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Marlène Perignon, Jalila El Ati, Carole Sinfort, Sophie Drogue, Nicole Darmon, Marie Josephe Amiot-Carlin, . Medina Study Group

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# 3<sup>RD</sup> INTERNATIONAL CONFERENCE ON GLOBAL FOOD SECURITY

3-6 DECEMBER 2017 CAPE TOWN, SOUTH AFRICA



## Which dietary changes to move towards nutritionally adequate diets without increasing their impact on biodiversity, water and land-use? The case of Tunisia

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# Food security in the Mediterranean region & Tunisia

- **Epidemiological and nutritional transition**

- ➔ increase in overweight, obesity and co-morbidities
- ➔ burden of obesity especially high among women (~1/3 in Tunisia)

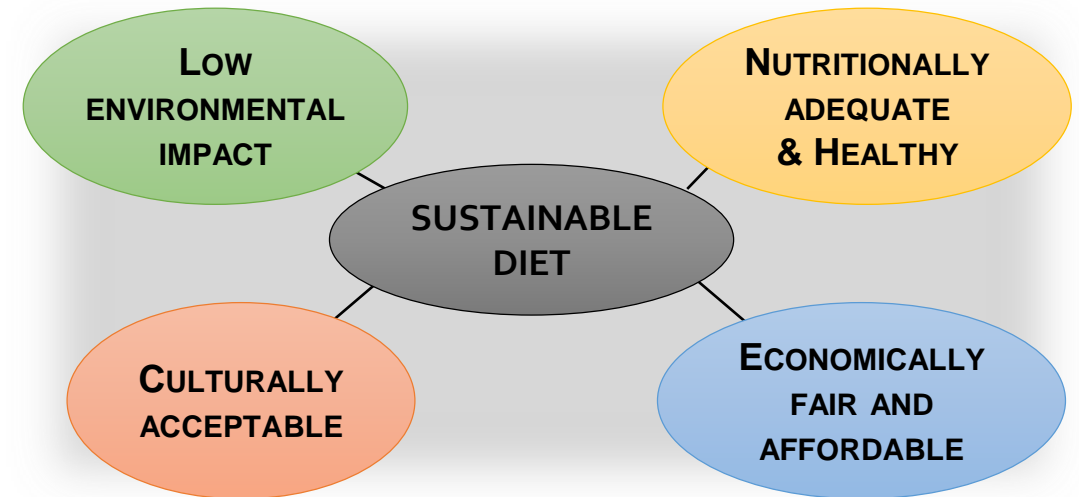


- **Environmental issues**

- ➔ Water scarcity, soil erosion and biodiversity loss
- ➔ Food system is responsible for a considerable proportion of environmental footprint (15-28% to overall GHGE)

# Moving towards more sustainable diets

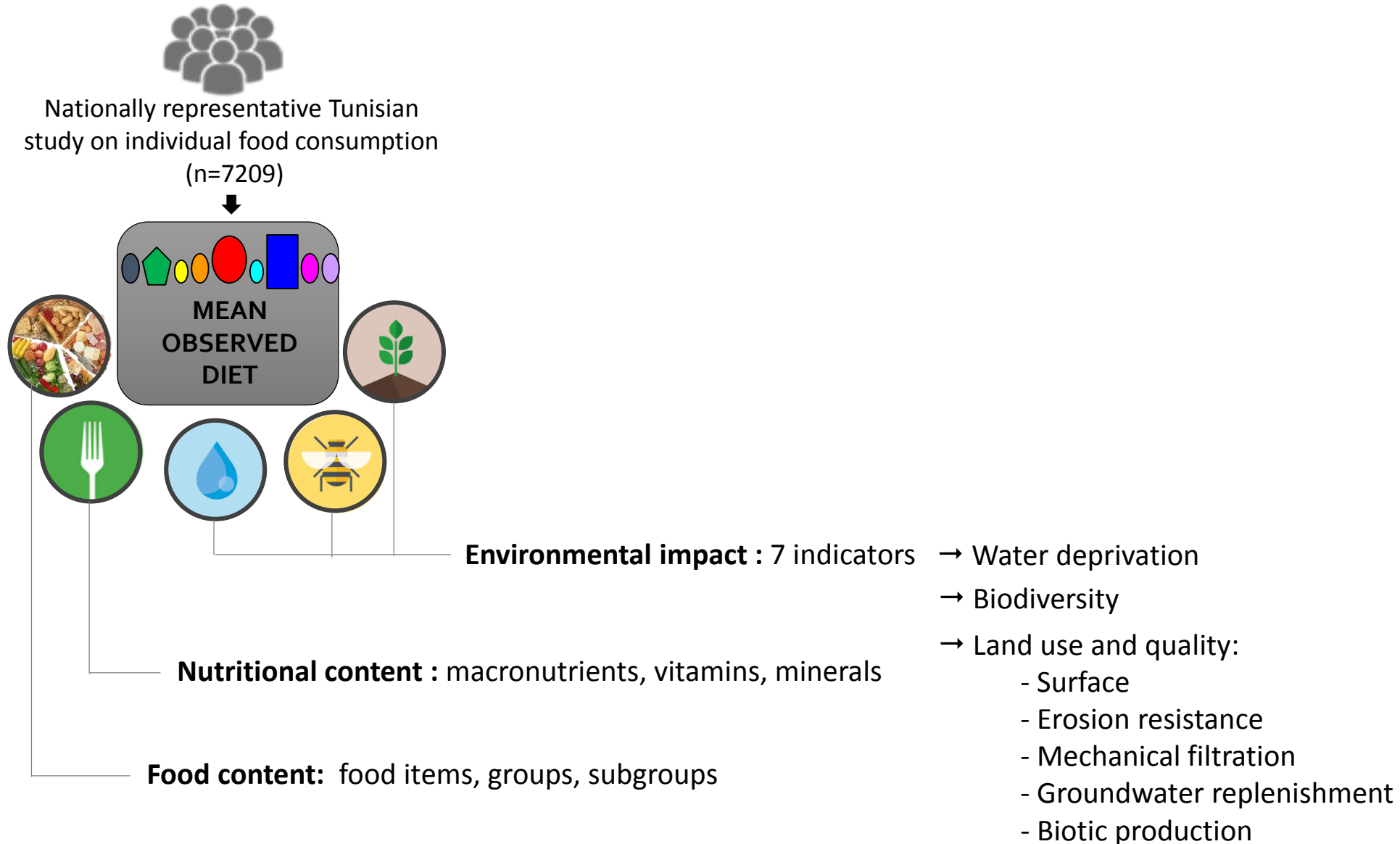
- Changes in both food consumption and food production are needed
- *“Sustainable Diets are those diets with low environmental impacts which contribute to food and nutrition security and to healthy life for present and future generations. Sustainable diets are protective and respectful of biodiversity and ecosystems, culturally acceptable, accessible, economically fair and affordable; nutritionally adequate, safe and healthy; while optimizing natural and human resources.”*  
(FAO, 2010)



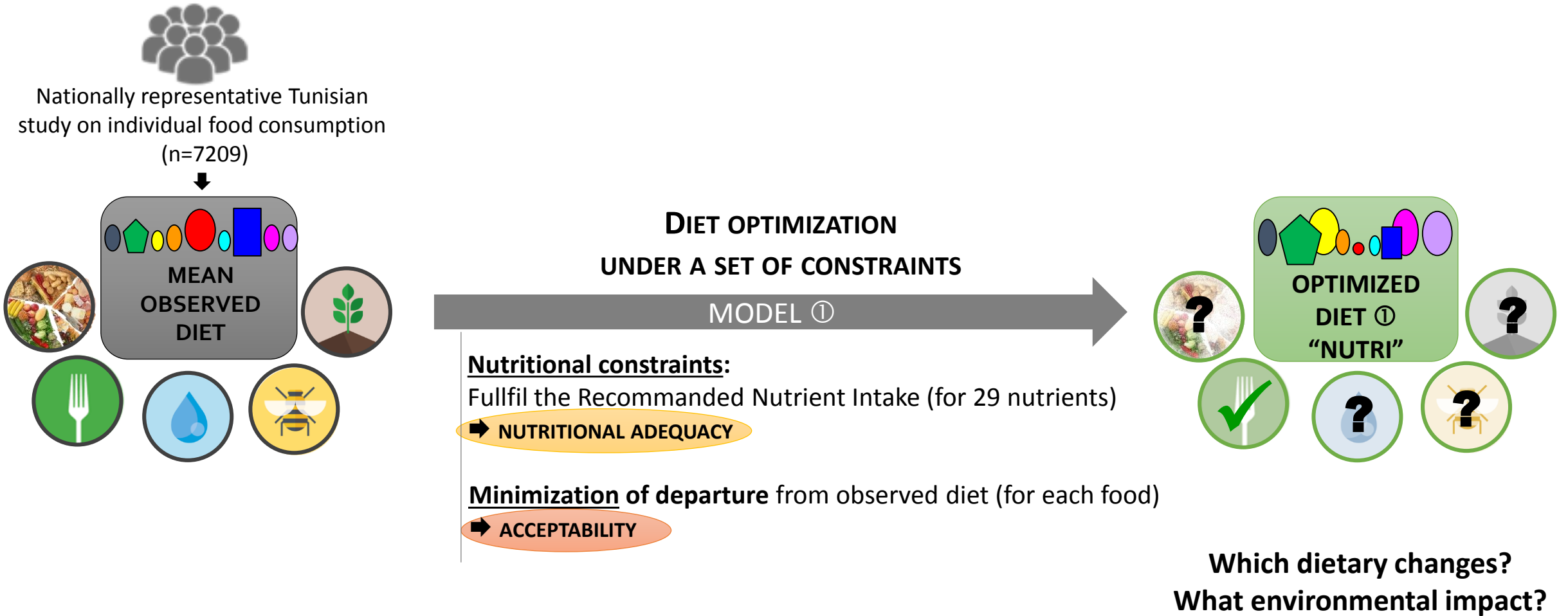
## Objective:

To identify dietary changes allowing to move towards healthy and culturally acceptable diets in Tunisia without increasing their environmental impact

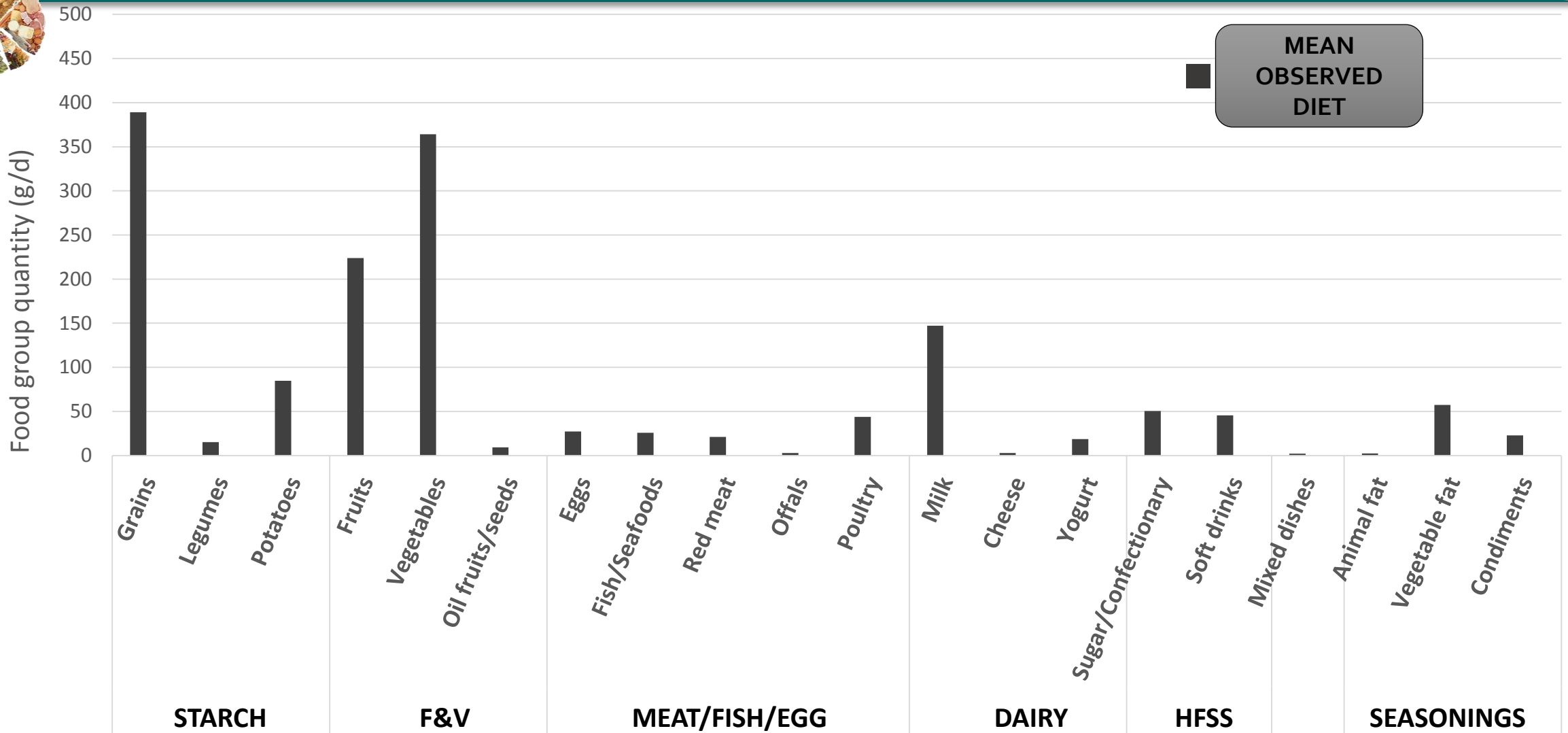
# Methodology : Diet optimization by linear programming



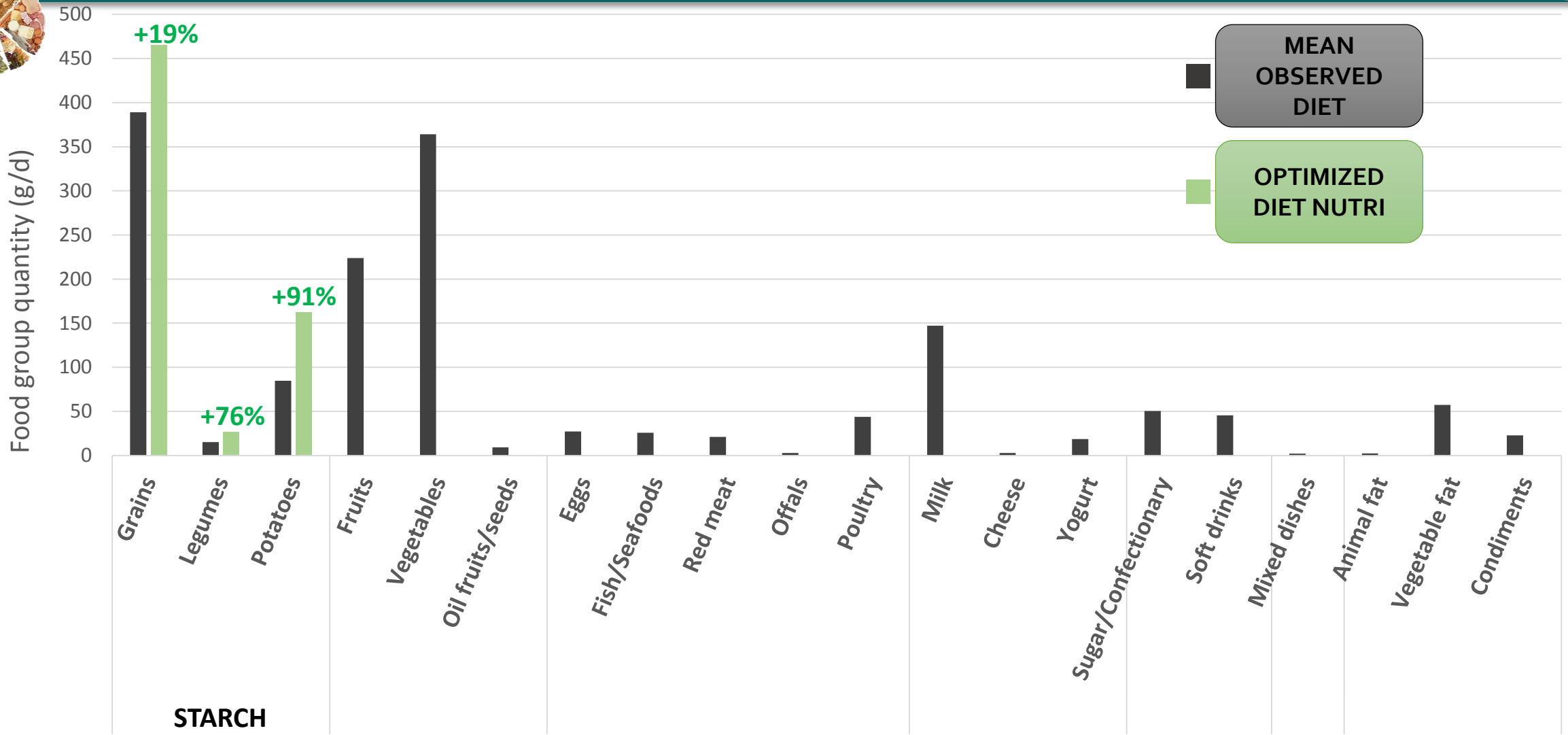
# Methodology : Diet optimization by linear programming



# Food group content



# Food group content



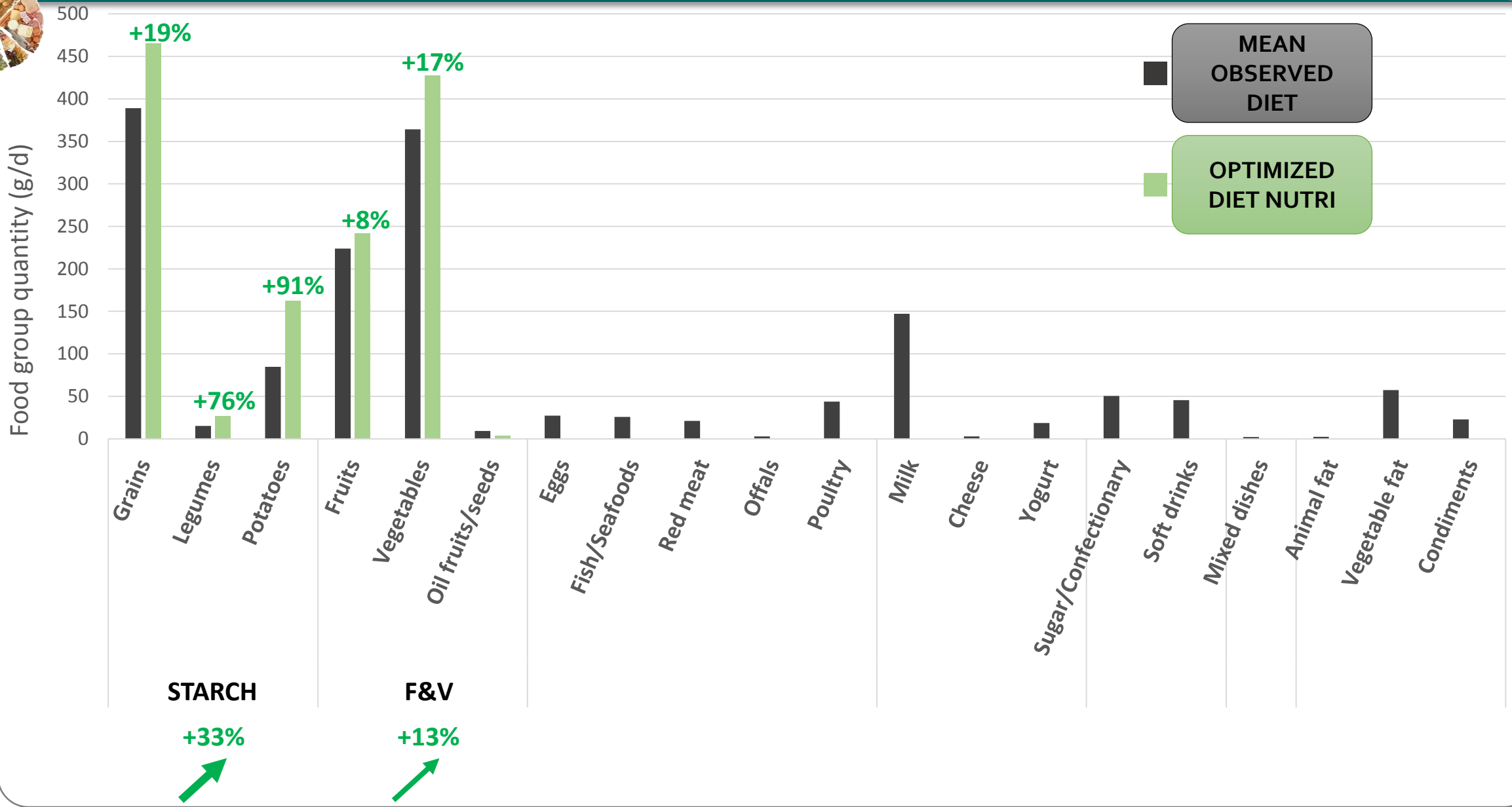
**STARCH**

+33%

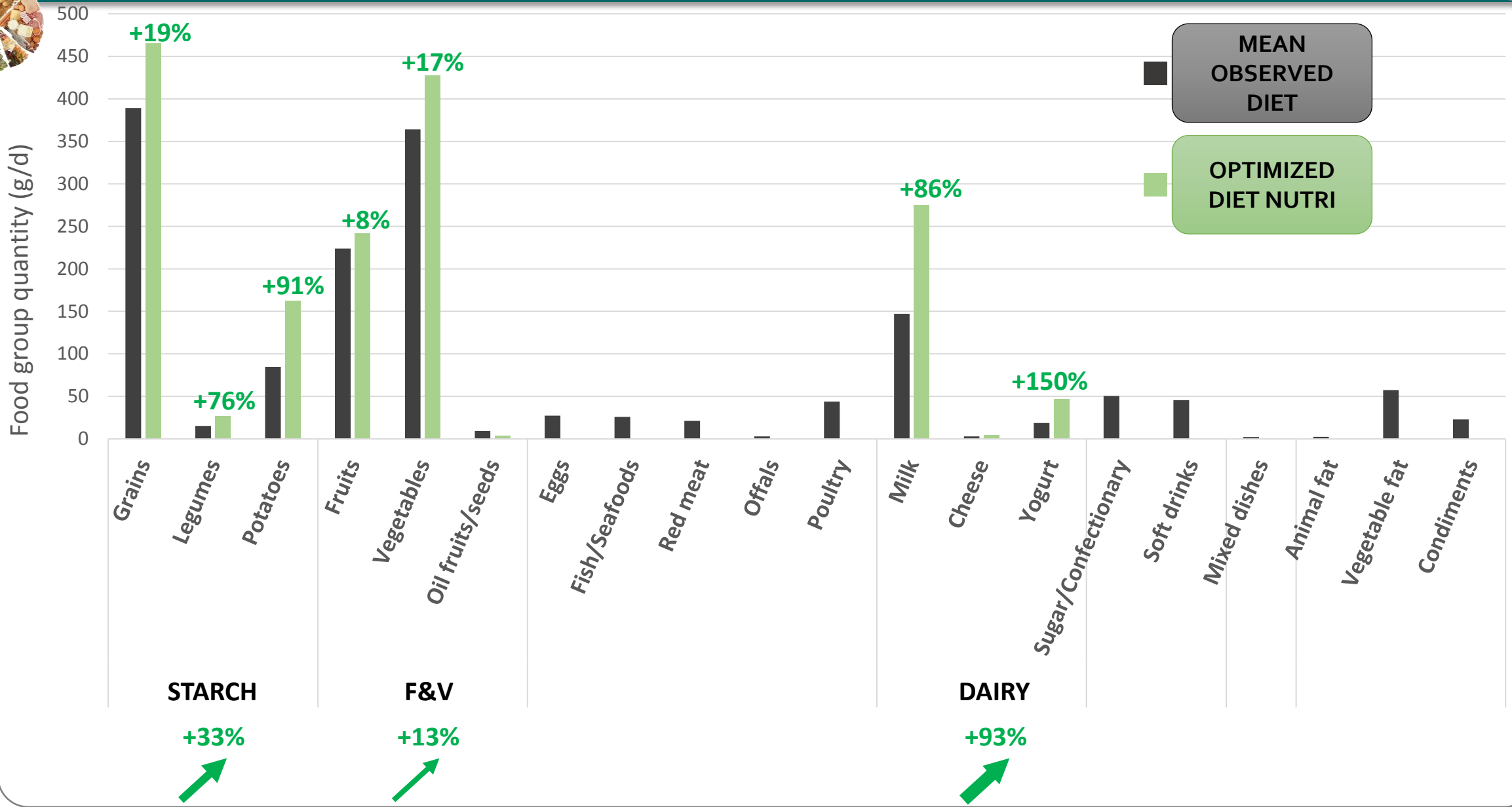




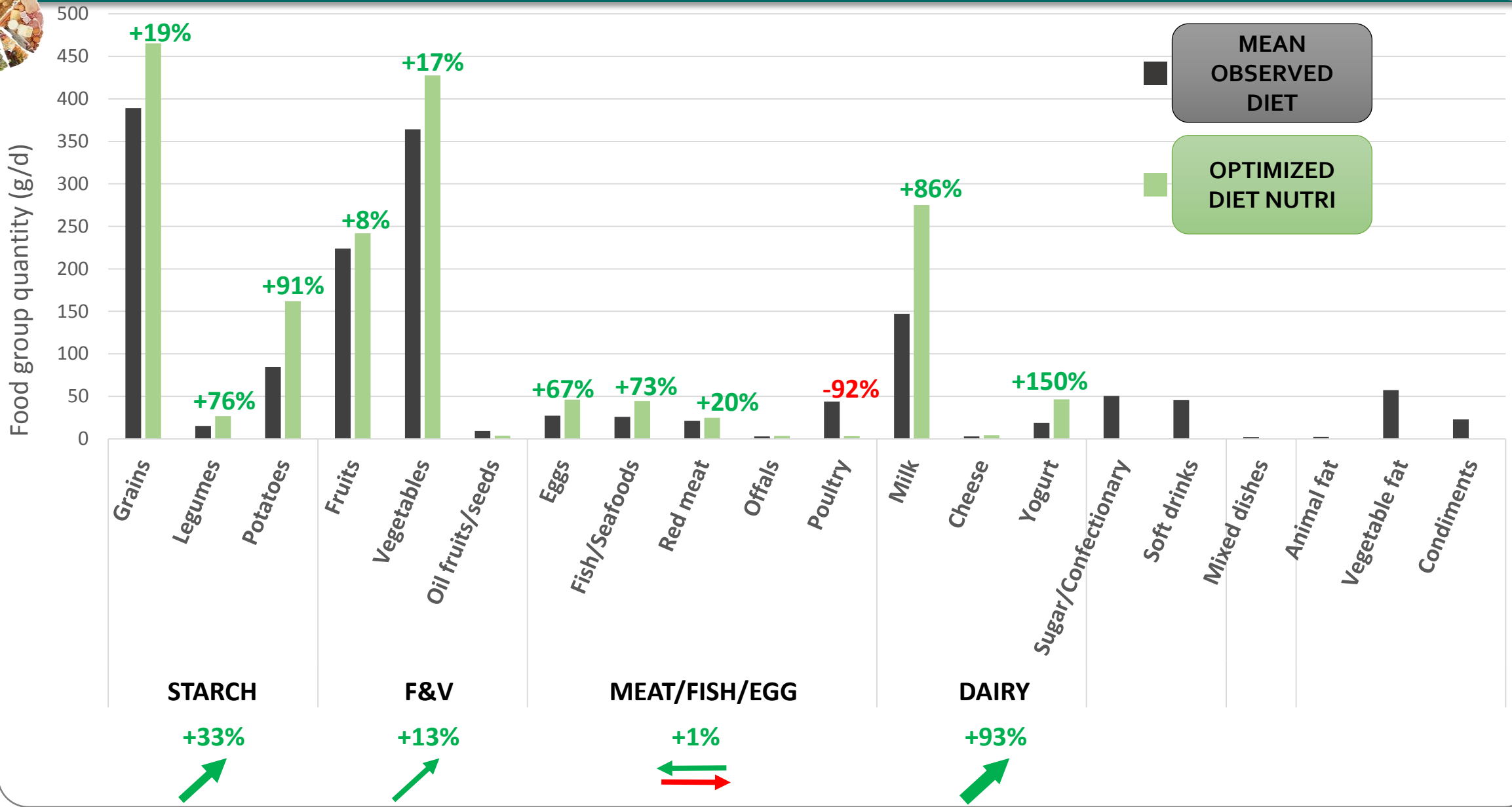
# Food group content



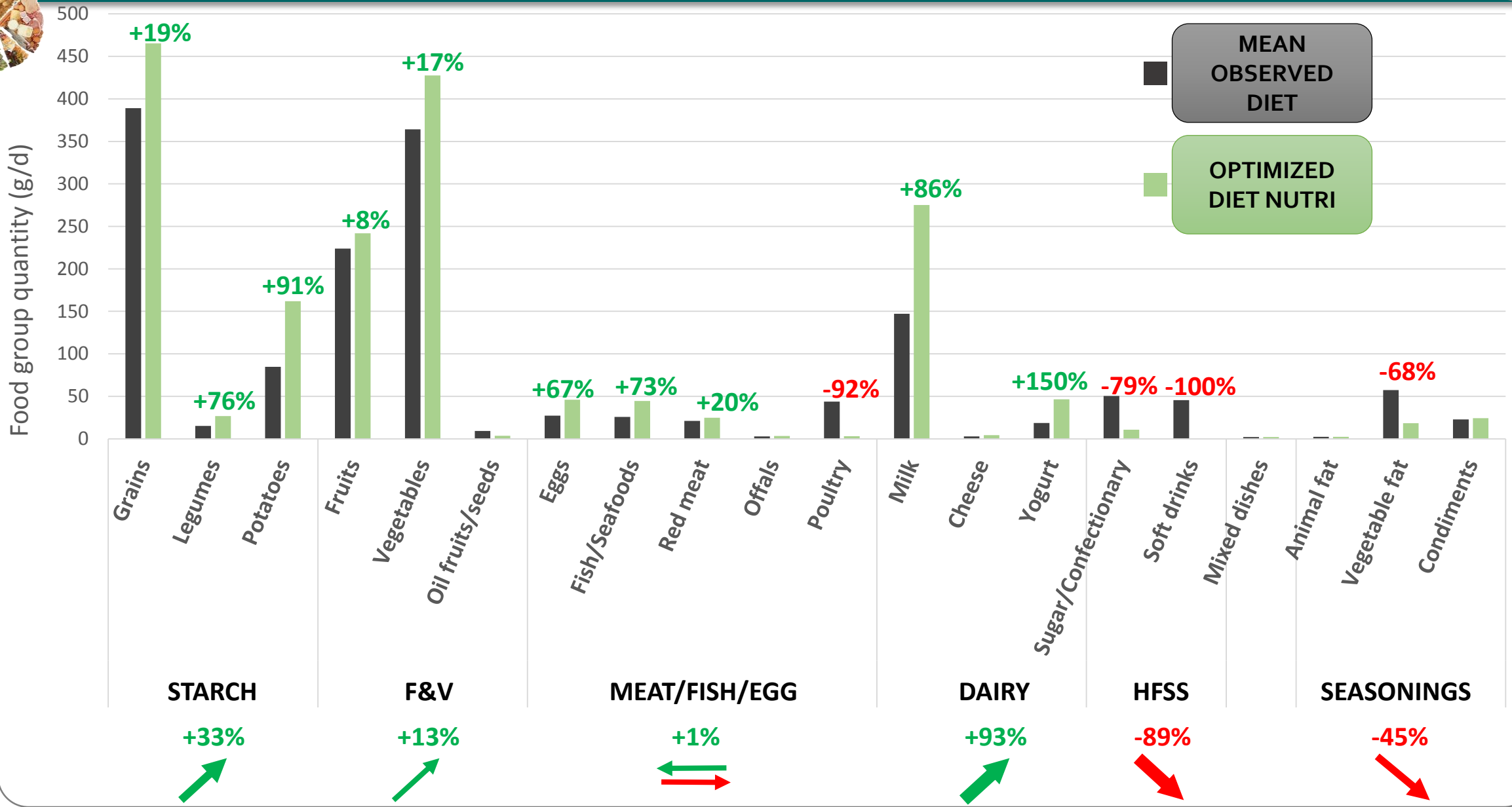
# Food group content



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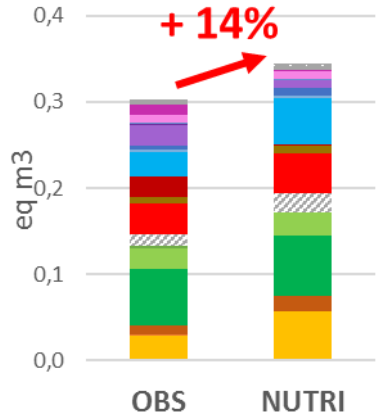
# Food group content



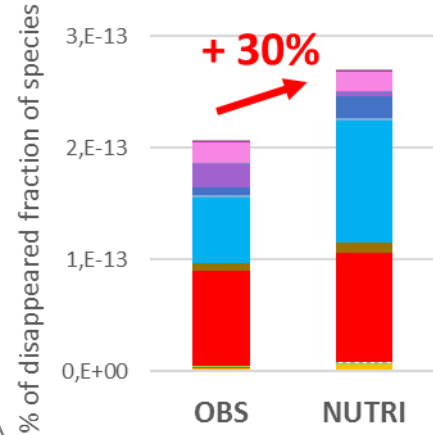
# Environmental impact



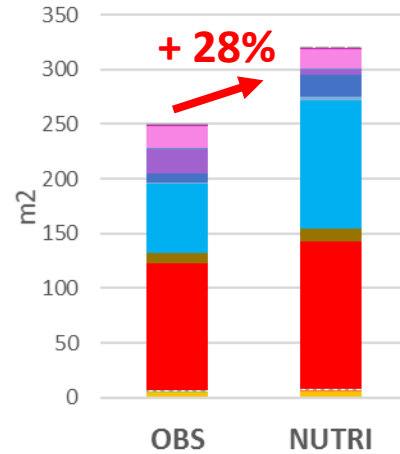
Water deprivation



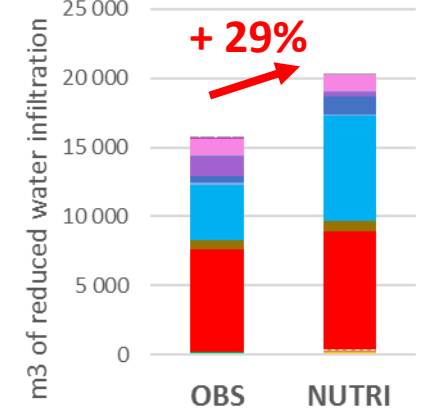
Biodiversity loss



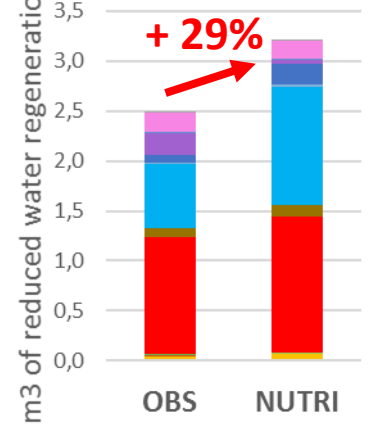
Land occupation



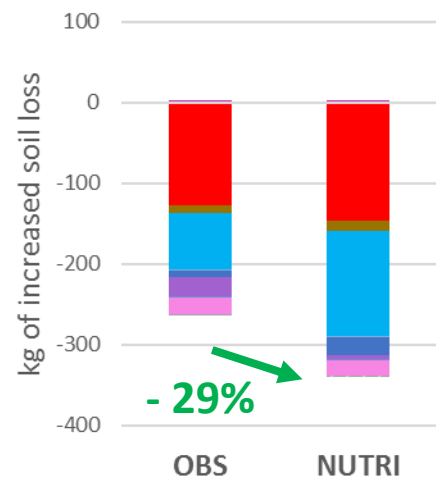
Mechanical filtration reduction



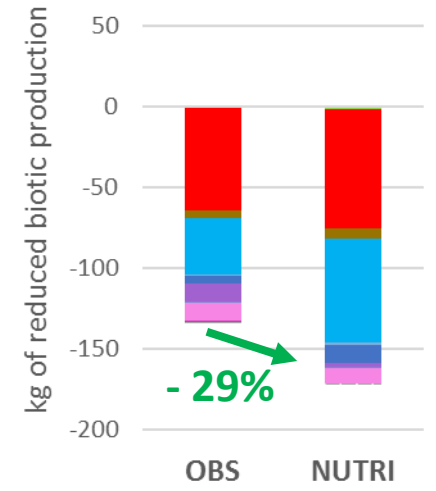
Groundwater regeneration loss



Erosion resistance loss



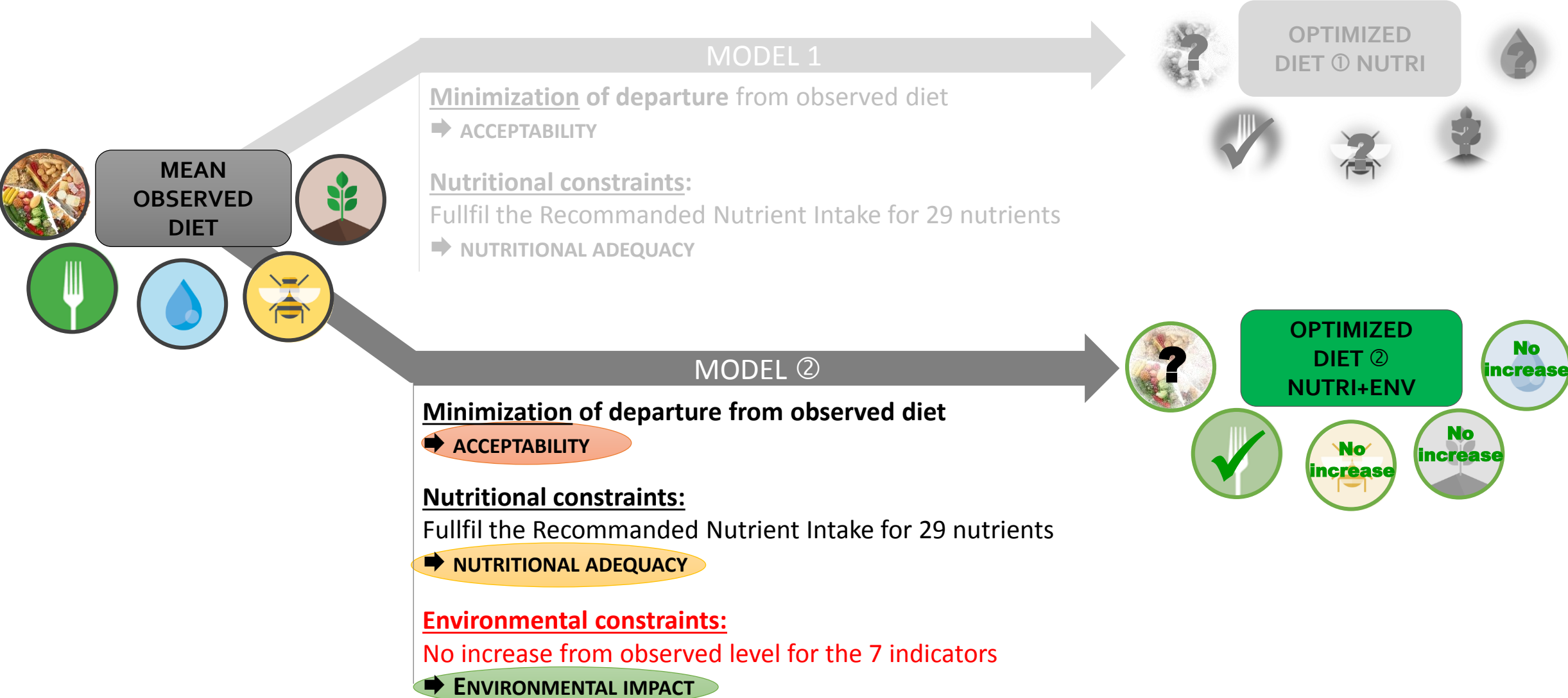
Biotic production loss



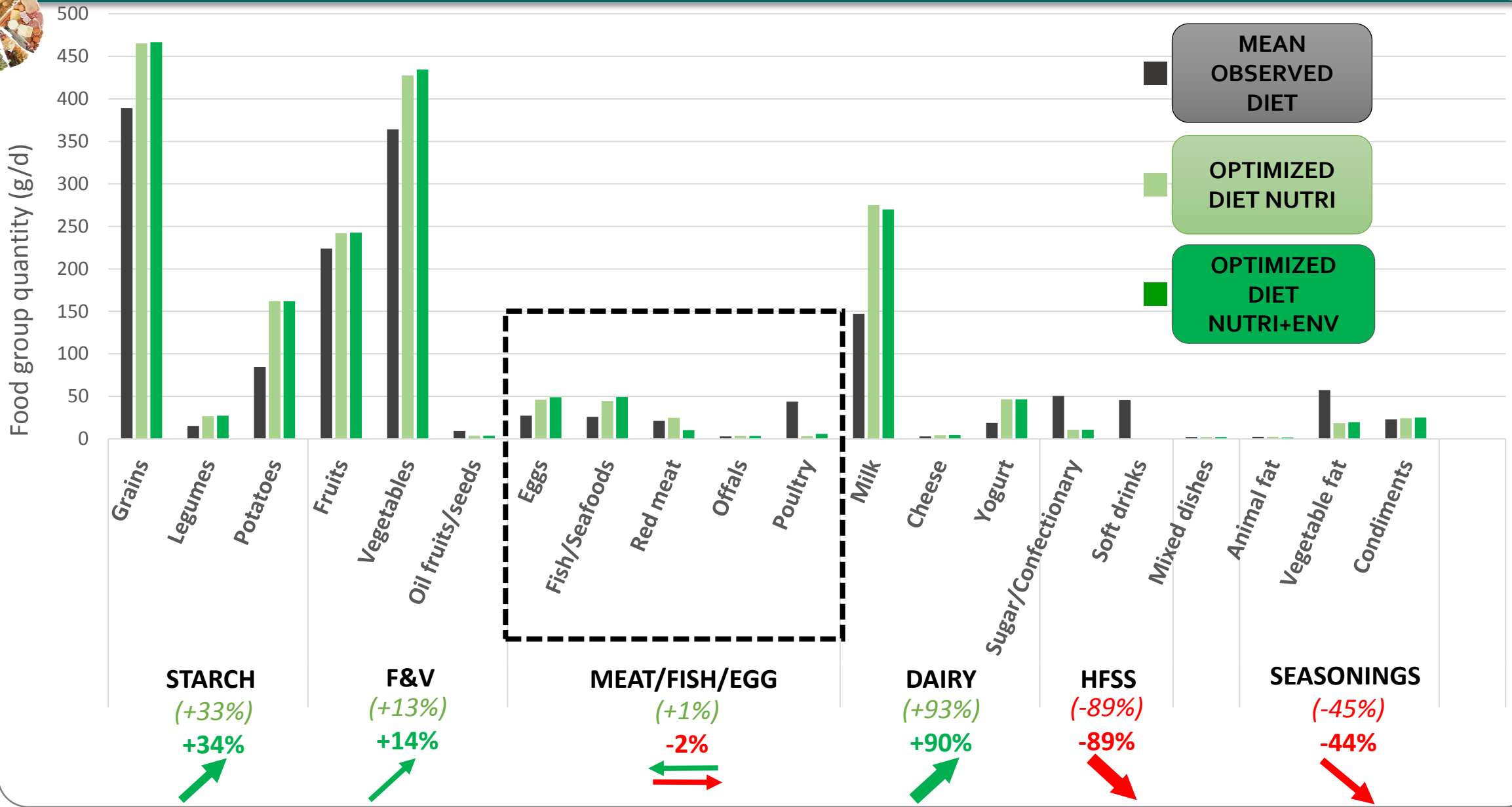
- Grains
- Legumes
- Potatoes
- Fruits
- Vegetables
- Oil fruits & seeds
- Eggs
- Fish
- Red meat
- Offals
- Poultry
- Milk
- Cheese
- Yogurt
- Soft drinks
- Mixed dishes
- Animal fat
- Vegetable fat
- Condiments
- Sugars & confectionery

- Dietary changes to reach nutritional adequacy ↗ **the impact** on water, biodiversity and 3 indicators of landuse
- Incompatibility of the nutrition vs. environmental dimensions

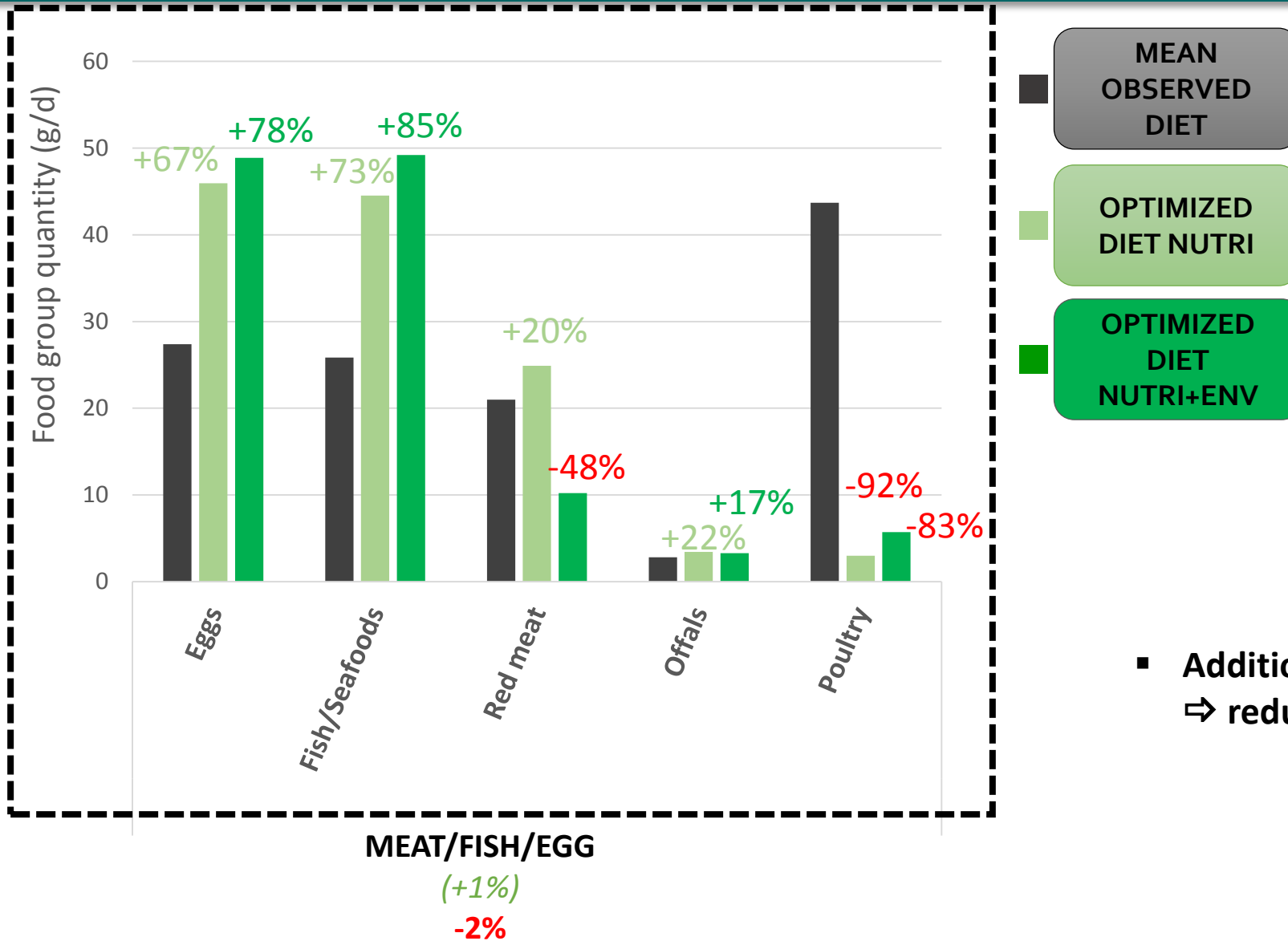
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# Food group content



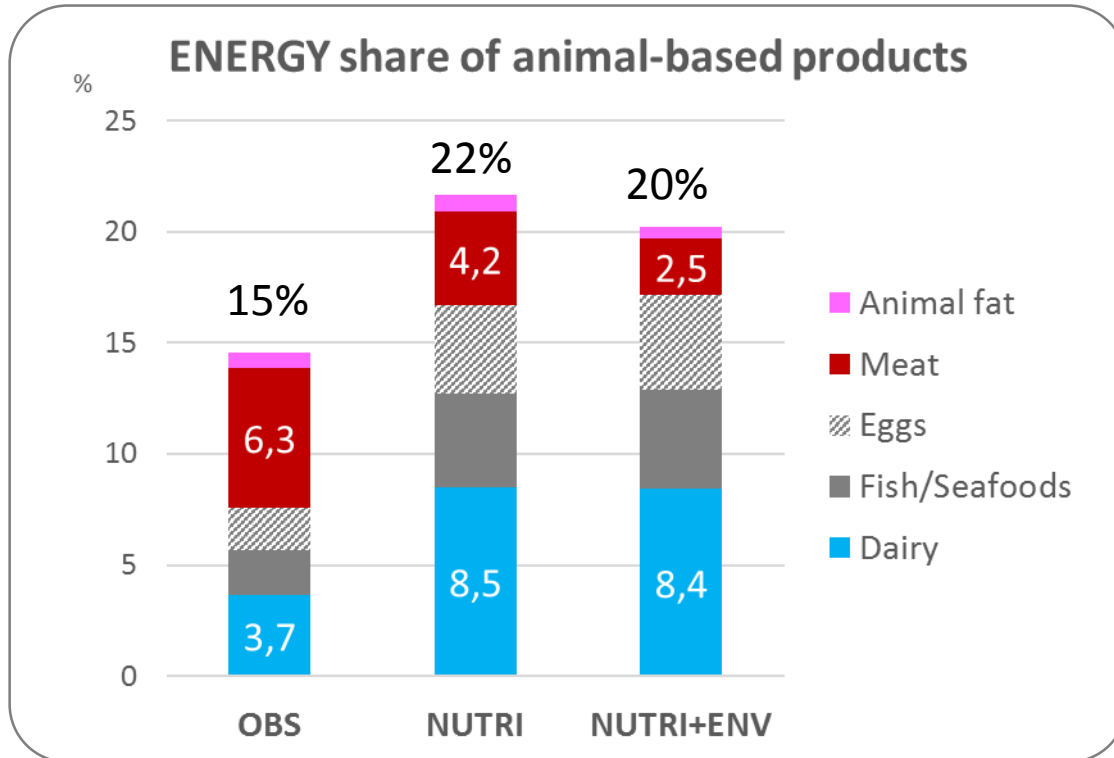
# Food group content



- Addition of environmental constraints  
⇒ reduction of red meat by half



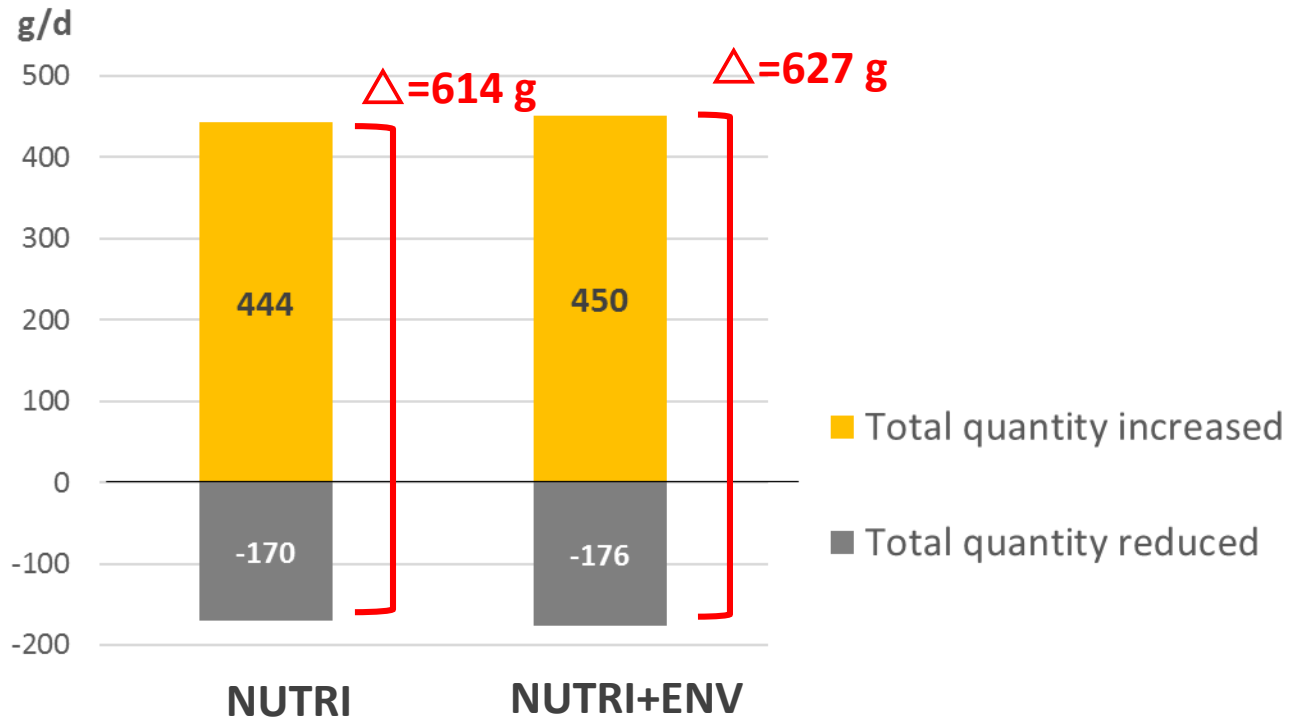
# Share of animal-based products



- **Increase of total energy share** of animal-based products
- But **restructuration of contributions** within animal-based products:
  - ↗ Dairy, Fish, Egg
  - ↘ Meat

# Deviation from actual diet

Diet deviation from observed diet



- Reaching nutritional adequacy without increasing environmental impact is possible but requires **higher diet deviation**
- but **small additional changes** vs. NUTRI

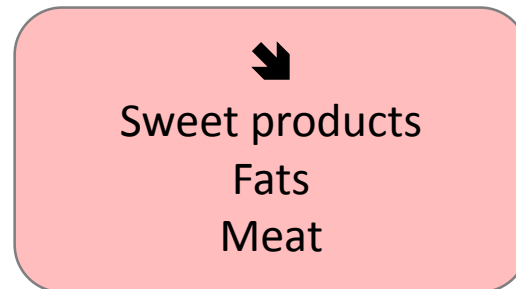
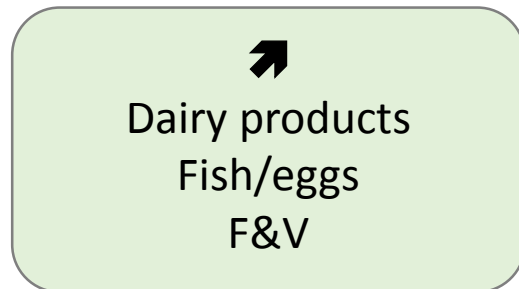
	Obs	NUTRI	NUTRI+ENV
Total diet weight (g/d)	1556	1829	1830

# Conclusion

## ▪ Compatibility of sustainable diet dimensions:

- ↳ Dietary changes **improving nutritional quality may induce a higher environmental impact** of diet
  - ⇒ Both **dimensions should be considered together** when designing guidelines for healthy & sustainable diet
- ↳ It is **possible to reach nutritional adequacy without increasing the environmental impact of diet**
  - ⇒ it requires **higher deviation from observed diet** (but additional changes are small)

## ▪ Main dietary changes identified to move towards more sustainable diet in Tunisia:



Animal-based products ~ 20% of total energy  
(~ 1/4 of total weight)

# Translation into action proposals

## DIETARY CHANGES

Dairy



**Improve stability of supply/availability** : to expand the installation of small, mobile or industrial processing units to transform the surplus seasonal products into stabilized ingredients and food products for off-season use and consumption.

Fish & seafoods



**Improve access (physical)** : improve distribution channels to ensure regular access to fresh seafoods, and encourage the artisanal seafood processing sector (salting, drying, smoking and pickling techniques)

F&V



**Improve access (economic)**: Promote deployment of sales points "from producer to consumer". This action will be accompanied by a communication campaign to encourage the use of these local distribution channels

Fats



**Rebalance the utilization of vegetable oils**: remove the subsidy for imported vegetable oils (soybean) and transfer this subsidy in the form of vouchers for olive oil (reserved for people living below the poverty line)

Sodium / salt



**Improve formulation of main contributors**: set a maximum permitted level of salt in manufactured products that are highly contributors (bread, cheeses and processed meats). A quality label will be awarded to products complying with these standards

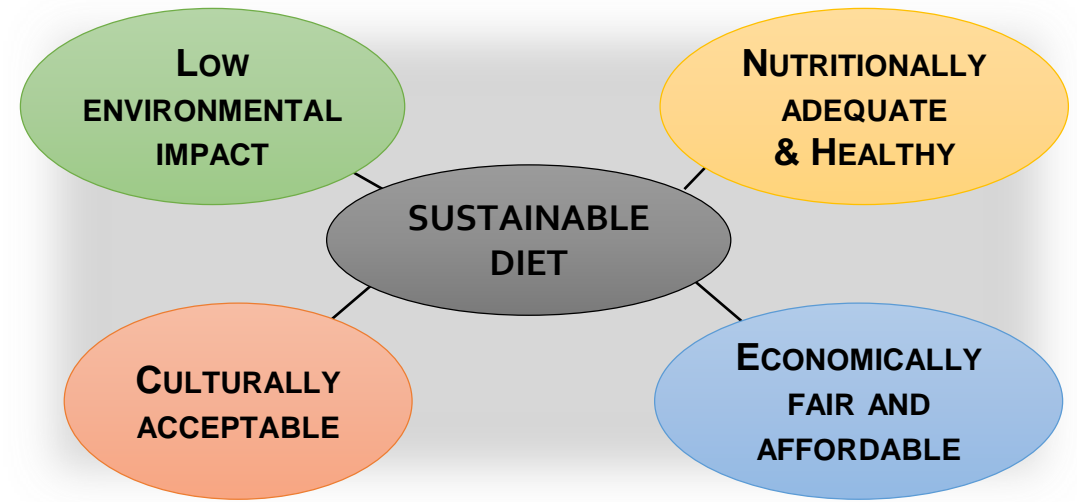
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## EXAMPLES OF ACTION PROPOSALS

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# Perspectives

- **Evaluation of the actions proposals** by key stakeholders
- **Diet optimization with reduced environmental impact**
- **Models improvement:**
  - ➔ Marine biodiversity and GHGE
  - ➔ Iron bioavailability, quality of protein
  - ➔ Optimization at the individual level
  - ➔ Diet cost





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## Thank you for your attention

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