Global Food Security and Safety Challenges:

Go beyond Productivity

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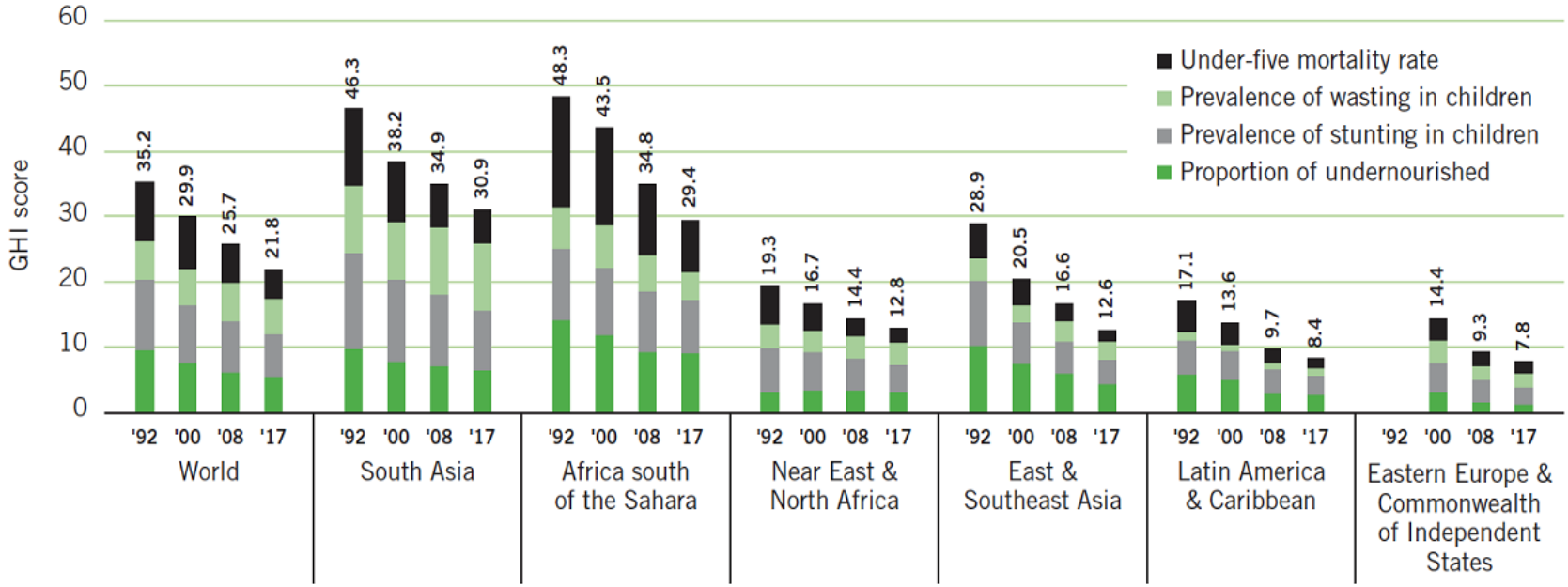
Situation



Global and regional Global Hunger Index scores, with contribution of components

- **815 million people – 1/9 – suffer from hunger.**

SDG2 ***(2nd Sustainable Development Goals)***

--"Zero Hunger" by 2030.

- **Even more – 1/3 – suffer from some form of malnutrition (WFP).**

FOOD Security:

- Sufficiency
- Safety
- Nutrition

"Food security exists when all people, at all time, have physical, social and economic access to **sufficient, safe and nutritious food** *which meets their dietary needs and food preference for an active and healthy life."*

- the 1996 World Food Summit (WFS)

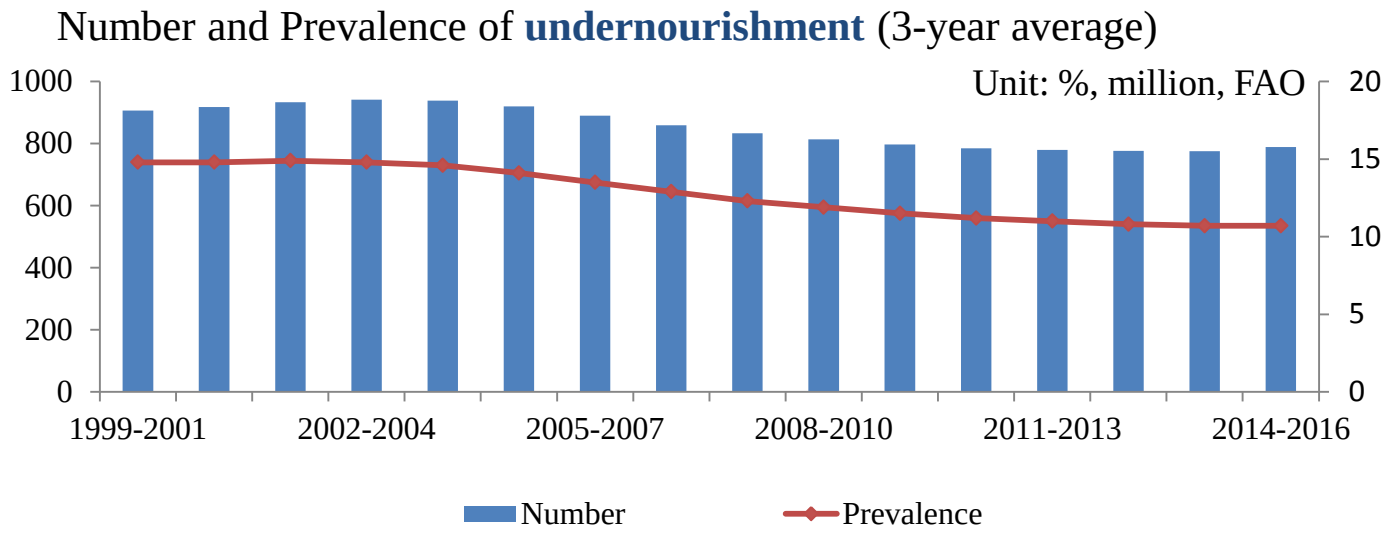
Challenges

- **Malnutrition**
- **Food safety incidents**
- **Resource Scarcity and Environmental Stress**

Malnutrition

“Triple burden of malnutrition”:

- **Hunger:** *undernourishment*
- **Hidden hunger:** *micronutrients deficiencies*
- **Overweight and obesity**



- **Hidden hunger**

  More than two billion people globally,

  primarily in developing world.

- **Overweight and obesity:**

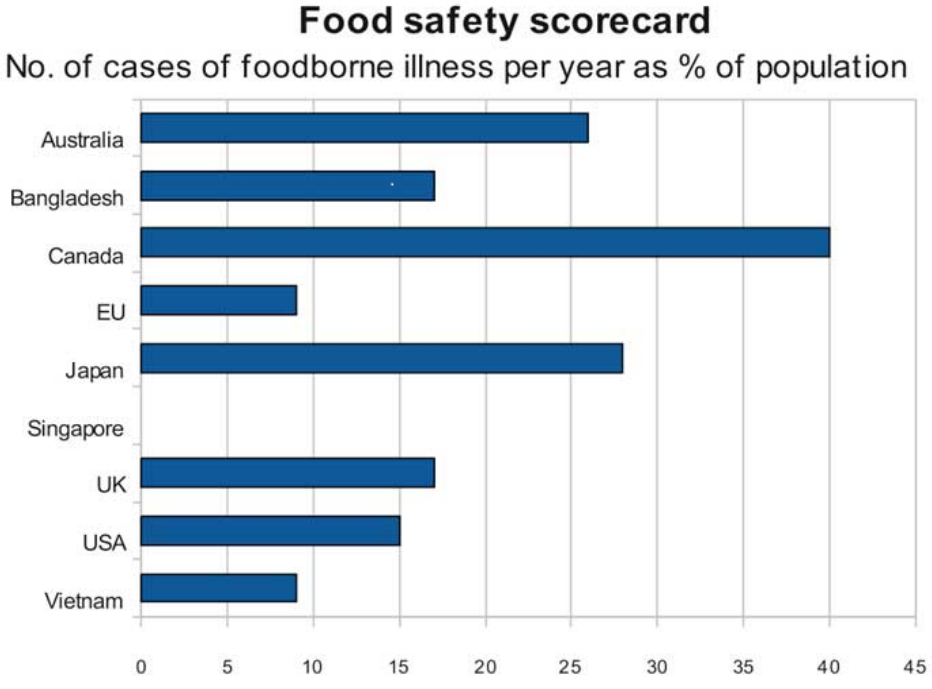
  overweight and obese children increased by:

  70% in developing countries （from 1990 and 2010）

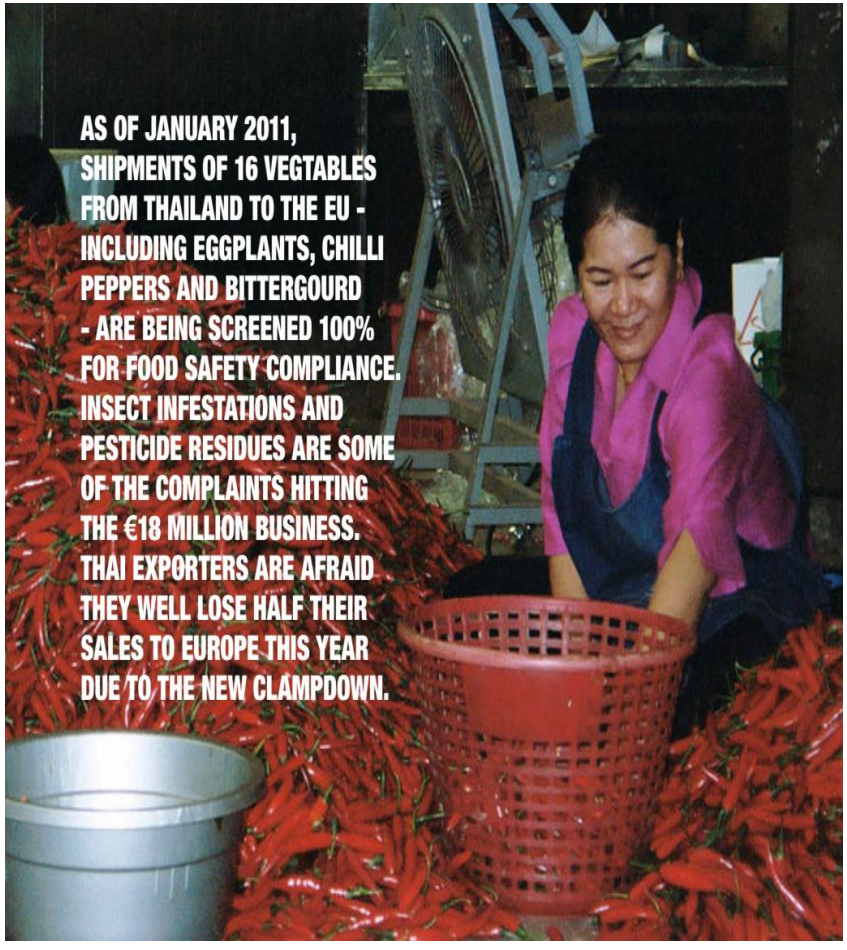
  30% in developed countries

Food safety incidents

- **Two billion people are affected globally by food safety incidents each year (WHO)**



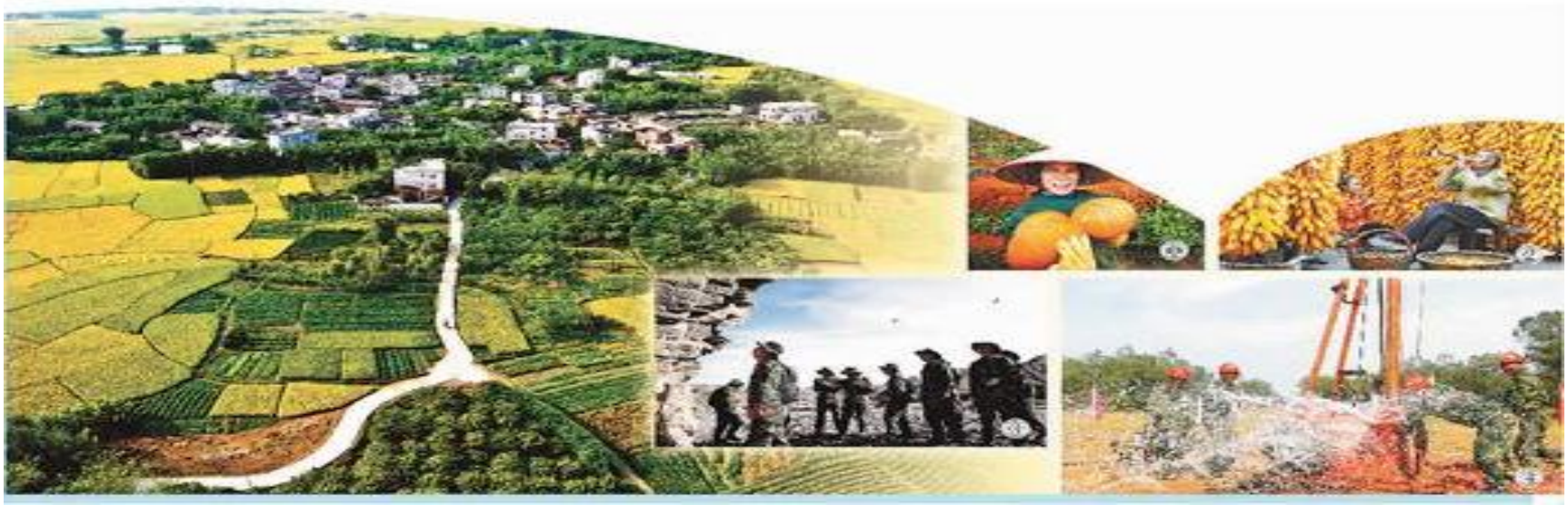
Data compiled by GRAIN from government and UN sources, 2008-2010
(except Australia=2005)



Resource Scarcity and Environmental Stress

- **Greater competition for land and water**
- **The environmental impacts of agricultural expansion**
- **Climate change**

Long-term Sustainable Food Security



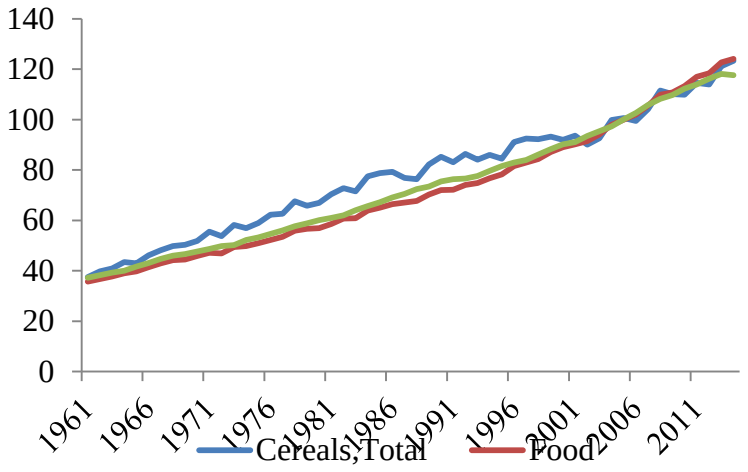
Can we feed the 8.5 billion population well in 2030?

Productivity Growth

Table 16.4. Agricultural output and productivity growth for global regions by decade.

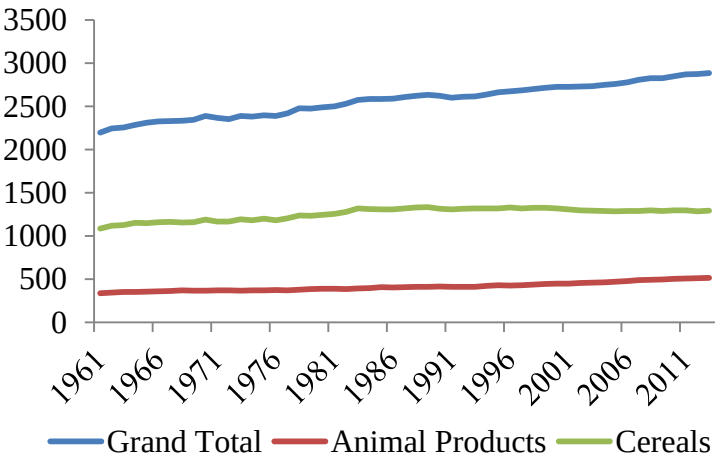
	Agricultural output growth (annual %)					Agricultural TFP growth (annual %)				
Region	1961–1970	1971–1980	1981–1990	1991–2000	2001–2009	1961–1970	1971–1980	1981–1990	1991–2000	2001–2009
All developing countries	3.15	2.97	3.43	3.64	3.34	0.69	0.93	1.12	2.22	2.21
Sub-Saharan Africa	2.95	1.19	2.82	3.05	2.69	0.17	−0.05	0.76	0.99	0.51
Latin America & Caribbean	3.05	3.31	2.26	3.14	3.41	0.84	1.21	0.99	2.30	2.74
Caribbean	1.70	1.97	0.68	−0.73	−0.18	−1.00	0.57	−0.26	−0.55	−0.16
Central America	4.63	3.72	1.36	2.95	2.24	2.83	1.95	−1.69	3.05	2.33
Andean countries	2.97	2.75	2.77	3.08	3.19	1.49	1.18	0.55	2.12	2.60
Northeast (Brazil, mainly)	3.56	3.86	3.41	3.65	4.44	0.25	0.60	3.02	2.62	4.03
Southern Cone	1.80	2.87	1.13	3.15	2.79	0.58	2.56	−0.82	1.61	1.29
Asia (except West Asia)	3.26	3.10	3.67	3.78	3.41	0.91	1.17	1.42	2.73	2.78
Northeast (China, mainly)	4.79	3.32	4.49	5.17	3.39	0.94	0.67	1.71	4.10	3.05
Southeast Asia	2.63	3.92	3.31	2.89	4.45	0.57	2.10	0.54	1.69	3.29
South Asia	2.02	2.66	3.31	2.65	3.32	0.63	0.86	1.31	1.22	1.96
West Asia & North Africa	2.87	3.05	3.64	2.82	2.35	1.40	1.66	1.63	1.74	1.88
North Africa	2.62	1.58	4.53	3.34	3.57	1.32	0.48	3.09	2.03	3.04
West Asia	2.98	3.65	3.29	2.60	1.77	1.21	2.21	0.95	1.70	1.34
Oceania	2.53	2.34	1.58	2.07	2.29	−0.14	0.47	−0.73	0.54	1.33
All Developed Countries	2.05	1.93	0.72	1.37	0.58	0.99	1.64	1.36	2.23	2.44
USA & Canada	2.06	2.29	0.68	1.96	1.41	1.25	1.67	1.31	2.18	2.24
Europe (except FSU)	1.96	1.60	0.42	0.24	−0.16	0.58	1.44	1.43	1.25	1.98
Europe, Northwest	1.56	1.36	0.51	0.34	−0.09	0.85	1.48	1.55	1.80	2.75
Europe, Southern	2.11	1.96	0.69	1.32	−0.42	1.97	2.03	1.30	2.42	3.04
Australia & New Zealand	2.90	1.68	1.48	3.21	−0.22	0.72	1.53	1.35	2.62	1.09
NE Asia, developed	3.31	2.23	1.23	0.18	−0.24	2.34	2.46	1.74	2.23	2.07
Transition Countries	3.27	1.32	0.85	−3.51	1.96	0.57	−0.11	0.58	0.78	2.28
Eastern Europe	2.67	1.73	−0.04	−1.35	0.04	0.54	0.59	0.81	0.79	0.78
Former Soviet Union (FSU)	3.59	1.10	1.30	−4.69	2.96	0.53	−0.51	0.63	0.59	3.29
Baltic[a]	3.56	0.93	1.09	−6.01	2.10	2.11	−0.49	0.58	0.82	2.20
Central Asia & Caucasia[a]	3.41	4.71	0.56	0.08	4.33	−0.36	2.02	−0.89	0.65	2.45
Eastern Europe FSU[a]	3.16	0.76	1.39	−5.39	2.70	0.89	0.85	0.86	0.92	4.00
World	2.74	2.30	2.12	2.21	2.49	0.18	0.60	0.62	1.65	1.84

[a]Data for former Soviet republics covers 1965–2009 only. The average annual growth rate in series Y is found by regressing the natural log of Y against time, i.e. the parameter B in ln(Y) = A + Bt. *Source*: Author's estimates. See Table 16.3 for list of countries in each regional group.



World Food Gross Production Indices

(Unit: Int $, 2004-2006=100)



World Food Consumption

(Unit: kcal/capita/day)

However...

- Not enough
- May work in opposite direction

Modern inputs: fertilizers, Pesticides, etc.

soil and water pollution

harmful residues

Environmental sustainability

Food safety

However...

- Not enough
- May work in opposite direction

More & cheaper food

Over consumption, Obesity

Higher productivity, Lower price, farmers' income

food security status of rural poverty group

“Go Beyond Productivity”

“Go Beyond Productivity”

- ✓ **Move from productivity to “efficiency”;**
- ✓ **Shift from productivity to "consumer-focused supply-side reform";**
- ✓ **Increased focus on “beyond-productivity technology”;**
- ✓ **Supplement productivity-led commercialization with “local priority”;**
- ✓ **Toward “holistic, efficient food system”.**

1. Move from productivity to “efficiency”;

- **Food production**

➢ **Productivity:**

cost-benefit , ignore negative environmental externalities;

➢ **Efficiency:**

most effective utilization of production resources, especially natural resources

- **Food consumption**

Dietary pattern inefficient

- **excessive** intake of calories, sugar, salt, fat, and etc.
- **insufficient intake** of nutrients

The inefficiency in food production and consumption may **interplay** with each other.

Move from **productivity** to **efficiency** **-- sustainability of environment and food security.**

“Go Beyond Productivity”

- ✓ Move from productivity to “efficiency”
- ✓ **Shift from productivity to "consumer-focused supply-side reform"**
- ✓ Increased focus on “beyond-productivity technology”;
- ✓ Supplement productivity-led commercialization with “local priority”;
- ✓ Toward “holistic, efficient food system”.

2. Shift from productivity to "consumer-focused supply-side reform"

- **Changing in diet:**

Conventional food → ***➢High-valued, usually animal sourced food***
➢ Healthy and nutritious food, such as higher quality fruits and vegetables.

- **Changing in pursuits:**

Productivity and quantity increase → ***Quality, safety, nutrition and other higher value characteristics***

“Go Beyond Productivity”

- ✓ Move from productivity to “efficiency”
- ✓ Shift from productivity to "consumer-focused supply-side reform"
- ✓ **Increased focus on “beyond-productivity technology”;**
- ✓ Supplement productivity-led commercialization with “local priority”;
- ✓ Toward “holistic, efficient food system”.

3. Increased focus on “beyond-productivity technology”

- **Changing in Technologies:**

Input intensive Technologies → ***Resource-saving and environment-friendly Technologies***

- **Demand for the Technologies:**

- **Be economically competitive**
- **Successfully and easily reveal the traits of consumers’ upgraded food safety and nutritional concerns.**

“Beyond-productivity technology”

- **For consumers: consume higher quality, more nutritious and healthier food**
- **For Producers: increase their income, and benefit their food security status**
- **For the Society: improve sustainability for the environment.**

“Go Beyond Productivity”

- ✓ Move from productivity to “efficiency”
- ✓ Shift from productivity to "consumer-focused supply-side reform"
- ✓ Increased focus on “beyond-productivity technology”;
- ✓ **Supplement productivity-led commercialization with “local priority”;**
- ✓ Toward “holistic, efficient food system”.

4. Supplement productivity-led commercialization with "local priority"

- **Market integration and globalization help improve food security and safety in many ways:**
  - ***making up for the shortage of natural resources***
  - ***unifying food safety standards***
  - ***improving world's total productivity***
- **However,**

"Winner wins all" in the food sector.

Those who are highest in productivity and lowest in production cost will win.

- **Increase productivity and cost-effective competitiveness, by:**
  - **Homogenous seed variety**
  - **Shortened production period**
  - **Addition of elements for longer shelve time, and etc.**

- **“Wipe out” local varieties and fresh supply**
- **Increase food safety uncertainties, and could easily escalate any food safety incidents into big impact issues**

- **“Local priority” should be built into the food system.**
- **“Leave a green room” for local varieties to survive, and for local fresher supply to sustain.**
- **Considerations in international trade arrangement**

Local priority

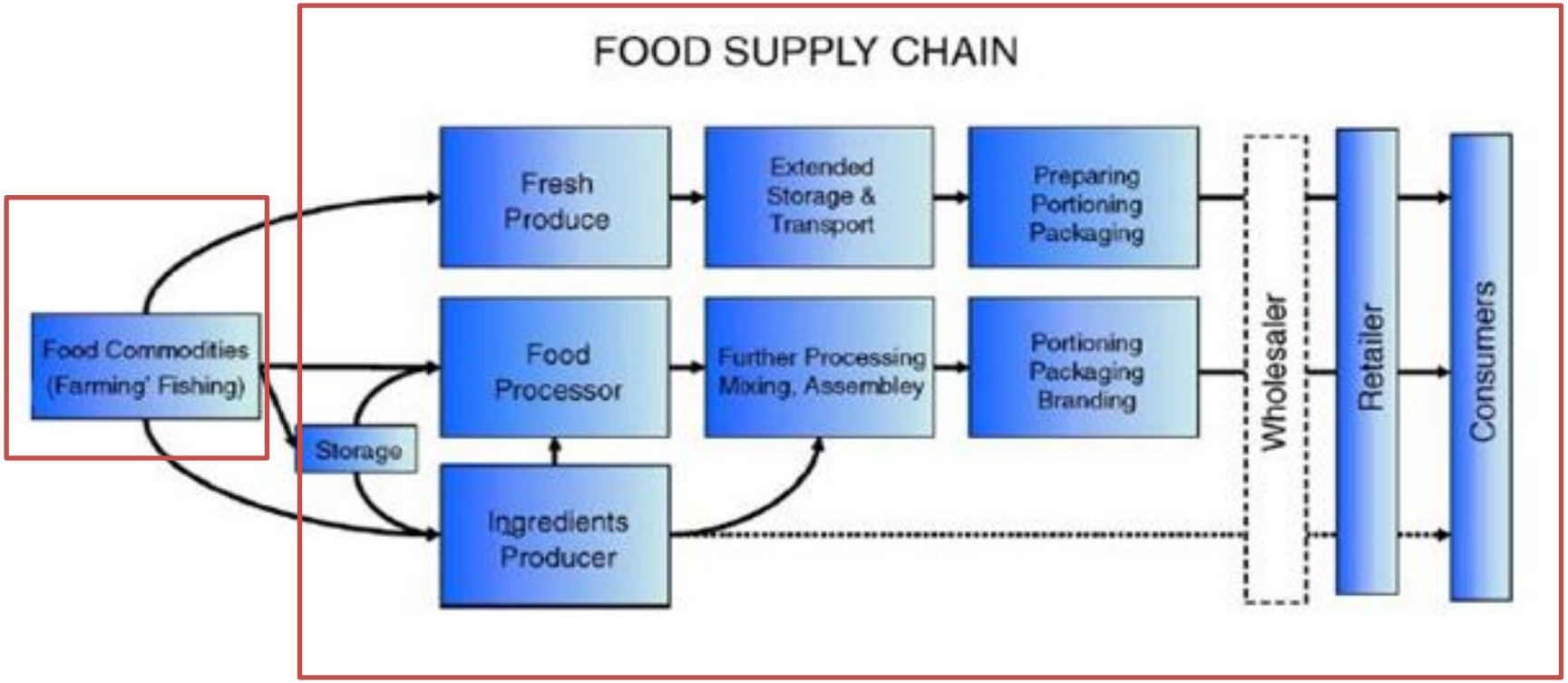
Productivity-led commercialization

&

“Go Beyond Productivity”

- ✓ Move from productivity to “efficiency”
- ✓ Shift from productivity to "consumer-focused supply-side reform"
- ✓ Increased focus on “beyond-productivity technology”;
- ✓ Supplement productivity-led commercialization with “local priority”;
- ✓ **Toward “holistic, efficient food system”.**

5. Toward “holistic, efficient food system



- **Reducing food waste and loss along the supply chain.**

Utilizing the underutilization of the “edible parts” of food, due to various reasons.

A holistic, efficient food system: from “farm to fork”

CHANGE from conventional mentality

GO BEYOND PRODUCTIVITY

FIGHT the global food security and safety challenges with dynamic and enriched toolbox and our ever-enhancing human wisdom.

Zero-hunger, Zero-malnutrition 2030!

Thanks !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