

How to make the food system more sensitive to nutrition

?

Sylvie Avallone

L'Institut Agro and Qualisud research team

UNESCO Chair on World Food System

Montpellier (France)



1. The current food systems are not optimal / key facts on nutrition
2. How to make food system more sensitive to nutrition ?
 - a) Dietary diversity in traditional food system
 - b) Food fortification to address micronutrient deficiencies
 - c) Labelling to improve food environment
3. Conclusions



Undernutrition

462 millions adults underweight

250 millions women

52 million children under five wasted (17 million severe forms)



Micronutrient deficiencies (vitamin A, iron, zinc, iodine)

2 billions people

155 million children under five stunted

1.6 billion people concerned by anemia (women in child bearing age and children)



Overweight / obesity

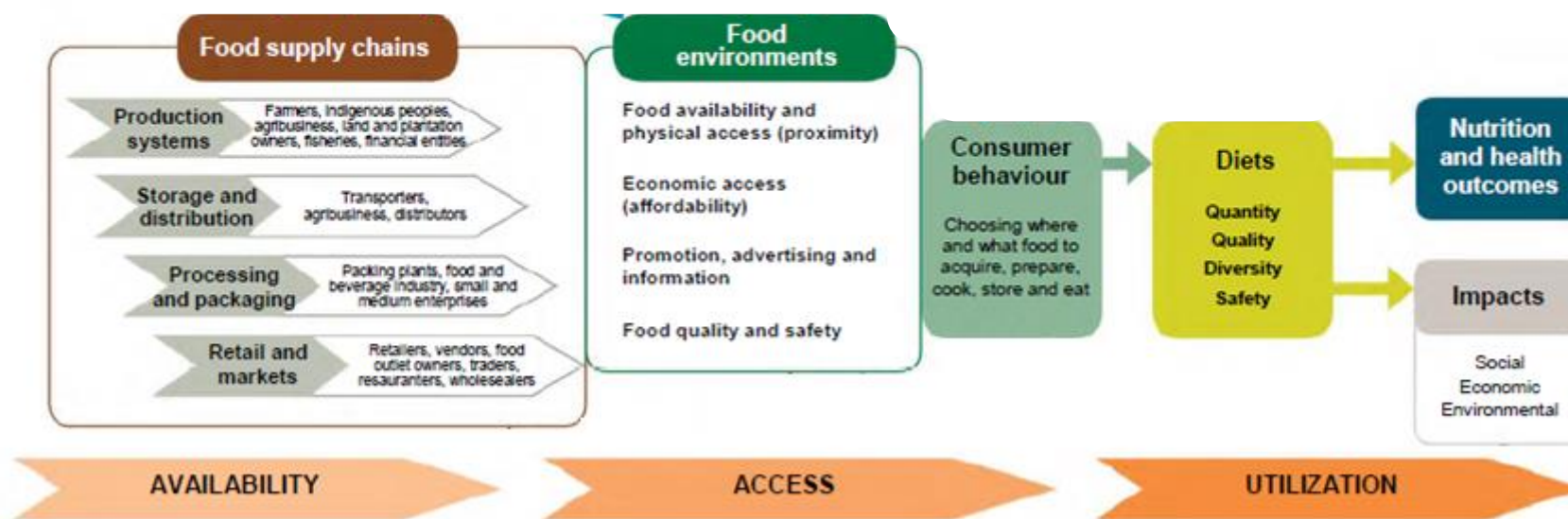
1.9 billions overweighted people

600 millions obese people

41 millions children under five overweight

Malnutrition contributes to premature deaths of children and women
Urgent need to improve food systems

Conceptual framework of food system and nutrition



Examples - Research or actions to improve food system

Food Supply Chains

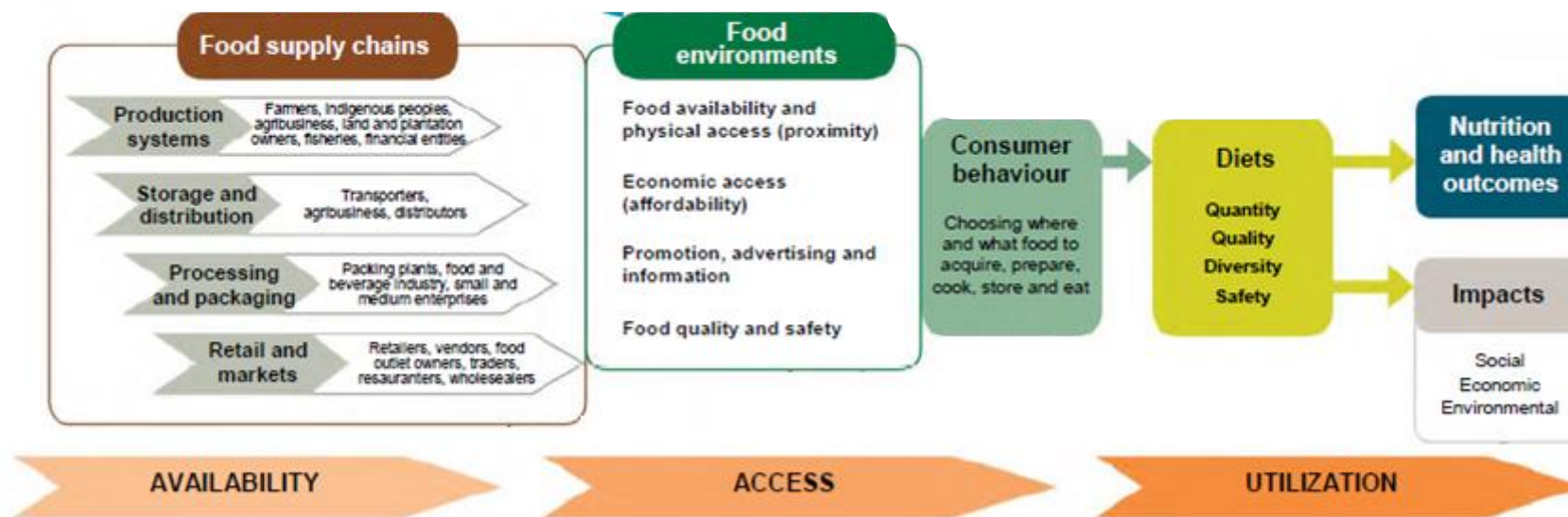
- food fortification formulation, packaging, logistics and retail

Food Environments

- food classification
- labelling

Consumer behaviour and diet

- traditional food system
- Production by family farmers
- Food environment



Example 1 – Diet assessments in traditional food system

Children under five and women

- Africa (Burkina Faso, Madagascar, Benin) and Cambodia
- 24h recall : nutrient and micronutrient intakes, dietary diversity
- description of raw food and traditional recipes

starchy products + micronutrient-dense-food



©terresnourricieres



Tonle Sap Lake ©senglyroy

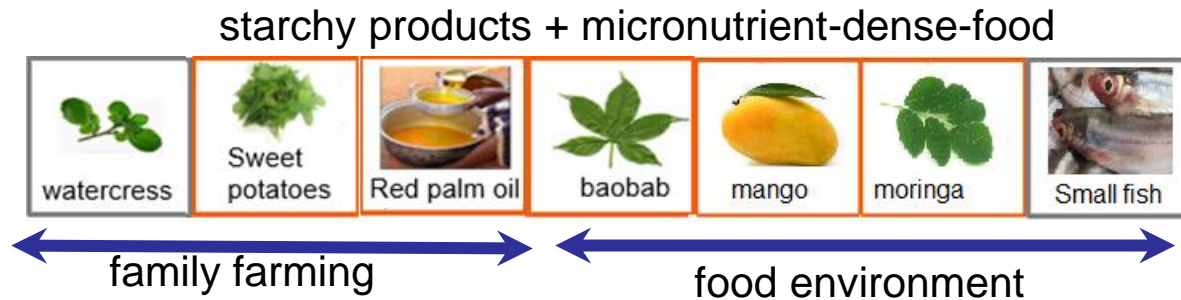
Main conclusions

- people are mainly family farmers
- dietary patterns not optimal (almost vegan, vitamin A B₉ B₁₂, **iron, zinc** issues)
- great seasonality according to territories and climates

Example 1 – Diet assessments in traditional food system

Children under five and women

- Africa (Burkina Faso, Madagascar, Benin) and Cambodia
- 24h recall : nutrient and micronutrient intakes, dietary diversity
- description of raw food and traditional recipes



©terresnourricieres



Tonle Sap Lake ©senglyroy

Main conclusions

- people are mainly family farmers
- dietary patterns not optimal (almost vegan, vitamin A B₉ B₁₂, **iron, zinc** issues)
- great seasonality according to territories and climates
- feeding function of **ecosystems** (forests / lakes)

How to increase diet diversity in traditional food system?

- strengthen local traditional food systems
 - diversify the crops and animals in family farming **along the year**
 - connect farmers to basic post harvest technologies
 - **protect fragile ecosystems** links to sustainable development goals 13 (climate), 14 (life below water), 15 (life on land)
- valorize traditional recipes
 - based on local food and generate incomes for farmers
 - integration in food composition tables, dietary guidelines, nutritional education programs
- healthy diet not reachable for poor people
 - in chronic malnutrition = fortification contributes to **prevention**
 - in food crisis and emergency = ready to use therapeutic food to **cure**

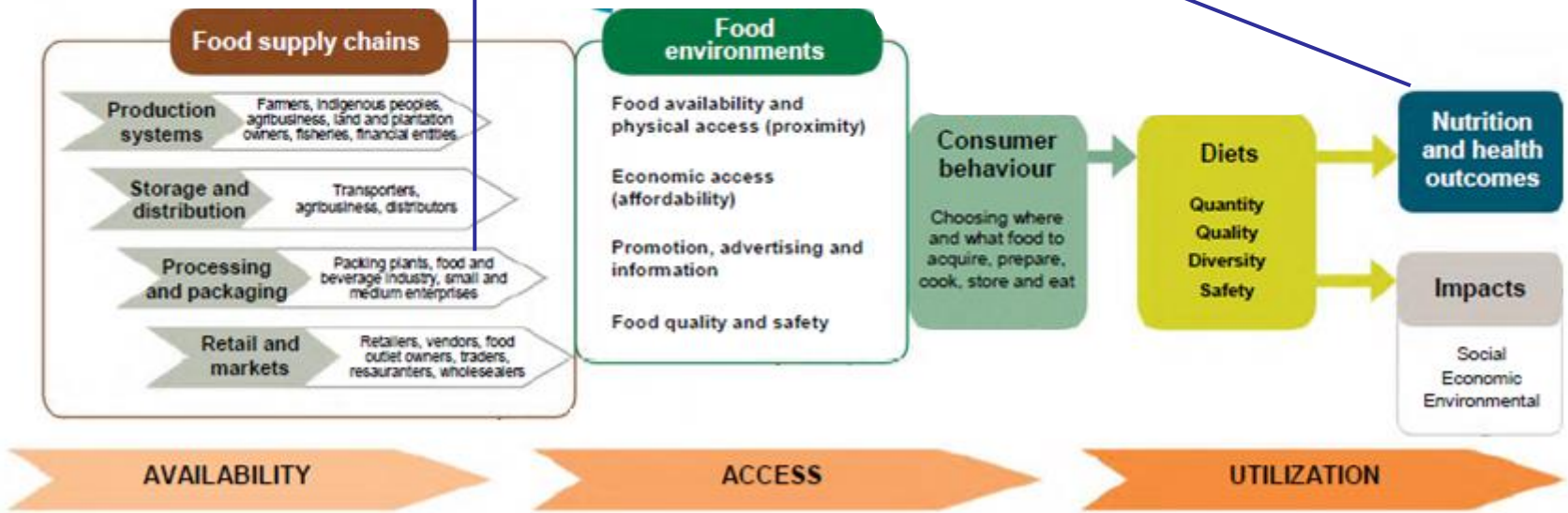
Example 2 - food fortification to address micronutrient deficiencies



Country Nutrition Profiles
+ public health issue

Source : FAO, Global Nutrition Report,
UNICEF, World Health organization

Fortification strategy
design by processors or NGOs to target
nutritional disorders of consumers



- a way to deliver nutrients to the overall population or more specific groups
- no need to change dietary patterns and local food system
- quick to set up, easy to implement and well accepted
- can yield rapid nutritional and health effects

- technicity and coordination of several stakeholders
- long-supply chains between producers and consumers

Fortification
success

Accessibility
Affordability
Stability of nutritional profile

Nine studies on the fortification strategy

Initial food quality

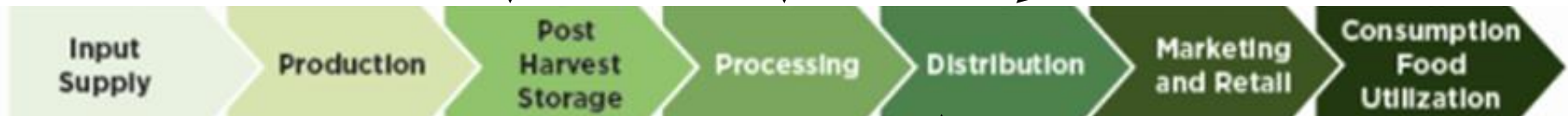
- oxidative status
- natural antioxidant
- water contents

Additives

- vitamins
- minerals
- antioxidants

Packaging

- composition (glass, cellulose, PP, PET)
- structure (simple or multilayers)



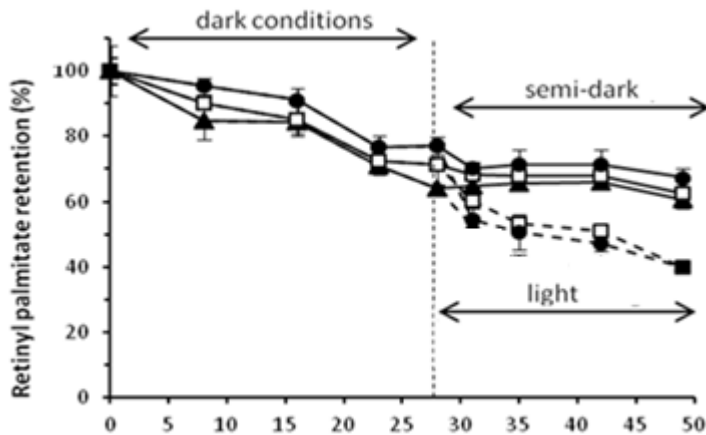
Logistic conditions

- Temperature (20 and 45°C)
- time 
- light 

Culinary practices

- cooking < 100°C
- frying > 120°C

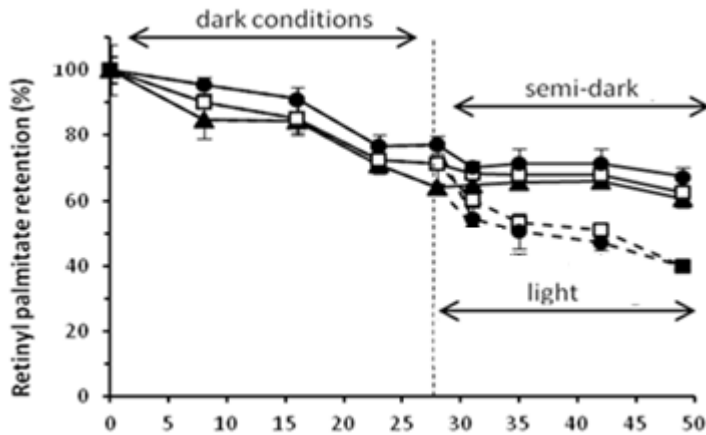
Soya oils fortified with vitamins ADE 2-month / PET packaging



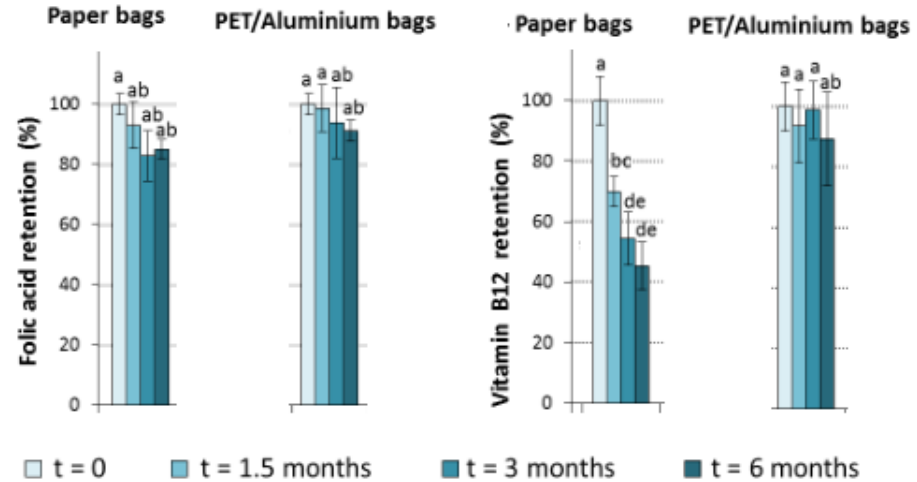
Main conclusions for fortified oils

- good safety and sensory properties
- unstable nutrients : vitamins A D + polyunsaturated fats
 - protection from light and temperature increase
 - use only for seasoning

Soya oils fortified with vitamins ADE
2-month / PET packaging



Wheat flour fortified with minerals and vitamins AB₉B₁₂ / 6-month / 25 °C and 40°C / cellulose and aluminium bags

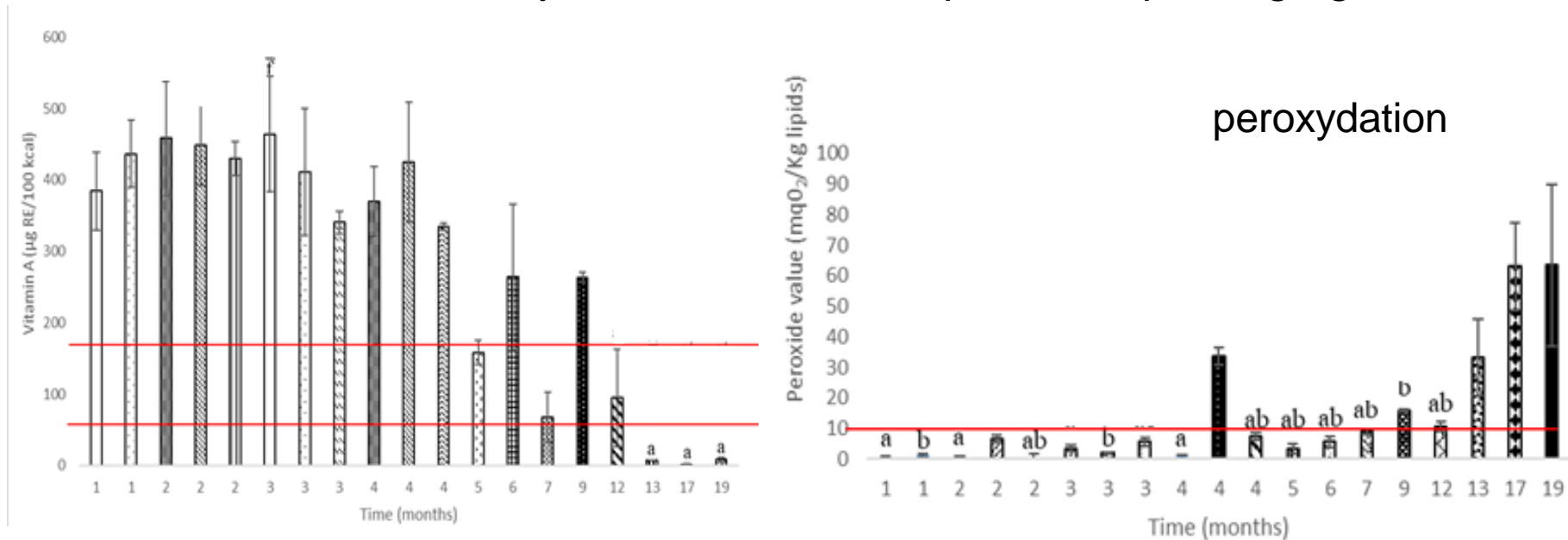


Main conclusions for wheat flours

- stable compounds : protein, mineral, vitamins B9 and B12 with PET aluminium packaging only
- unstable compounds : vitamins A + polyunsaturated fats

Lessons learned from stability studies in the real world

19 fortified infant formula from Ethiopia, Cambodia, Madagascar, Vietnam, Burkina Faso, Ivory Coast : nutritional profiles / packaging

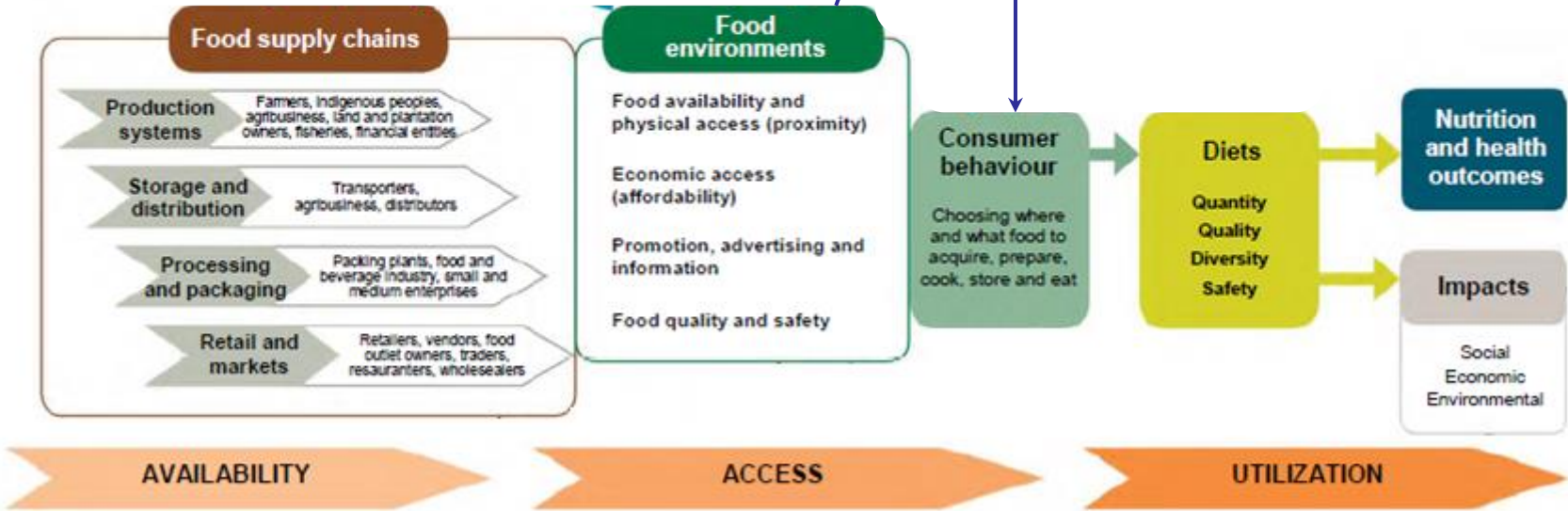


Main conclusions for infant formula

- safety and sensory properties were good
- stable compounds : protein, minerals
- unstable compounds : vitamins AD + polyunsaturated fats
- shelf life should be shorten (< 1 year)
- unit dose = very efficient → environmental issues with packaging

Example 3 - labelling to improve food environment

Food classification and labelling



What about processed food ?



- Distinct types of processors : small, medium or large enterprises
- Distinct products (processing and formulation)
 - unprocessed or minimally processed (close to the nature)
 - basically processed
 - moderately processed
 - highly processed : long list of ingredients / additives and complex processing
- Current trends worldwide
 - increasing contribution of processed foods to the consumer's diet
 - ultraprocessed food are becoming predominant
- Ultra-processed foods characteristics
 - high contents in energy, fat, sugars, salt
 - no matrix effect = high bioavailable nutrient in human gut
 - poor sources of protein, fibre, micronutrients
 - long shelf-life and sometimes big portion size

Lessons learned from epidemiological studies

- Ultra-processed food consumption is linked to
 - weight gain, obesity and non-communicable diseases in Brasil, Sweden and US
 - cancer risk in NutriNet cohort
- Non-communicable diseases → increasing number of deaths and public health costs
- News tools to help consumers in making healthier food choices
 - nutrient profiling and food labelling
 - French NUTRIScore (- salt sugar fat, + fiber fruit vegetables)
 - adopted in Belgium, Germany, Spain, Netherland
 - adopted by 200 food companies (reformulation step by step)



Lessons learned from epidemiological studies

- Ultra-processed food consumption is linked to
 - weight gain, obesity and non-communicable diseases in Brasil, Sweden and US
 - cancer risk in NutriNet cohort
- Non-communicable diseases → increasing number of deaths and public health costs
- News tools to help consumers in making healthier food choices
 - nutrient profiling and food labelling
 - French NUTRISCORE (- salt sugar fat, + fiber fruit vegetables)
 - adopted in Belgium, Germany, Spain, Netherland
 - adopted by 200 food companies (reformulation step by step)
 - risk of focusing on the quality of a single food (≠ healthy diets)
 - labelling should not be used only to communicate : companies have to really integrate nutrition issues in their strategy



Nutrition and health are multifactorial issues

Eight Sustainable Development Goals



Educate the overall society on food system and leverages

- to build competencies of stakeholders (universities, private sector, policy makers) and to motivate them to maximize nutrition outcomes
- Erasmus capacity building project to train a new generation of entrepreneurs in sustainable agriculture and food engineering (FoodSTEM, Institute of Technology of Cambodia)
- Massive Open Online Course under preparation (FAO and partners)

Conclusions

- No single food or strategy will improve nutrition in the next decade
 - combine complementary approaches
 - efficiency on different time scales
 - make the difference between emergency / development
 - strengthening the traditional food system should be prioritized : advantage to stimulate local economy (jobs, incomes), valorize food identity and culture with less negative externalities (food miles, packaging)
- Food system should be a part of the solution of the global issues = seek win-win situation between nutrition / health / poverty / environment