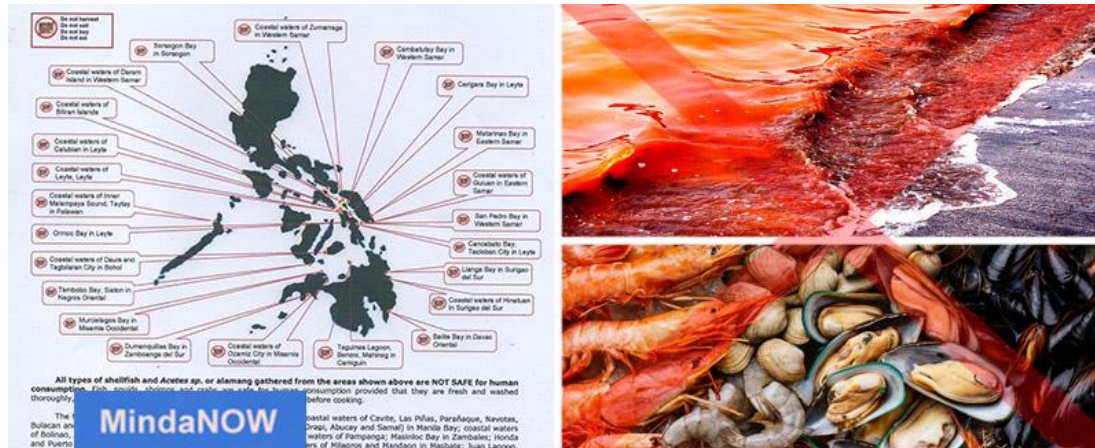


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Foodborne Intoxications

- Caused by consumption of food contaminated with metabolites excreted by microorganisms



NEWS Shellfish Samples From Ozamiz City, Camiguin, & More Positive With "Red Tide Toxin"

Featured Article brought to you by ACADEO. For more news and articles, visit: www.aboutcagayandeo.com.



Foodborne Intoxications

Harmful Algal Bloom (HAB)

- Red tides refer to toxic blooms of microscopic algae that occur worldwide
- Toxins can target multiple organ systems, including the nervous system, the liver, the skin, and the respiratory tract.



Antimicrobial Resistance

- Antibiotics have been used in different fields, in agriculture it is used on plants and animals to combat diseases.
- However, long term use promotes antimicrobial resistance (AMR) of bacteria in the environment.
- As antibiotics are completely absorbed, they settle in excrement and are used as fertilizer in the soil.



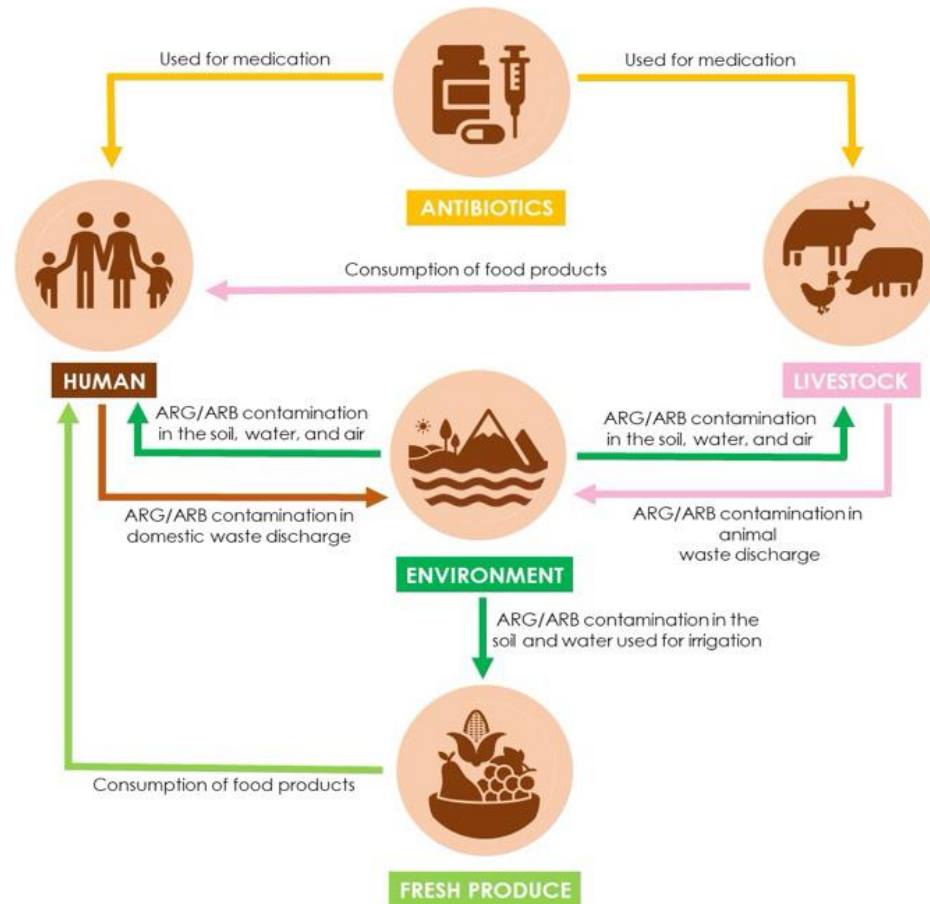


Figure 1: Transmission dynamics of antibiotic-resistant genes and bacteria among humans, livestock, environment, and fresh produce (Vital and Rivera, 2023).



Chemicals

- Naturally occurring toxins
- Persistent organic pollutants (POPs)
- Heavy metals
- Other chemical hazards

Food safety during pandemic

Meal kits
and delivery

Handling
packaged
food

Handling
and cleaning

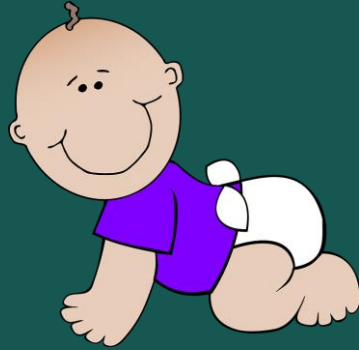
Food
donations

Spread of
pathogens
and AMR

MOST VULNERABLE TO FOODBORNE ILLNESSES



Elders



Children

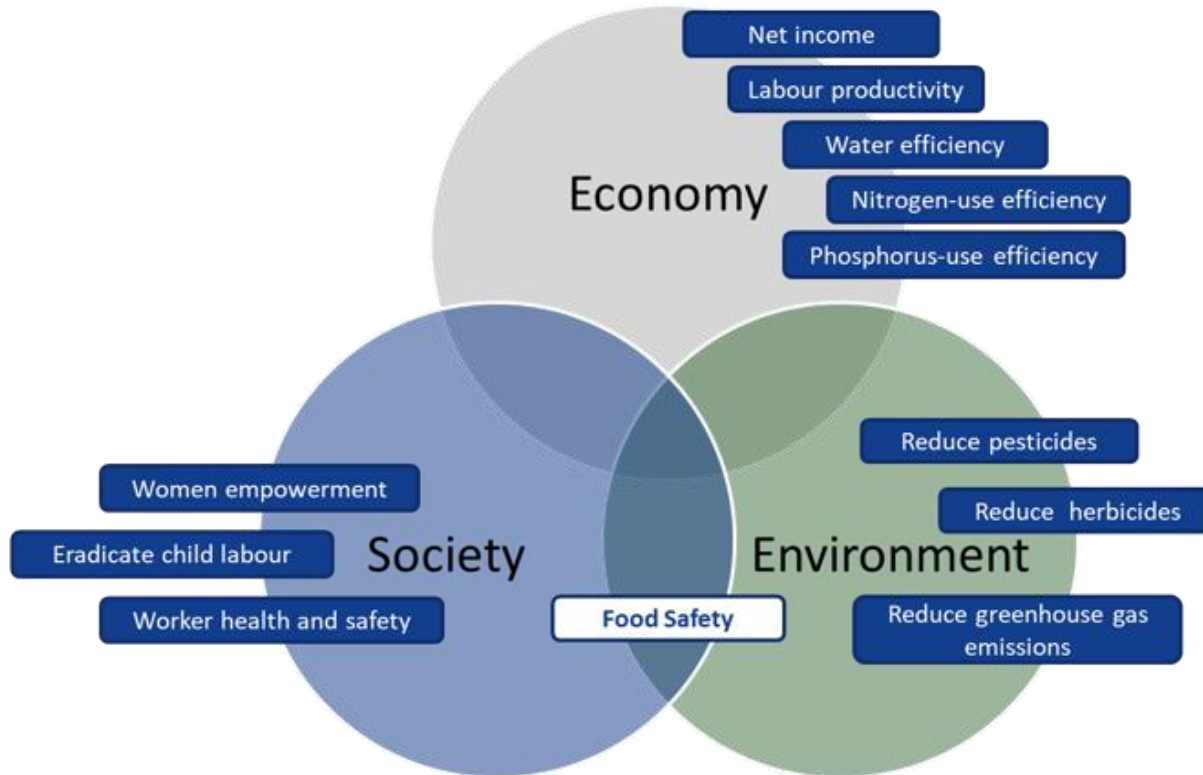


Pregnant Women



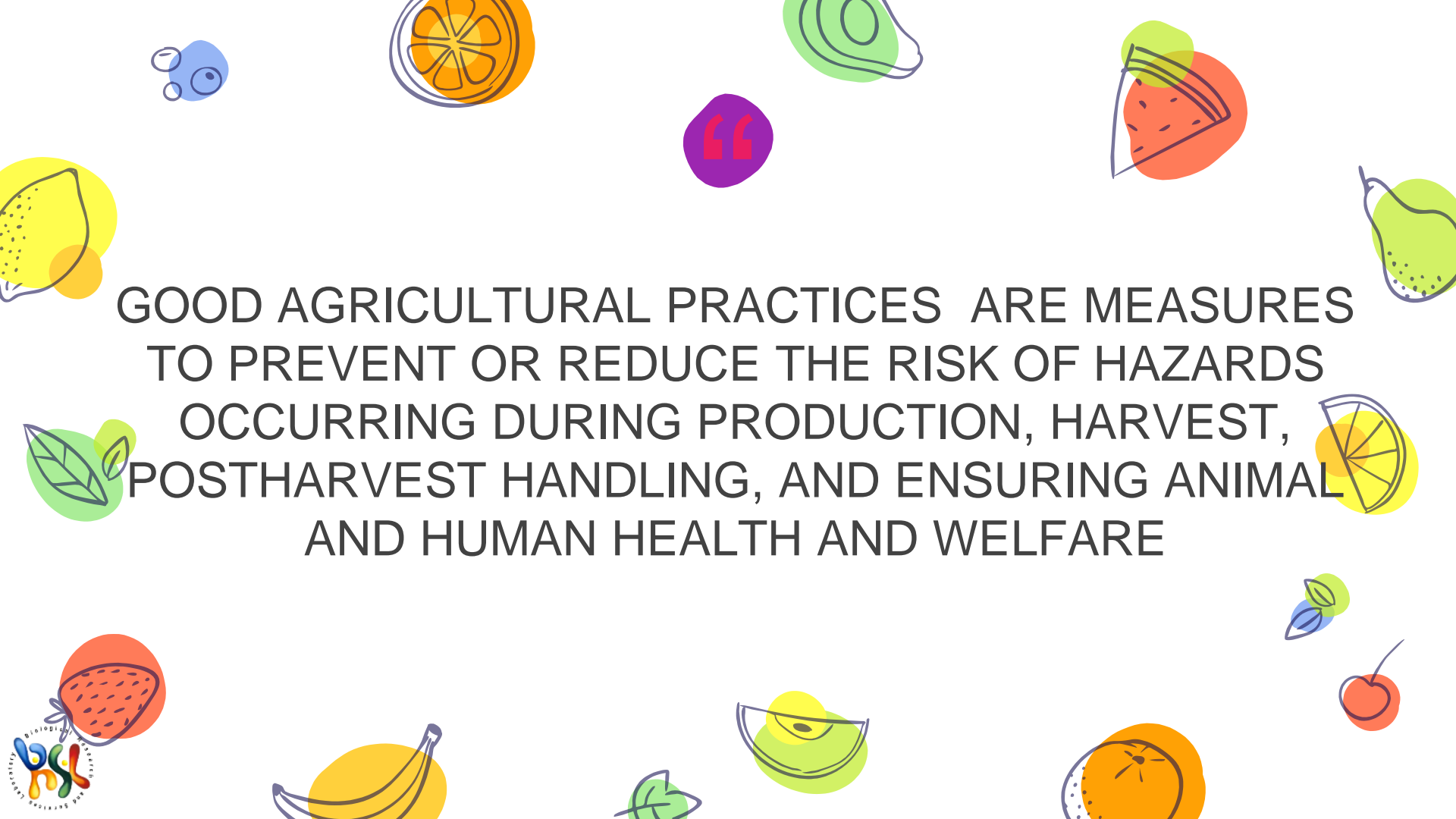
People with weak
Immune System

Food safety, security and sustainability

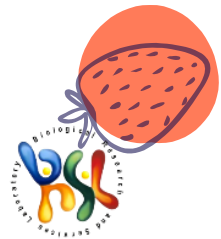


C. Sources and solutions





GOOD AGRICULTURAL PRACTICES ARE MEASURES
TO PREVENT OR REDUCE THE RISK OF HAZARDS
OCCURRING DURING PRODUCTION, HARVEST,
POSTHARVEST HANDLING, AND ENSURING ANIMAL
AND HUMAN HEALTH AND WELFARE



SOURCES OF CONTAMINATION IN FARMS



WORKERS



ANIMAL WASTE



SOIL



WATER



ANIMALS



SEWERAGE

Pre-Harvest Practices to Reduce Microbial Contamination

- Assess if the fish pond is free from chemical or biological hazards before production.
- Avoid entrance of farm animals to the pond sites at least 3 months before or during production.
- Ensure that good water source is available and no overcrowding of fish is permitted.
- Use only sterile fry as starting materials.



Pre-Harvest Practices to Reduce Microbial Contamination

- If outbreaks occur, report immediately to government agencies. Limit cross contamination to other ponds.
- If red tide is observed, notify BFAR and avoid catching shellfish.



Pre-Harvest Practices to Reduce Microbial Contamination

- Ensure human sewage is treated before releasing to aquatic resources.
- If water testing is available, tests should be done to identify possible contamination in water sources.
- Provide a safe alternative water source.



Harvest Practices to Reduce Microbial Contamination

- Equipment used should be washed before and after use.
- Harvest containers are checked and cleaned before use.
- After packing, containers should not be placed in direct contact with soil and water.
- Farm animals are banned where produce is handled, packed, and stored.



Post-Harvest Practices to Reduce Microbial Contamination

- Packed container are not placed in direct contact with soil.
- Transport vehicles are checked before use.
- Produce are stored and transported separate from goods that may potentially cause contamination.



WHO response

- WHO aims to strengthen national food control systems to facilitate global prevention, detection and response to public health threats associated with unsafe food.
 - Assess the safety of new technologies used in food production, such as genetic modification, cultivated food products and nanotechnology
 - Help implement adequate infrastructure to manage food safety risks and respond to food safety emergencies through the International Food Safety Authorities Network
 - Promote safe food handling through systematic disease prevention and awareness programmes, through the WHO Five keys to safer food message and training materials



WHO response

- Advocate for food safety as an important component of health security and for integrating food safety into national policies and programmes in line with the International Health Regulations
 - Monitor regularly the global burden of foodborne and zoonotic diseases at national, regional and international levels, and supporting countries to estimate the national burden of foodborne diseases
 - Update the WHO Global Strategy for Food Safety (2022-2030) to support Member States to strengthen their national food control systems and reduce the burden of foodborne diseases.
- WHO works closely with Food and Agriculture Organization (FAO), the World Organization for Animal Health (OIE), The UN Environment Programme (UNEP) and other international organizations to ensure food safety along the entire food chain from production to consumption.



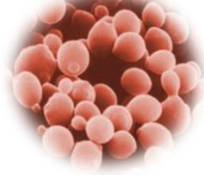
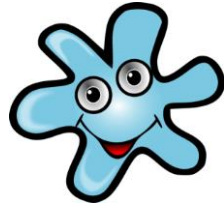
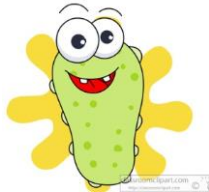
D. Role of research and academe in food safety



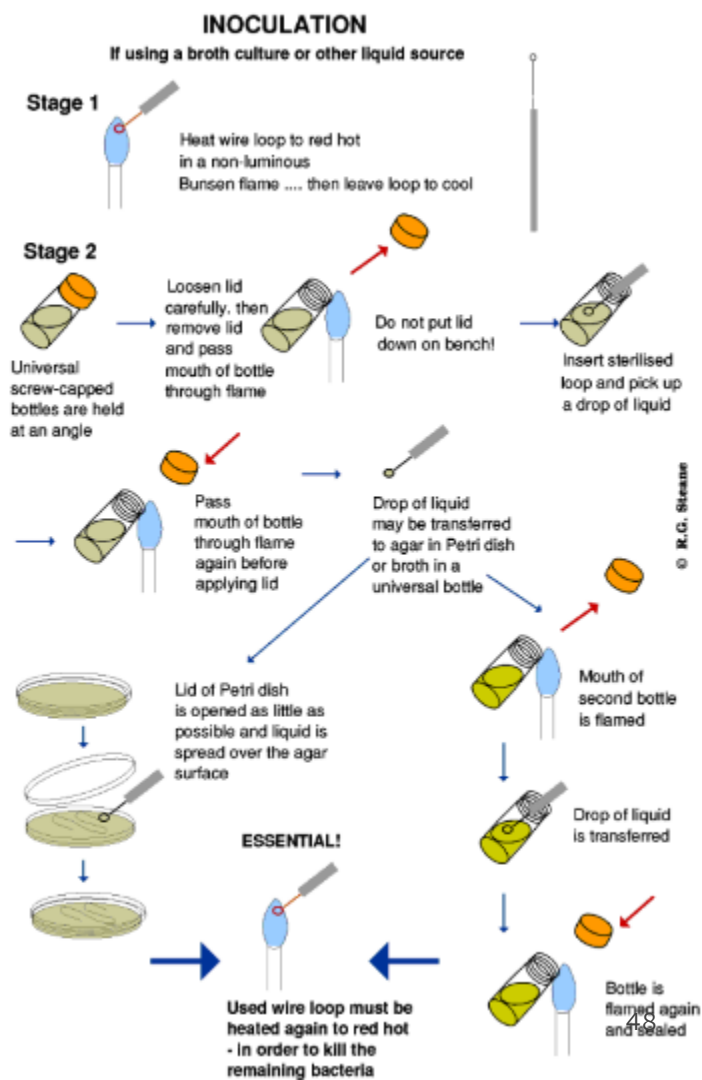
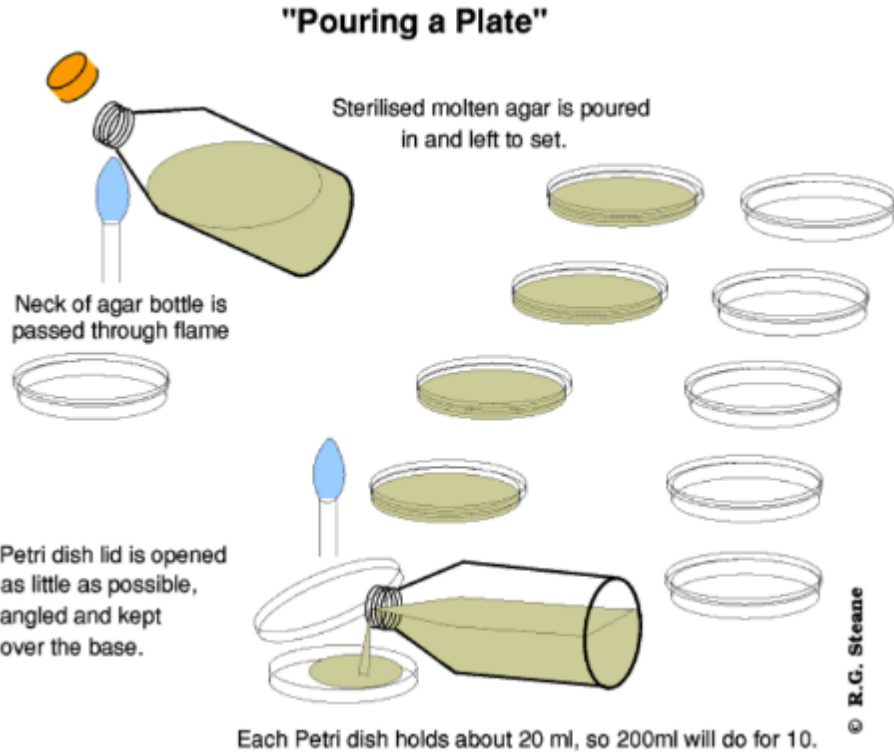
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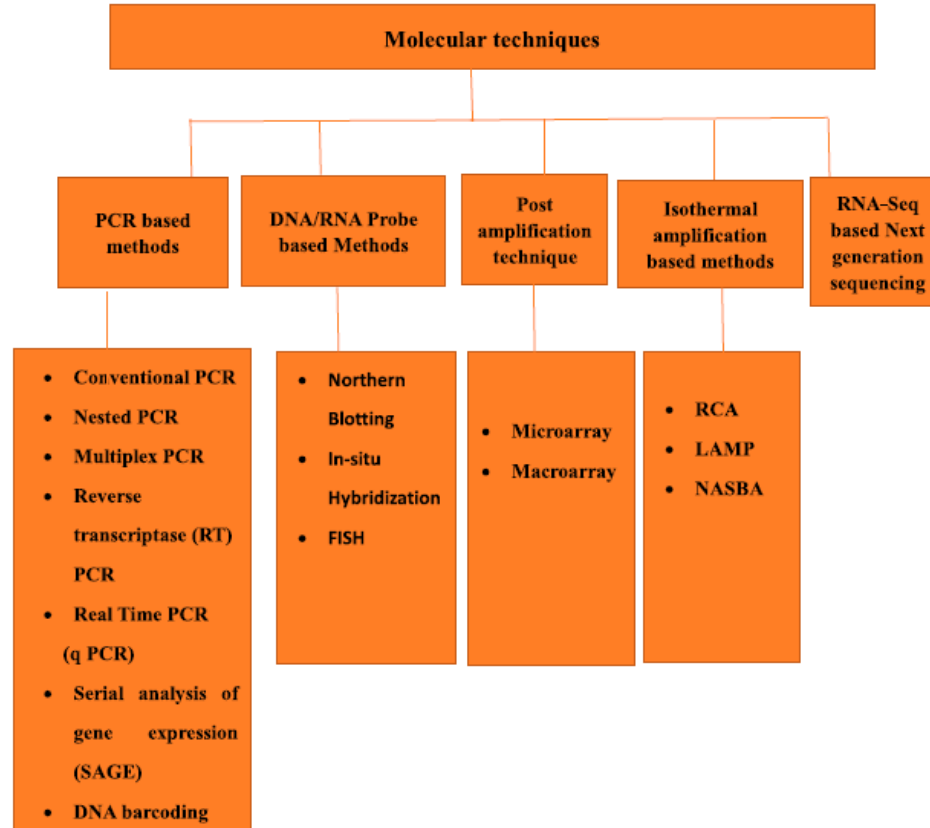
Food Safety in Microbiology



Techniques in Microbiology



Molecular Techniques

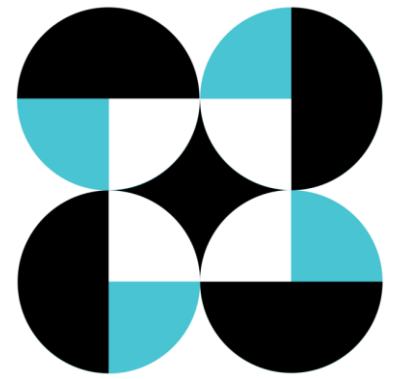


E. Role of government in food safety



- **Effective regulations are needed to address food safety issues**
- **Food safety is a shared responsibility of government agencies**





**PHILIPPINE
NATIONAL
STANDARD**

PNS/BAFS 372:2023
ICS 67.040

**Primary and Postharvest Food and Feed — Product
Standard — Microbiological Criteria**



BUREAU OF AGRICULTURE AND FISHERIES STANDARDS
BPI Compound, Visayas Avenue, Diliman, Quezon City, 1101 Philippines
Trunkline: (632) 8928-8741 to 64 loc 3301-3319
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Website: www.bafs.da.gov.ph

Department of Agriculture (DA)
Bureau of Agriculture and Fisheries Standards (BAFS)

Technical Working Group (TWG) for the Development of the Philippine
National Standards (PNS) on Microbiological Criteria for Primary and
Postharvest Food and Feed — Product Standard

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PHILIPPINE NATIONAL STANDARD

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Microbiological Risk Management (MRM) — Guidelines

ICS 67.020

**PHILIPPINE NATIONAL
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PNS/BAFS 307:2023

ICS 67.05

**Establishment and Application of Microbiological Criteria
related to Food**



F. Take away message(s)





Summary



There are many opportunities for food contamination to take place

Food contamination also affects the economy and society as a whole

Contaminated food can cause long-term health problems



(WHO, 2016)

Summary



Some harmful bacteria are becoming resistant to drug treatments



Consumers must be well informed on food safety practices



Everybody has a role to play in keeping food safe



(WHO, 2016)

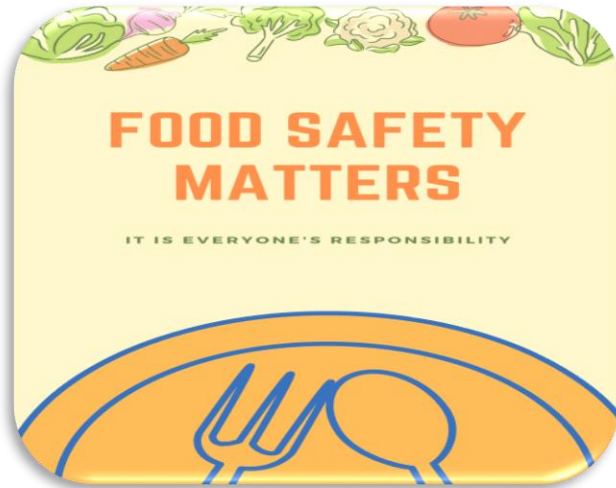
New challenges to food safety will continue to emerge, largely because of:

— — —

- Changes in our food production and supply, including more imported foods.
- Changes in the environment leading to food contamination.
- New and emerging bacteria, toxins, and antimicrobial resistance.
- Changes in consumer preferences and habits.
- Changes in the tests that diagnose foodborne illness.



Take away messages





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FRESHEST THANKS



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