Environmentally friendly food consumption: What does this mean for consumers?

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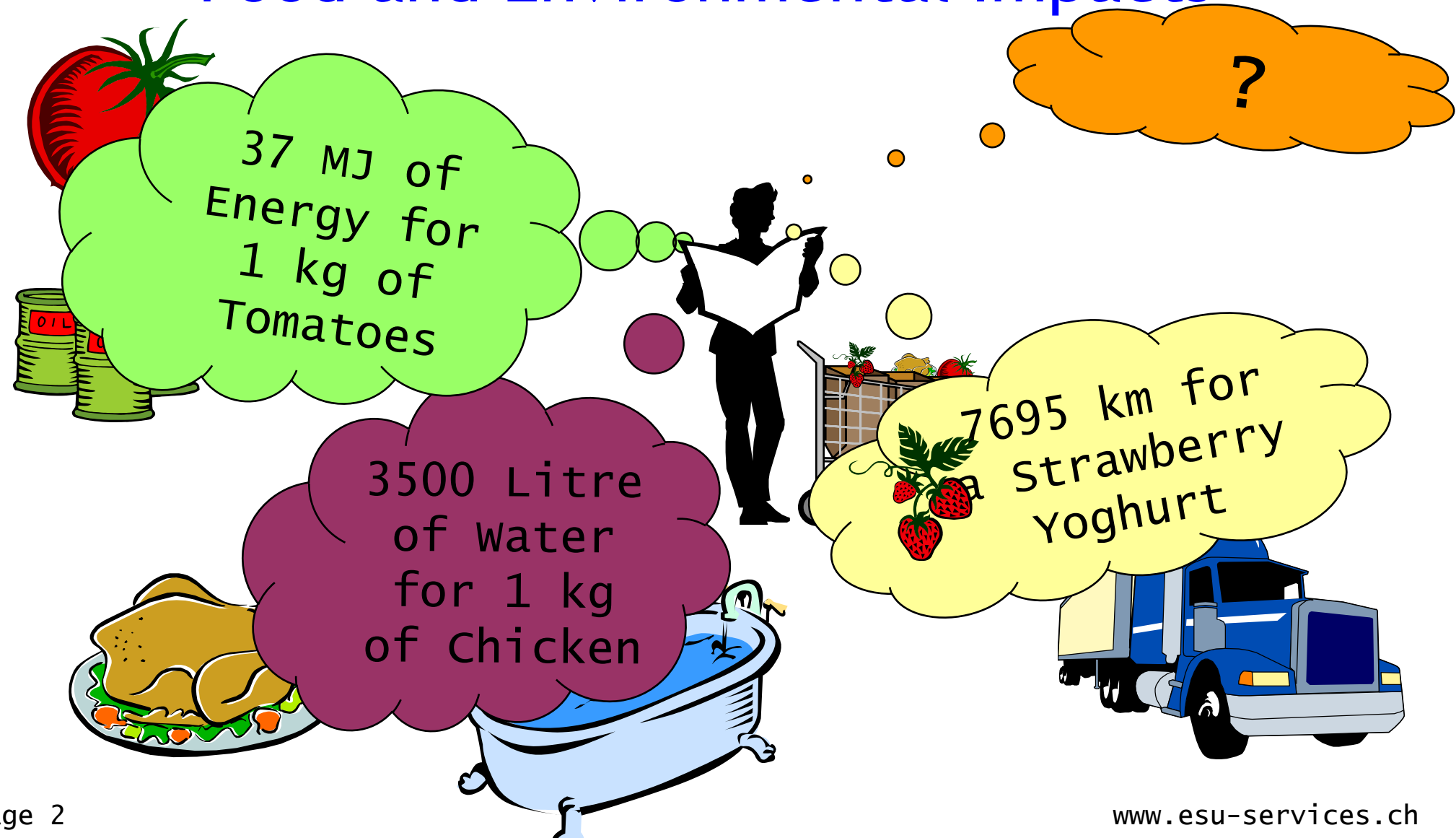
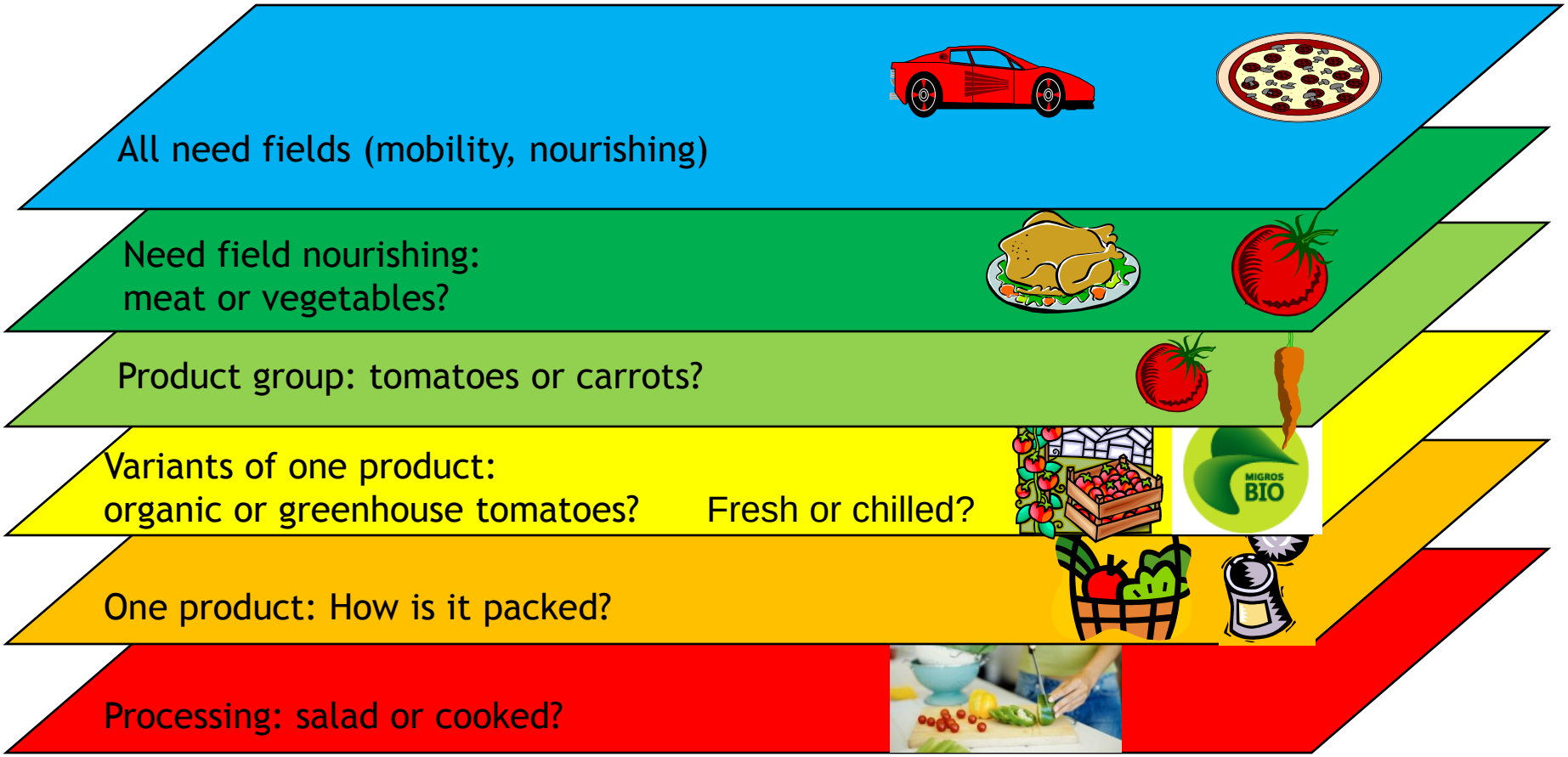
Food and Environmental Impacts



Contents

- Environmental impacts of food consumption
- Conclusions concerning food purchases from the consumers point of view
- Public interest
- Open research questions

Which questions to be answered?
Levels of Consumer Decision Making (DML)



- It is possible to address different types of questions, but not with one analysis

Which Life cycle impact assessment (LCIA)?

Carbon Footprint, CED:

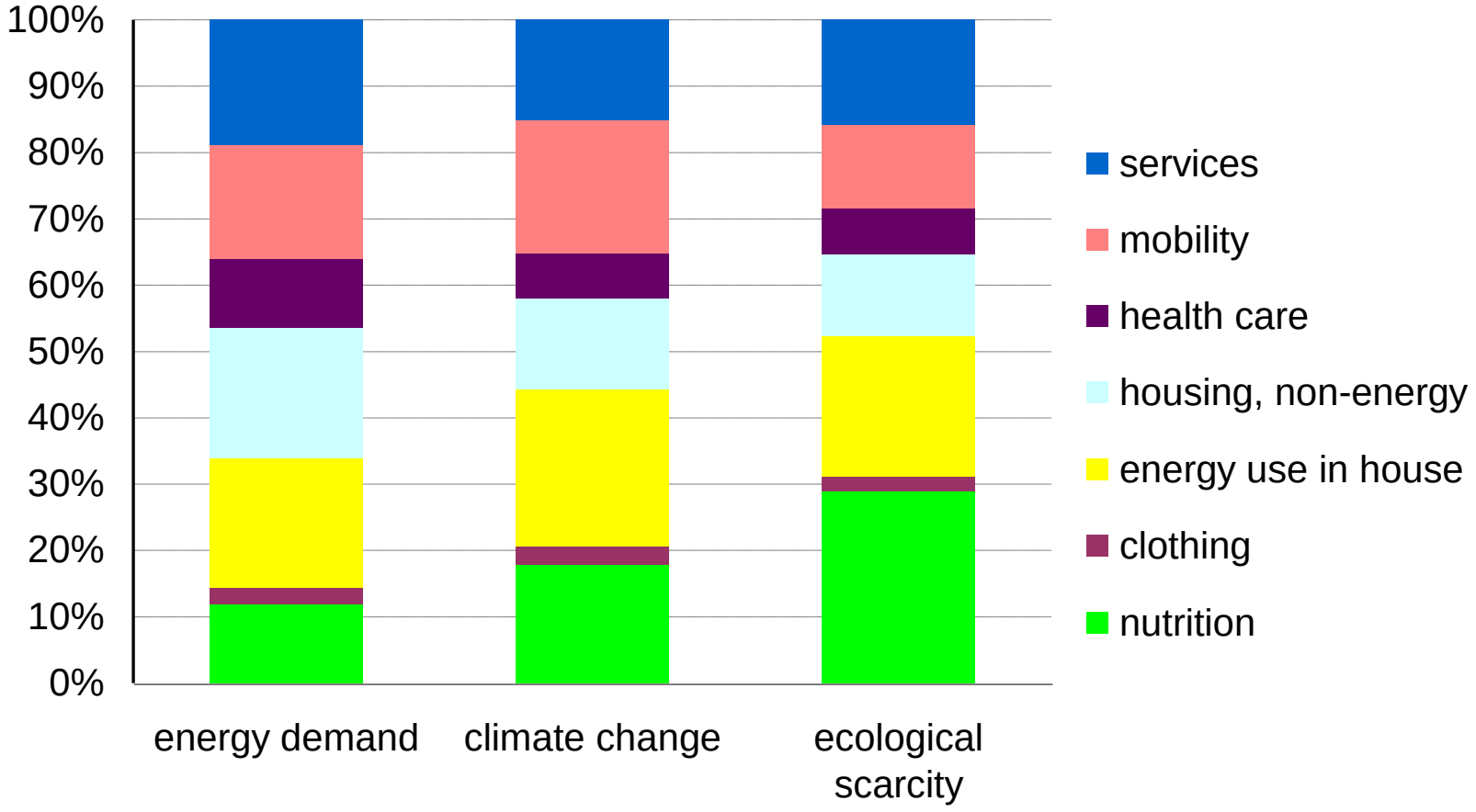
Ecological footprint:

Ecological scarcity: Comprehensive, reflects Swiss policy targets, used for assessment of products, companies and for the whole economy

		One environmental issue		Several issues	
	LCIA method: / Impact category	CED	Carbon footprint	Ecological footprint	Ecological scarcity 2006
Resources	Energy,non-renew able	√	∅	∅	√
	Energy, renew able	∅	∅	∅	√
	Ore and minerals	∅	∅	∅	√
	Water	∅	∅	∅	√
	Biotic resources	∅	∅	∅	∅
	Land occupation	∅	∅	√	√
	Land-transformation	∅	∅	∅	∅
Emissions	Only CO_2	∅	∅	√	∅
	Climate change incl. CO_2	∅	√	∅	√
	Ozone depletion	∅	∅	∅	√
	Human toxicity	∅	∅	∅	√
	Particulate matter formation	∅	∅	∅	√
	Photochemical ozone formation	∅	∅	∅	√
	Ecotoxicity	∅	∅	∅	√
	Acidification	∅	∅	∅	√
	Eutrophication	∅	∅	∅	√
	Odours	∅	∅	∅	∅
	Noise	∅	∅	∅	∅
	Ionising radiation	∅	∅	∅	√
	Endocrine disruptors	∅	∅	∅	√
Others	Accidents	∅	∅	∅	∅
	Wastes	∅	∅	∅	√
	Littering	∅	∅	∅	∅

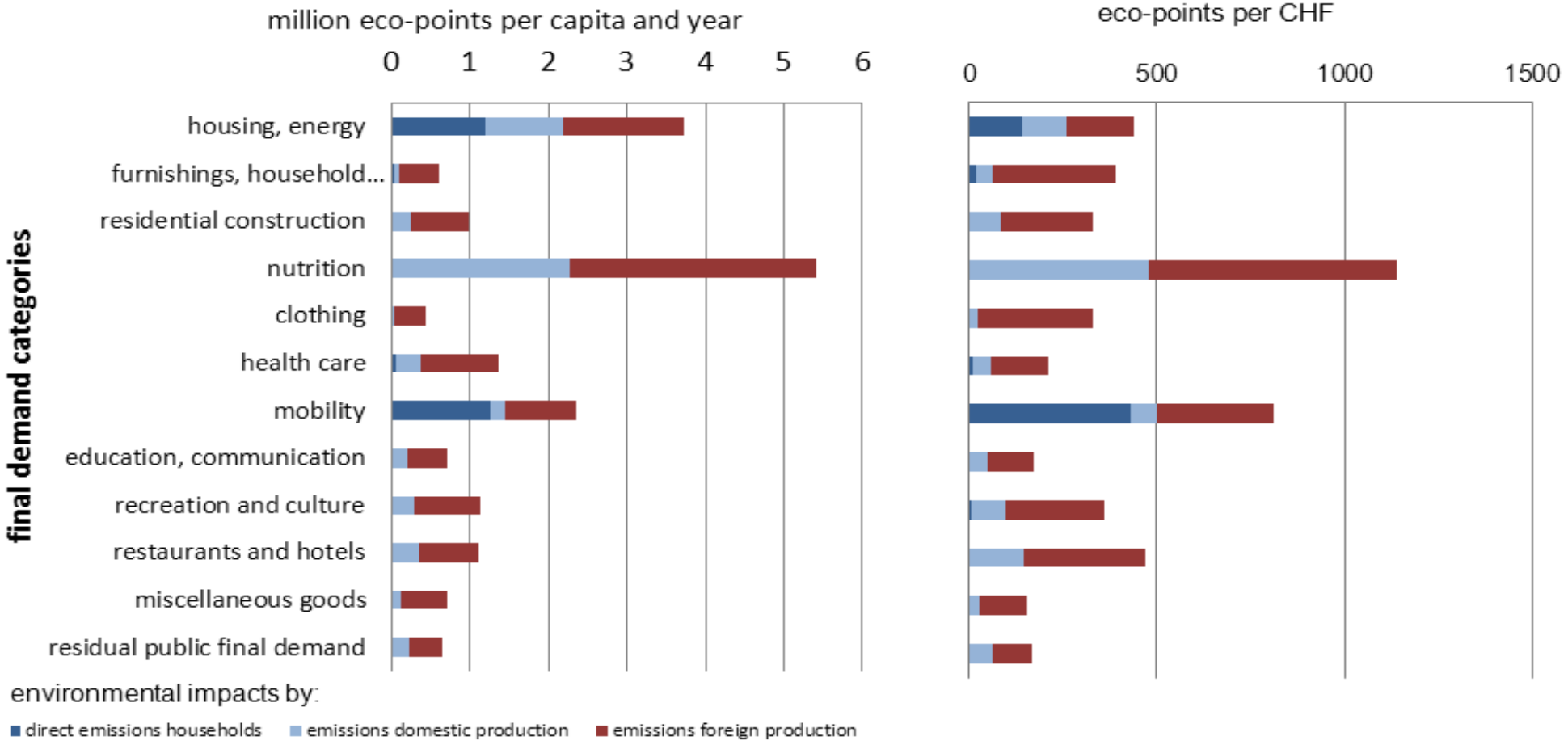
- It is necessary to apply LCIA methods that cover a range of environmental impacts
- For this presentation we use the Swiss ecological scarcity method 2006

Overall importance of nutrition in total consumption of households



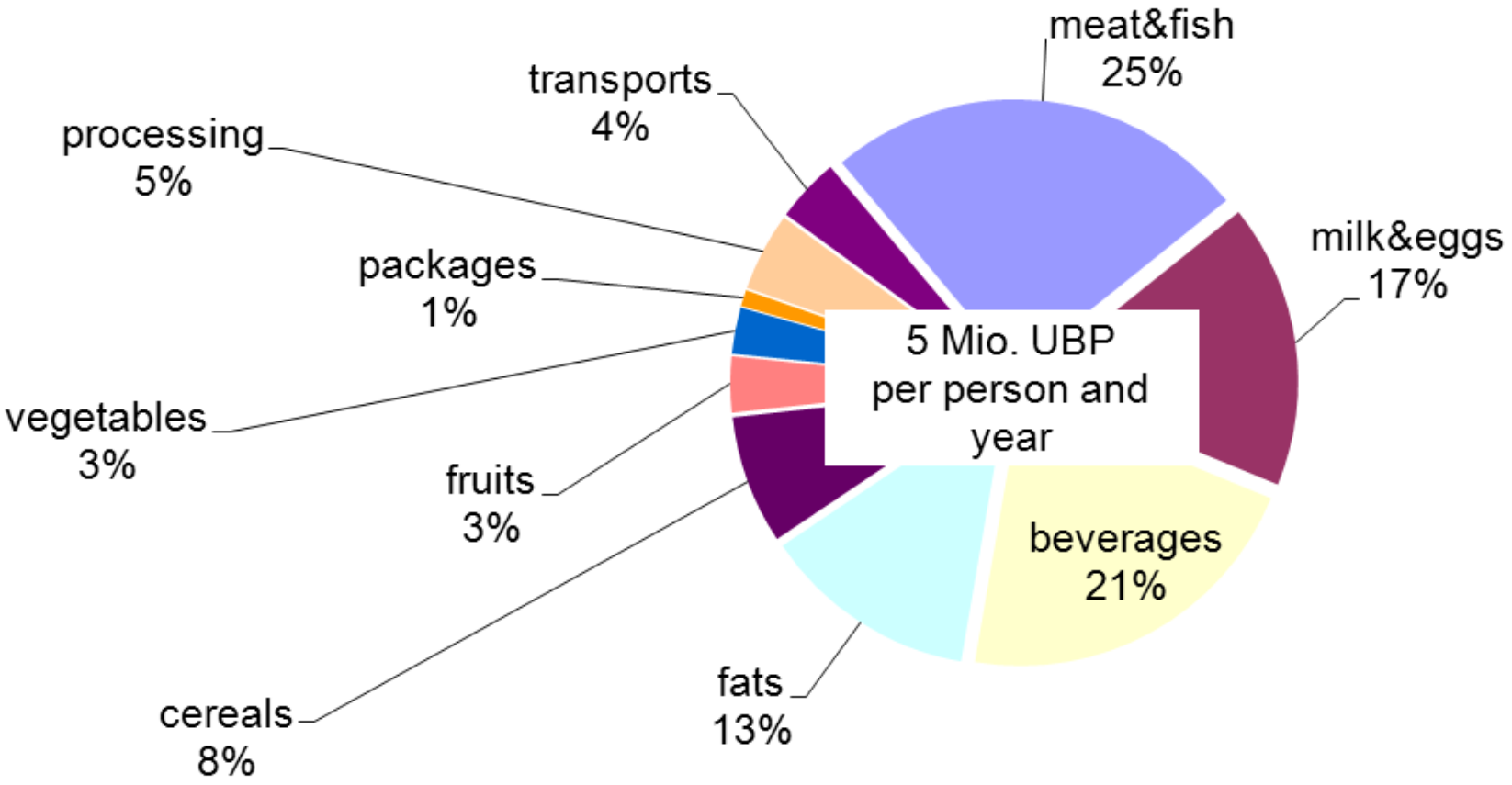
- Nutrition causes about 30% of total environmental impacts of consumption
- Carbon footprint and energy demand underestimate the agricultural impacts

Further evaluation of consumption



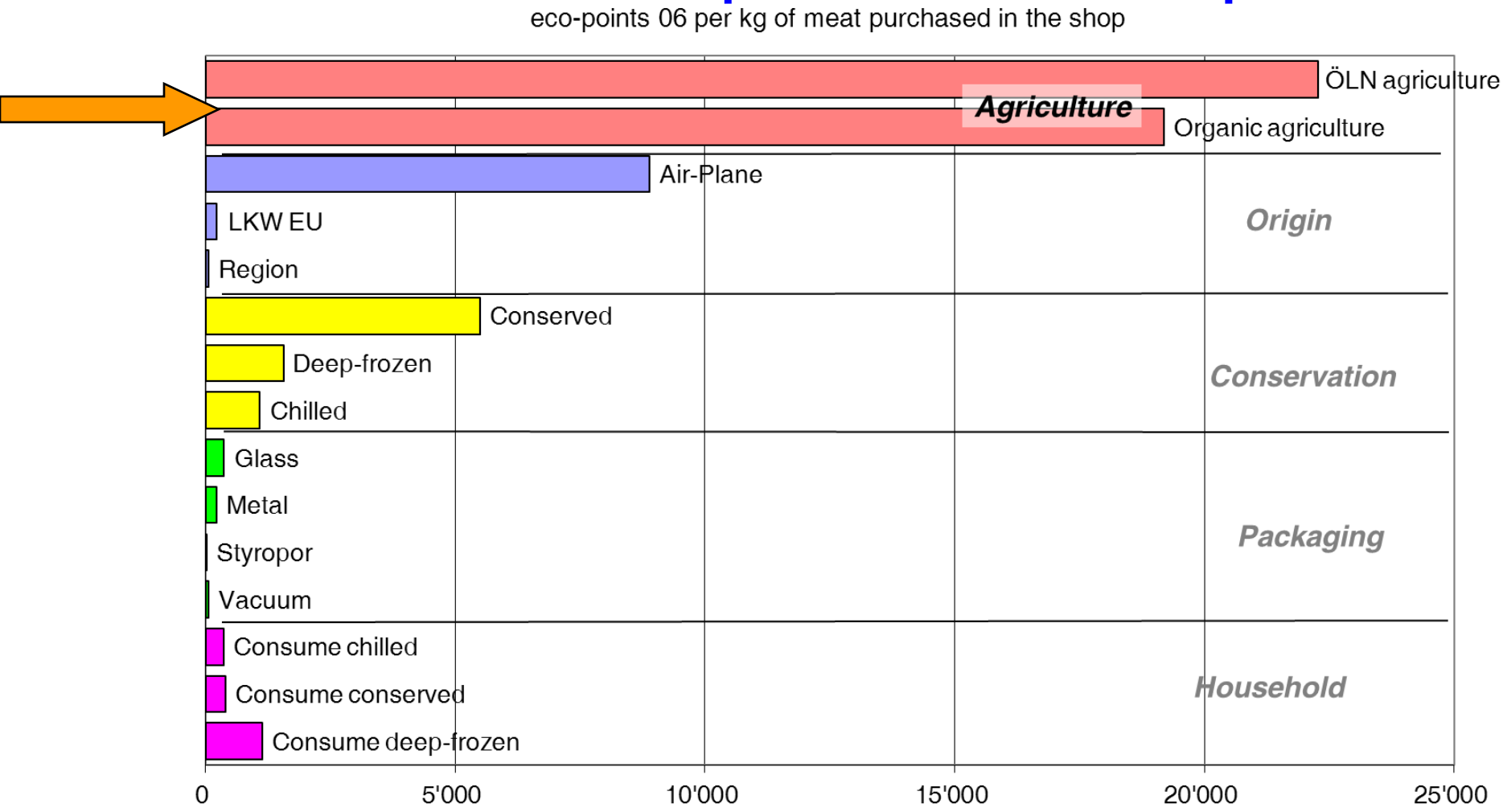
- Nutrition and mobility most intensive per money spent
- 40% of the environmental impacts due to nutrition occurs abroad

Share of product groups



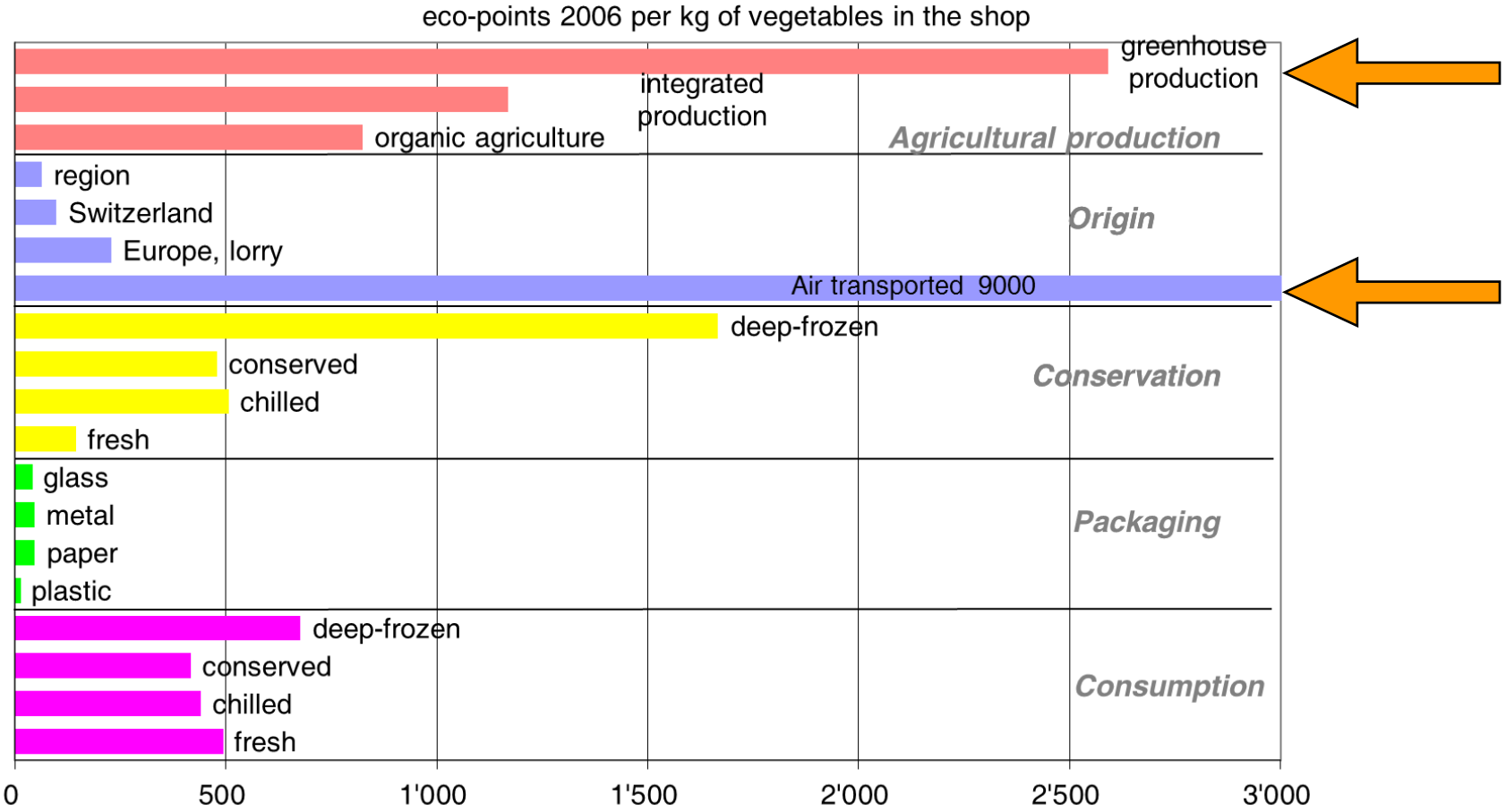
- Animal products (meat, milk, eggs) are most important
- Stimulants like wine, coffee, alcoholics cannot be neglected

Environmental impacts of meat purchases



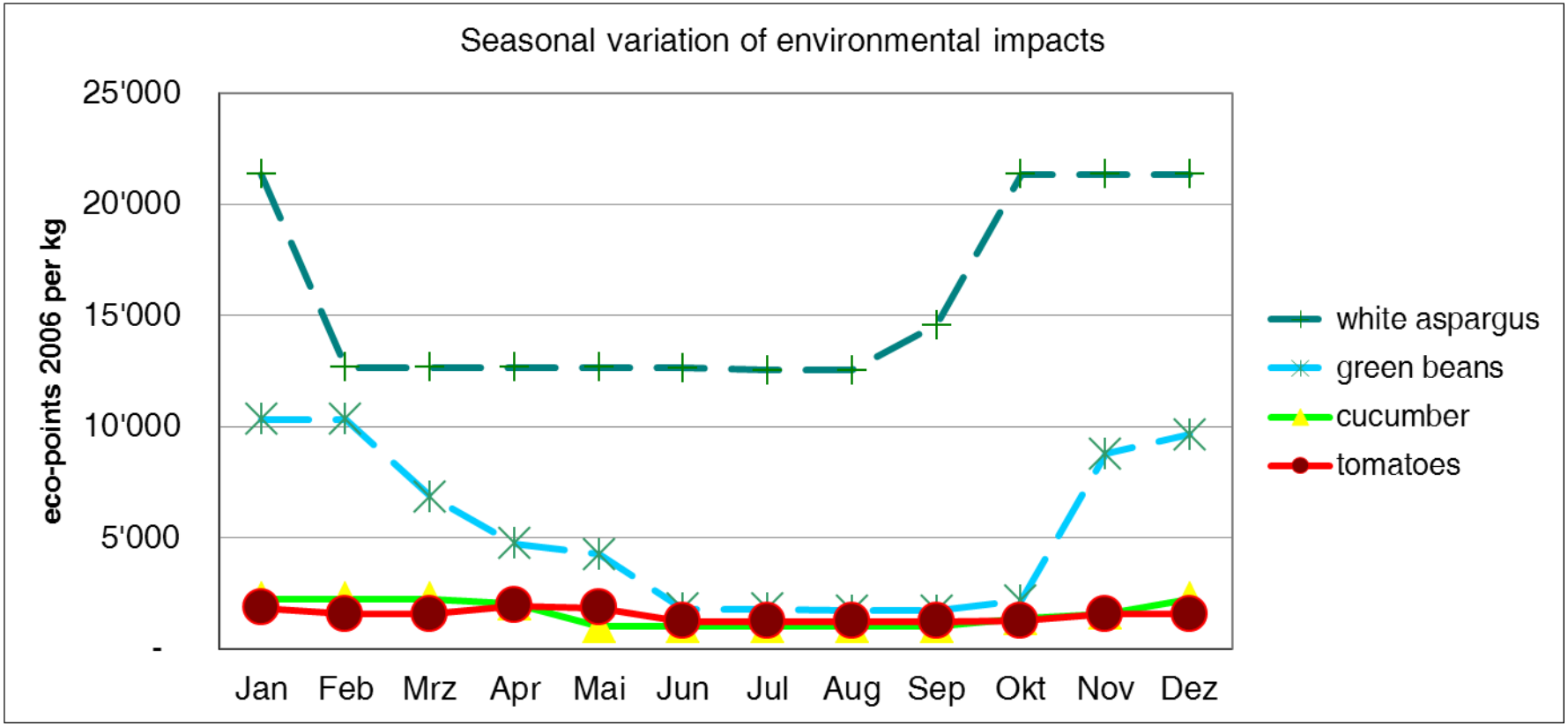
- Agricultural production dominates total impacts of meat products

Environmental impacts of vegetable purchases



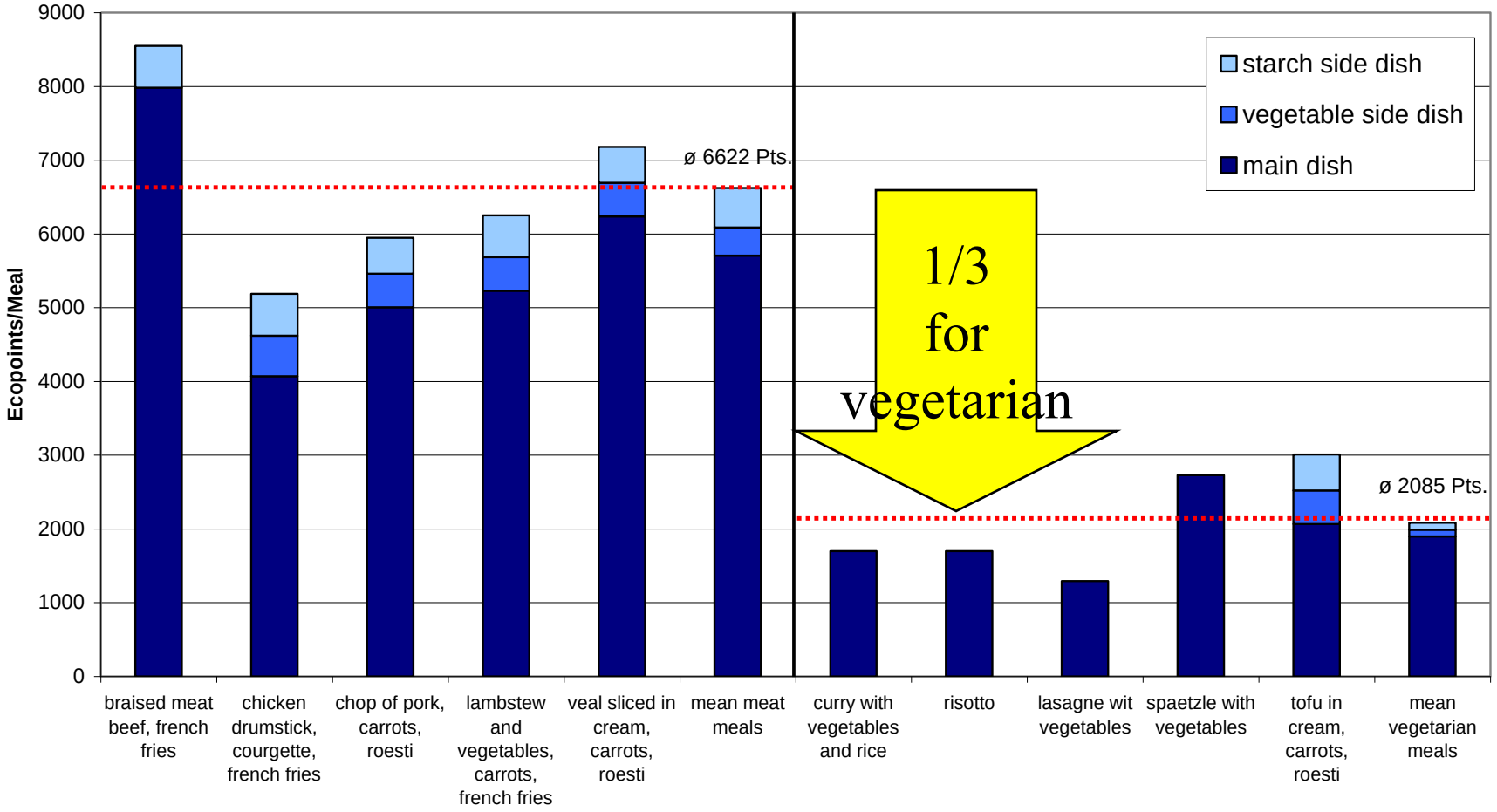
- All characteristics are important for plant products
- Air transports and heated greenhouse cause highest burdens for vegetables/fruits

We can buy aspargus the whole year?



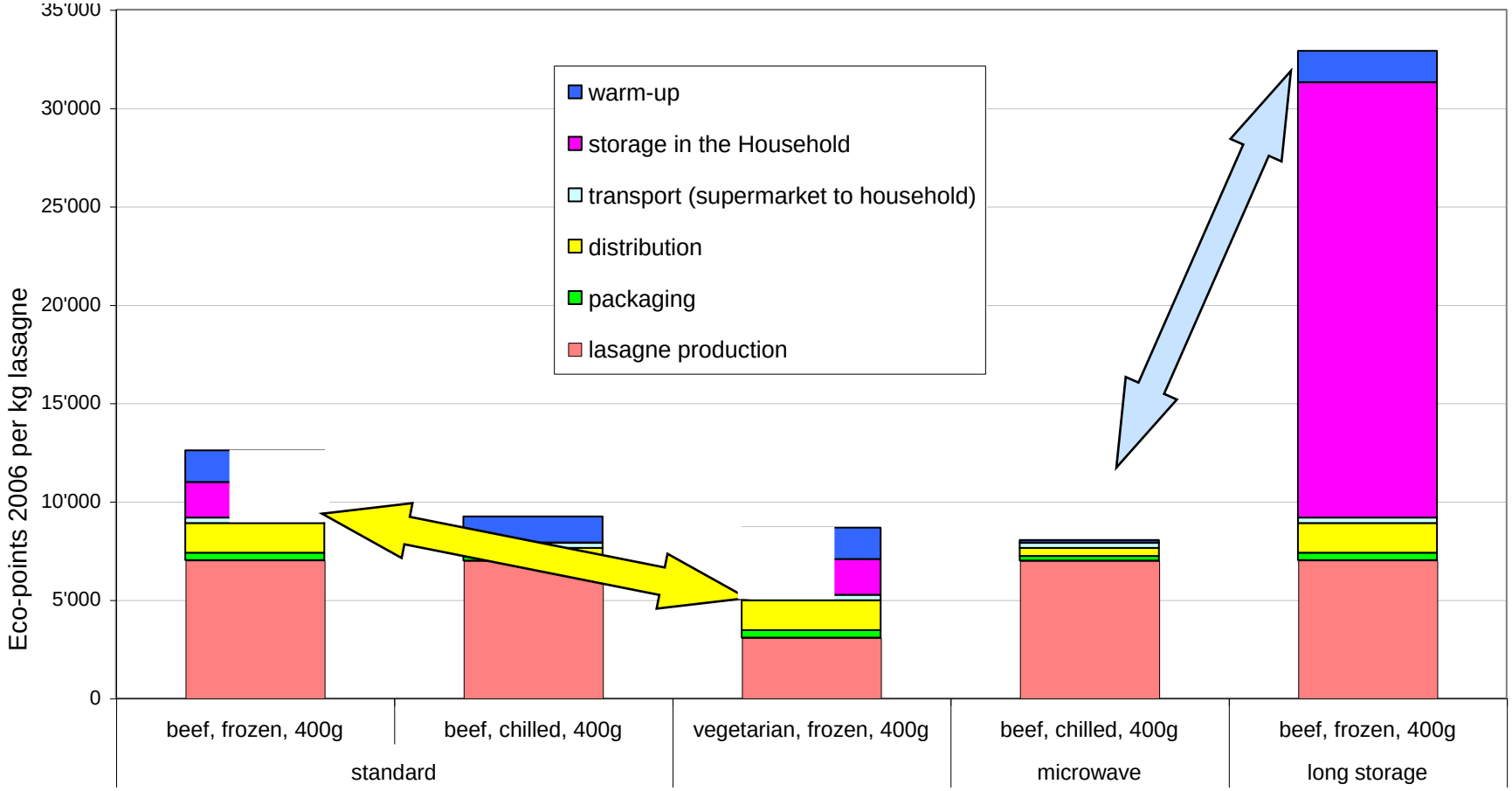
- Highest: Air transport
- Middle: Greenhouse products
- Lowest: Open-ground production in CH

Canteen Meals:
comparison of vegetarian and meat based recipes



- Vegetarian meals have considerably lower environmental impacts

Ready-to-Eat Lasagne and user behaviour



- Differences in production less obvious if full life cycle is evaluated
- Important differences in the use phase need to be addressed

Conclusions for Consumers

- Eat more vegetarian. Consumption of meat, fish and animal products must be reduced
  - two meat portions a week (400-500 grams)
  - one portion fish per month
- Avoid air transported products
- Buy seasonal and no products from heated greenhouse
- Reduce stimulants like alcoholics, coffee and chocolate
- Consider energy savings in private transportation and the household appliances
- Reduce wastage and overconsumption

Influencing consumers behaviour with LCA

- A lot of knowledge is available for consumers
- LCA studies are sometimes confusing if opposite results
- Less options for reducing environmental impacts compared to other fields like mobility and housing
- People tend to follow the easy things and not the important things, e.g. recycling of packages instead reducing meat consumption

➢ Stress the points that are really important and not what is scientifically surprising

Public interest on LCA studies of food

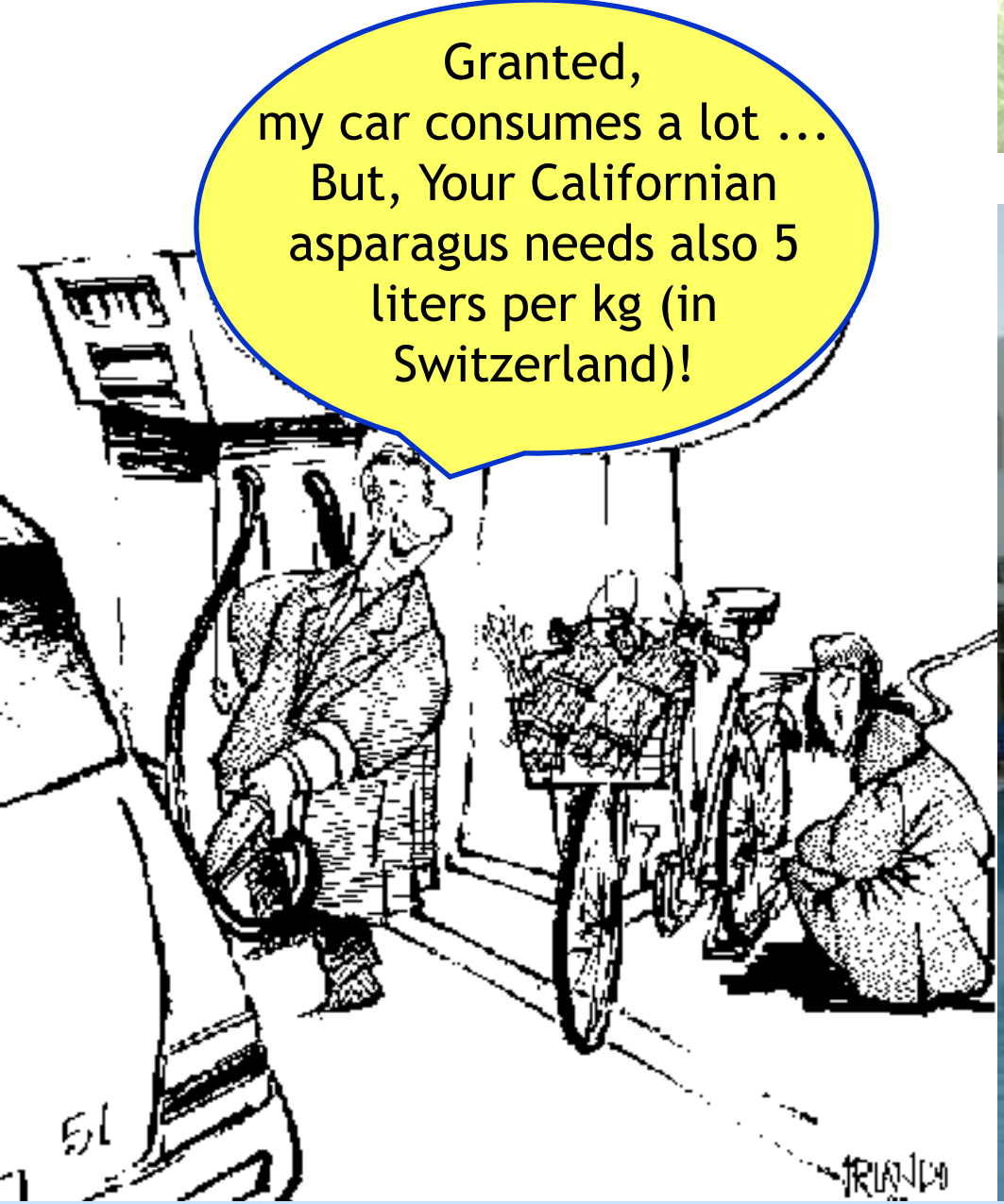
- High public interest allows to teach life cycle thinking
- Many people mix health aspects and environmental aspects when looking at food
- Sensations, even if wrong, are more interesting than confirmation of former research
- Detailed comparisons are more suited for producers and distributors than for consumers

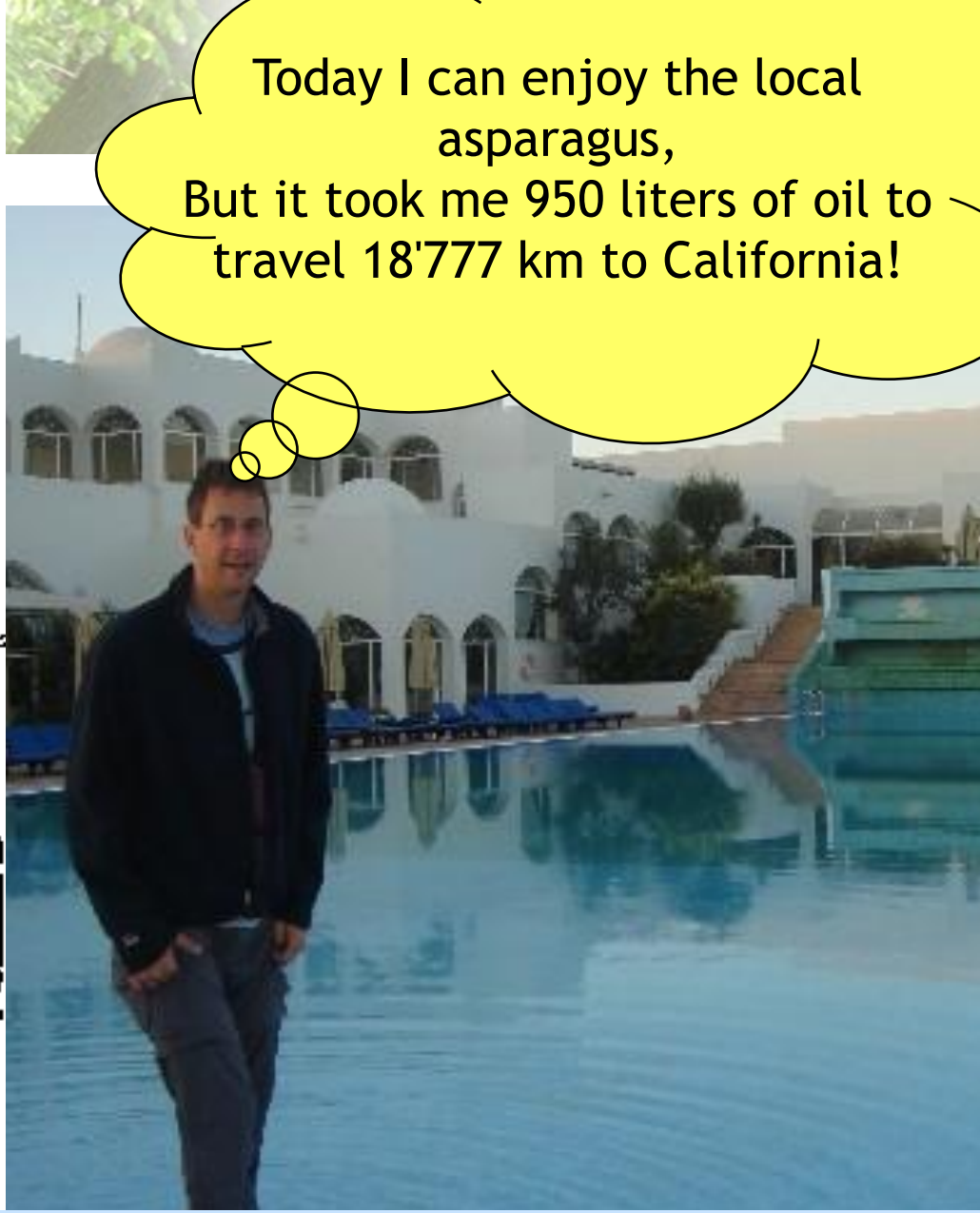
Lessons learned so far

- Carbon footprinting is often misleading
- LCA covering a range of environmental impacts is necessary to reduce burden shifting
- Reduced consumption of animal products helps the climate and the environment
- There is always an exception from the general rule

Outlook and open research questions

- Good models to address regional variation and specific types of emissions in agriculture
- Research on processed food, ready-to-eat meals and restaurants is necessary (eating at home is phasing out)
- Determine the level of sustainable consumption for animal products
- More case studies on food ingredients like flavours
- More data on wastage in all stages and its inclusion in LCA are needed





- Information about our studies www.esu-services.ch/publications/food/
- Calculate the impacts of Your food consumption www.ulme.ethz.ch

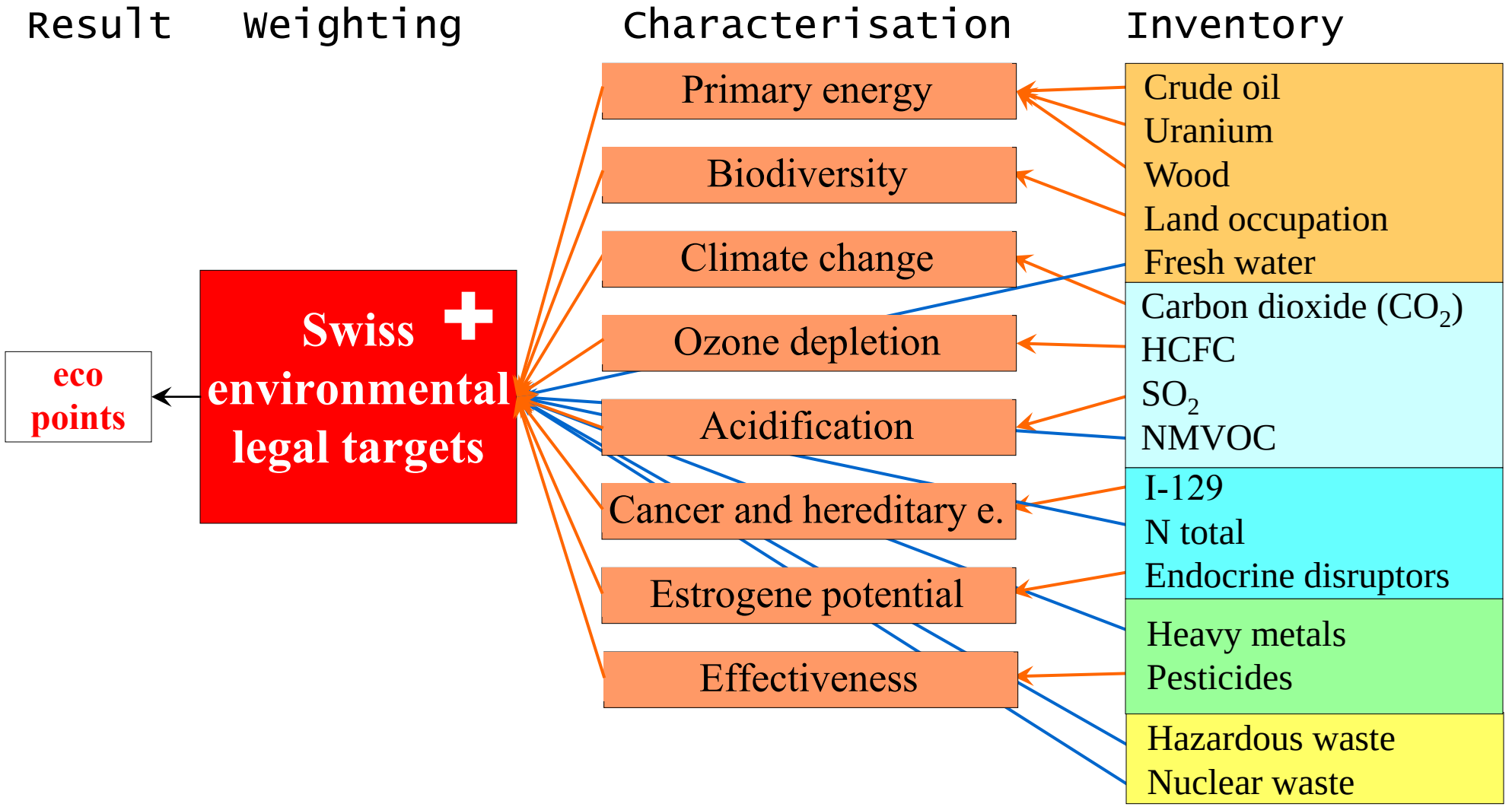
Annexe

Life cycle impact assessment (LCIA) methods

	environmental impacts	carbon footprint (kg CO2-eq)	ecological footprint (m2a)	ecological scarcity 2006 (UBP)	ReCiPe (points)
resources	abiotic resources, incl. water	∅	∅	√	√
	nuclear energy	∅	∅	√	√
	fossil energy	∅	∅	√	√
	land occupation	∅	√	√	√
	land transformation	∅	∅	∅	√
emissions	climate change	√	√	√	√
	ozone depletion	∅	∅	√	√
	toxicity	∅	∅	√	√
	summer smog	∅	∅	√	√
	acidification	∅	∅	√	√
	nutrification	∅	∅	√	√
	endocrine disruptors	∅	∅	√	∅
	noise, odour, litter	∅	∅	∅	∅
	ionising radiation	∅	∅	√	√
	waste (incl. radioactive waste)	∅	∅	√	∅

- Matter of choice and values, but not of science (alone)
- We recommend the Swiss ecological scarcity 2006 method

Ecological Scarcity 2006



- Assessment of emissions to air, water and soil as well as resource uses
- Aggregation of exchanges according to the environmental scarcity defined in Swiss politics

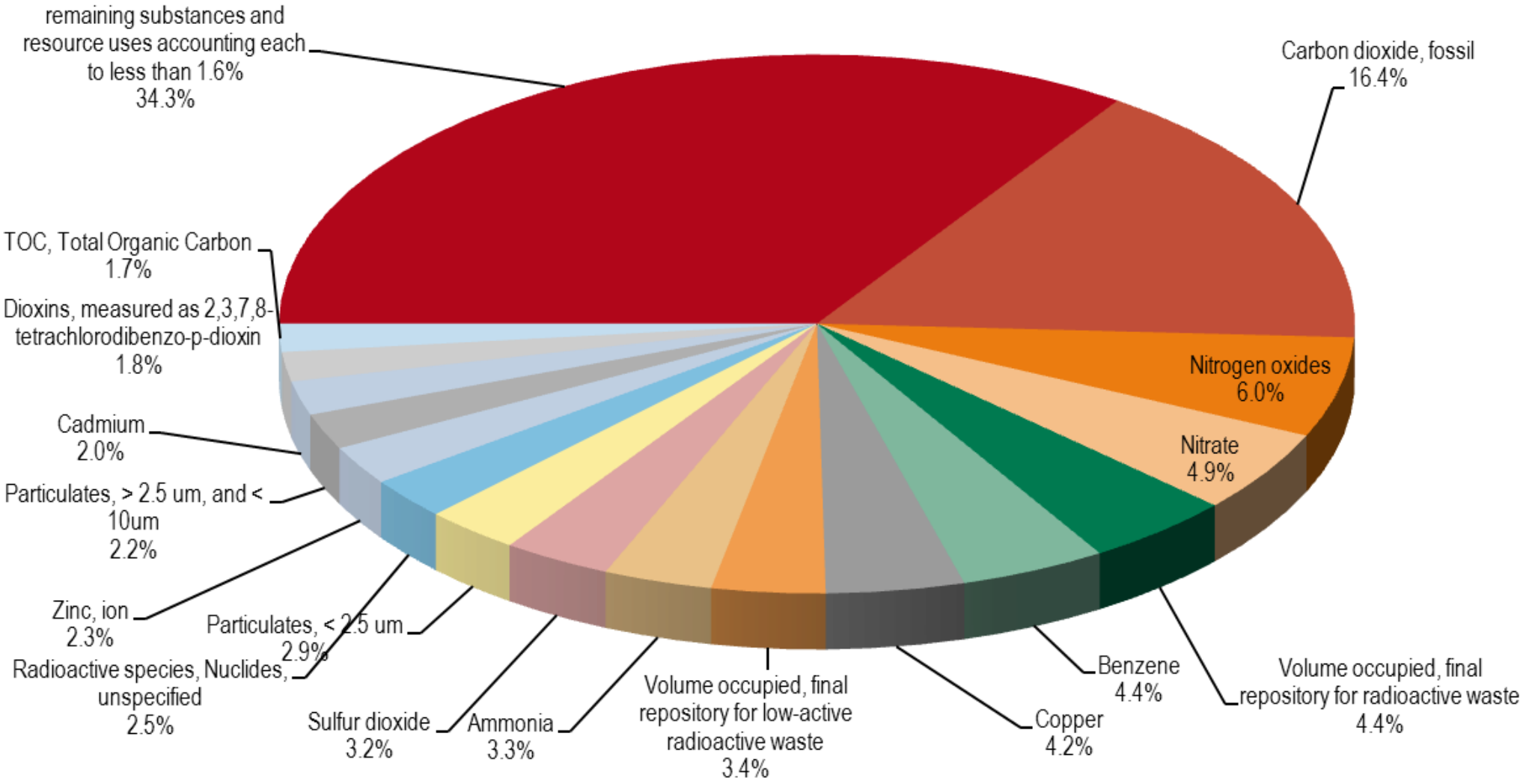
Specific features of Swiss Version

- Land use: impacts on biodiversity used in characterisation
- Radionuclide emissions to the Sea included
- Phosphorus input into freshwater bodies:
  regional differences are considered
- Emissions of endocrine disruptors to freshwater bodies
- Pesticides: Standard dose used in characterisation

Who uses UBP for biomass products?

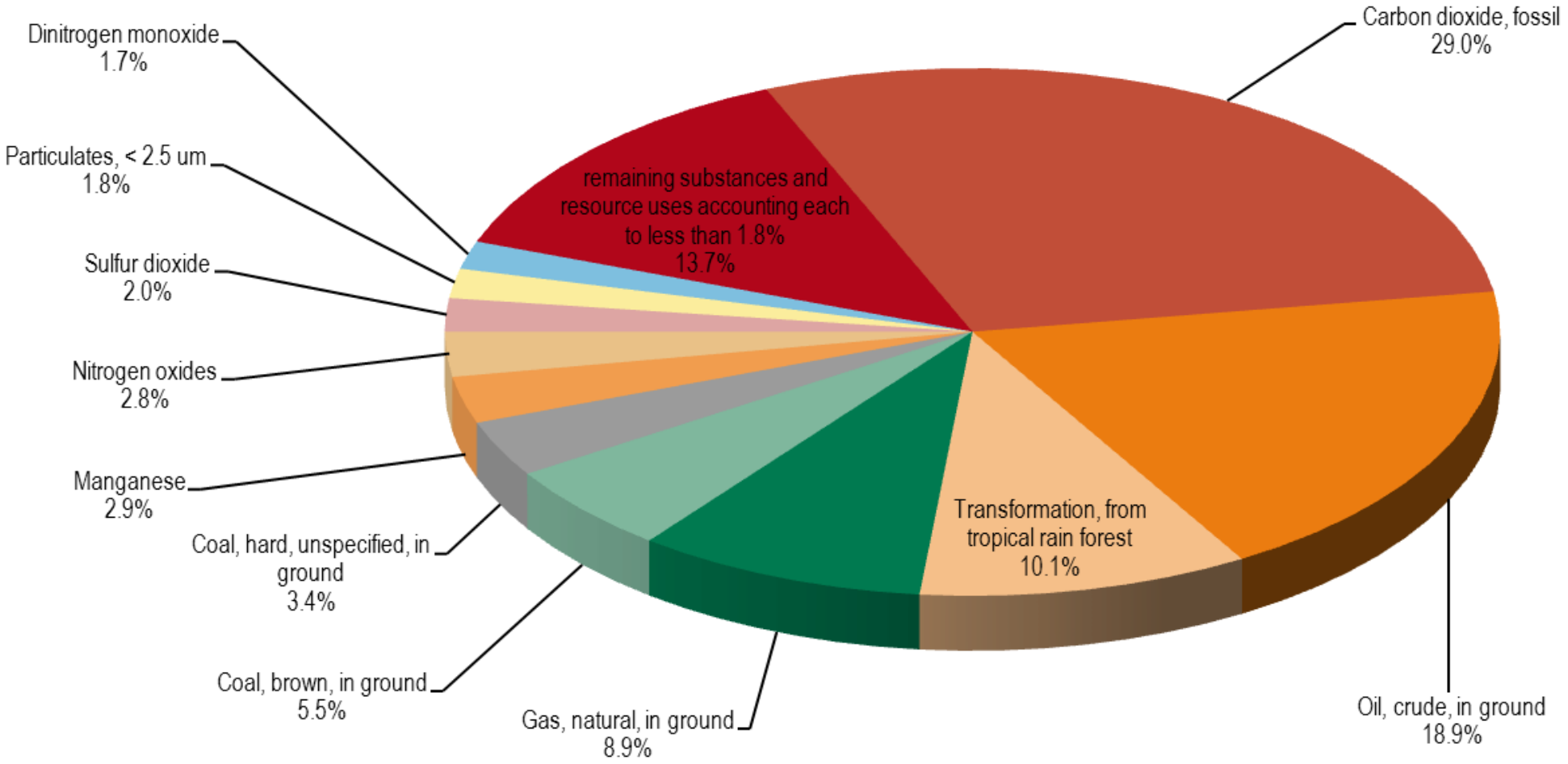
- LCA practitioners
  - Carbotech (biomass materials)
  - Climatop (cream, asparagus)
  - EMPA (e.g. biofuels, coffee)
  - ESU-services (food consumption)
  - ETH (e.g. vegetables)
- Customers
  - BFE, BLW, BAFU, WWF, Migros, Coop, McDonalds, City of Zürich, Climatop and others
- Japanese version developed within biofuels research program

Total emissions by Swiss consumption (Ecological Scarcity - UBP)



- Several emissions and resource uses must be considered

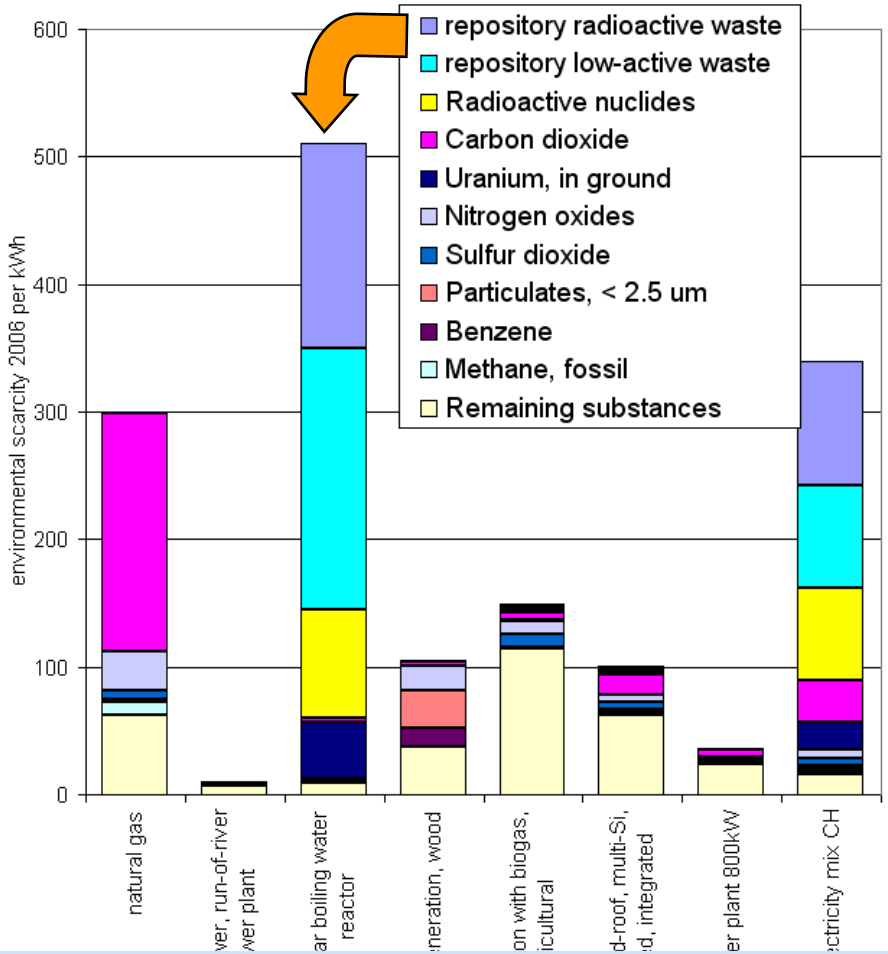
Total emissions by Swiss consumption (ReCiPe, World, endpoint (H,A))

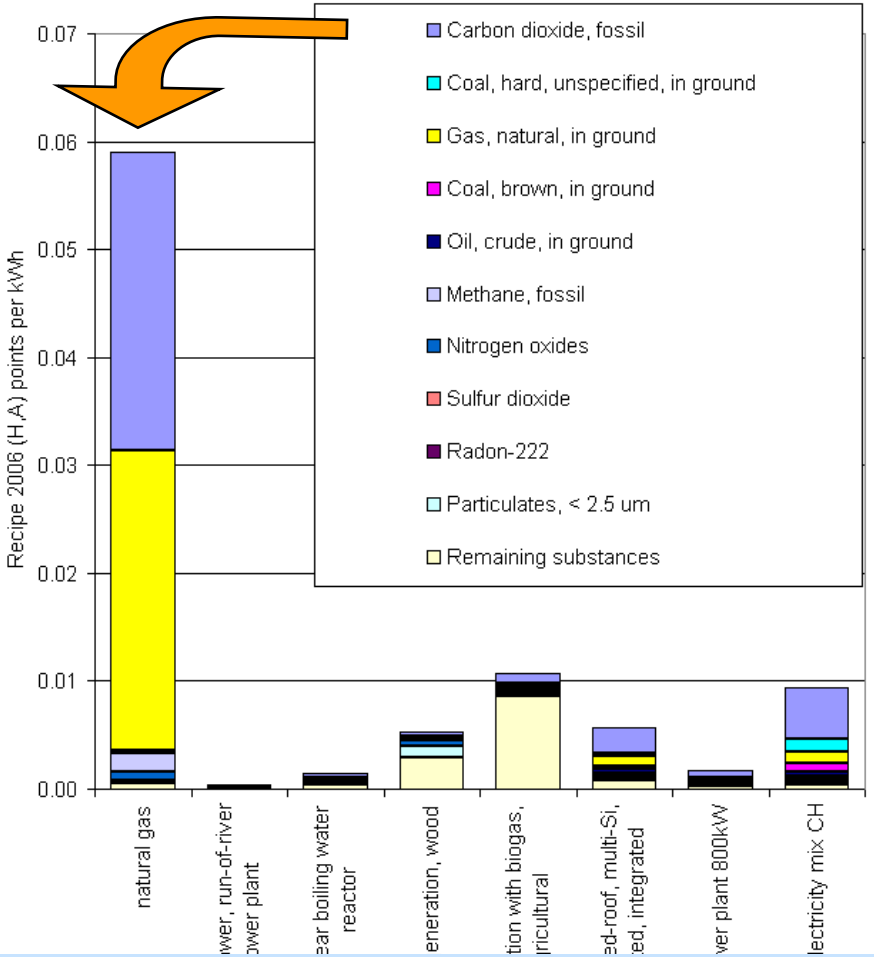


- Fossil energy and CO2 account for more than 60% of impacts

Life Cycle Impact Assessment (LCIA)

Ecological scarcity vs ReCiPe





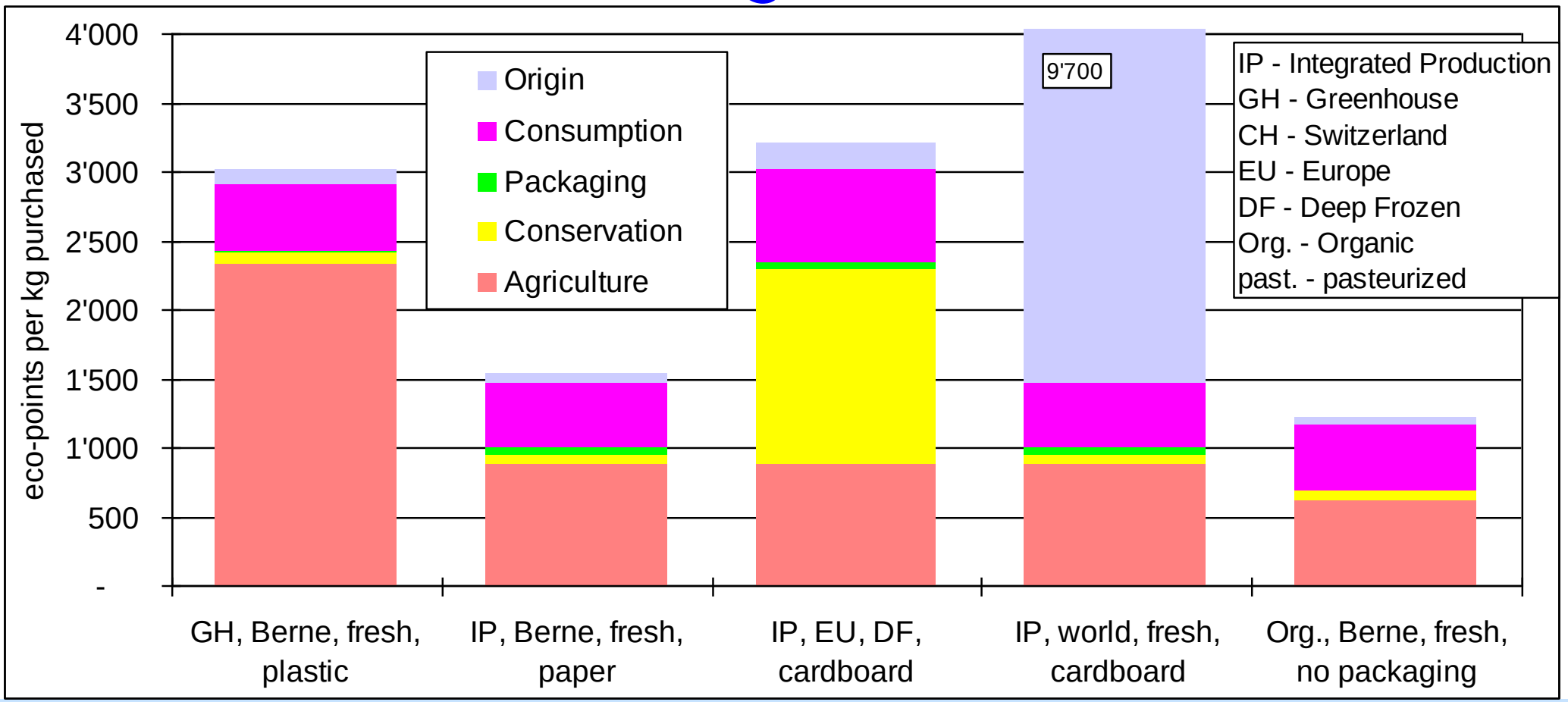
- Quite different assessment of nuclear energy

International acceptance of LCIA

- No acceptance of single score methods in the international LCA community because not allowed by ISO 14040
- Different political views in different regions and communities e.g. nuclear energy, water scarcity, resources
- Ecological scarcity concept is being used in other nations and world regions (e.g. Japan) and can be applied where quantified environmental goals are available

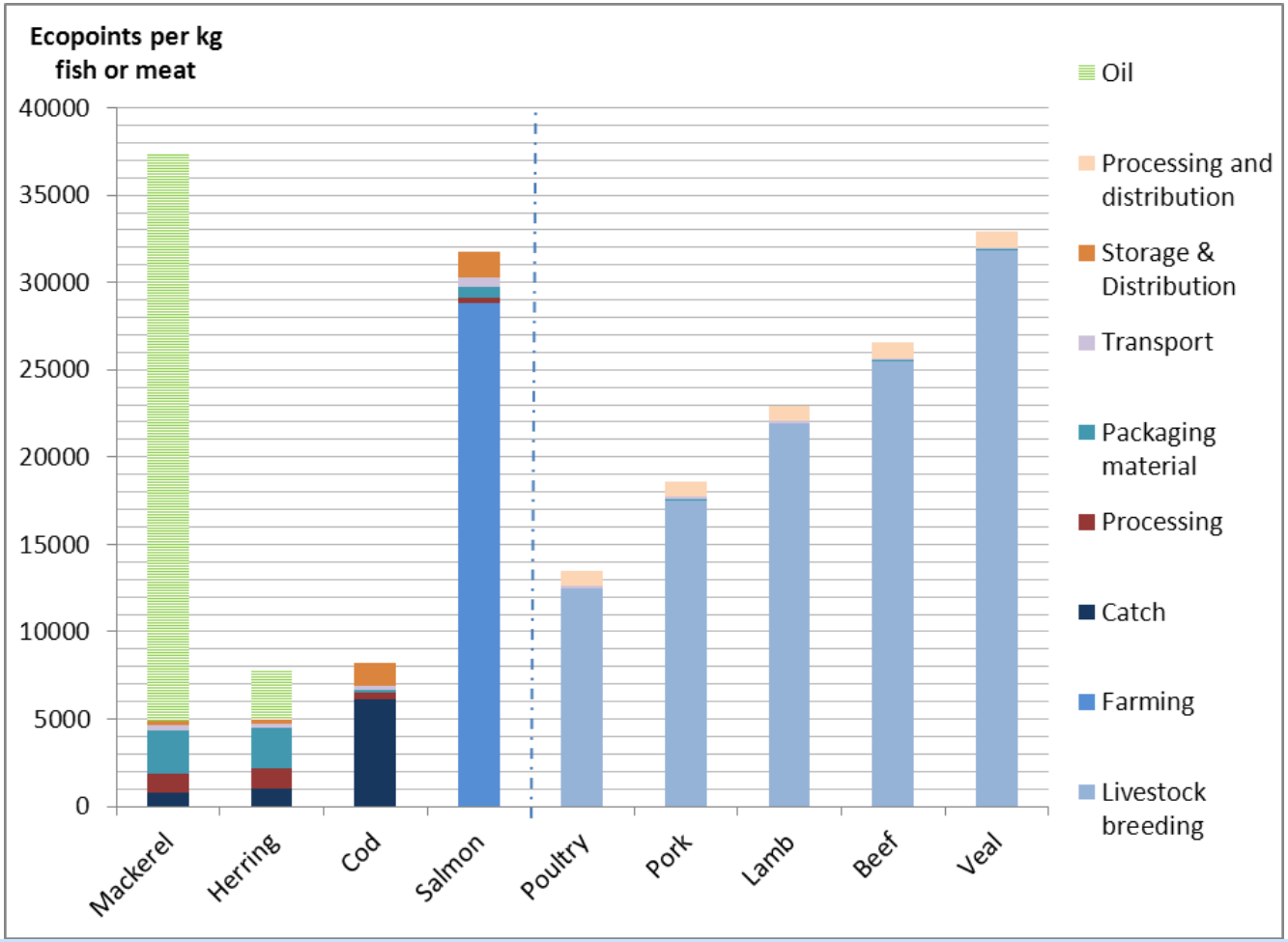
- LCIA method developed as combination of a scientific and political process
- Different priorities set by different groups of people

Combination of Product Characteristics for Vegetables



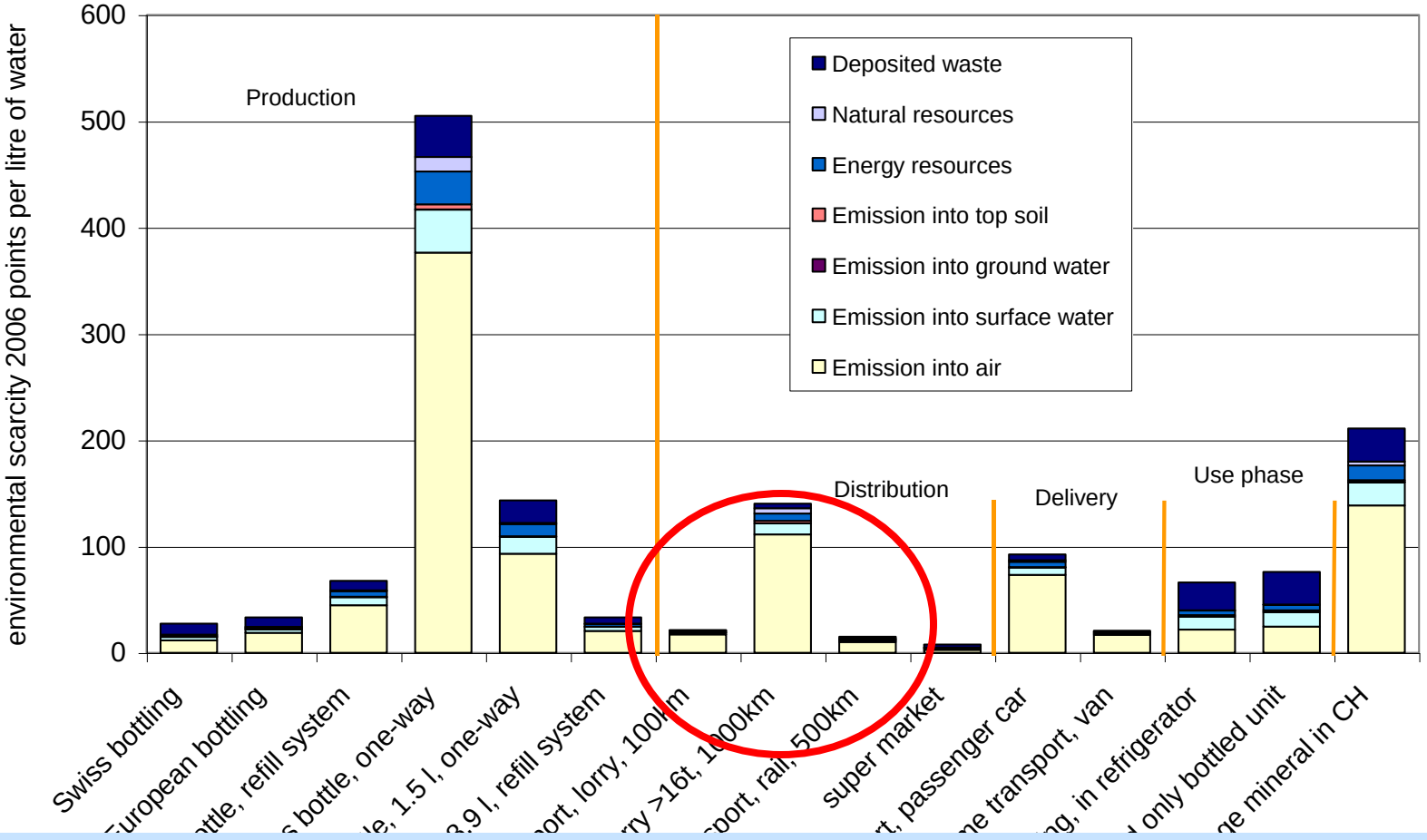
- Easy evaluation of consumption patterns

Fish or meat?



- Fish can cause as high environmental impacts as meat
- Nutrients emitted during farming can be quite important

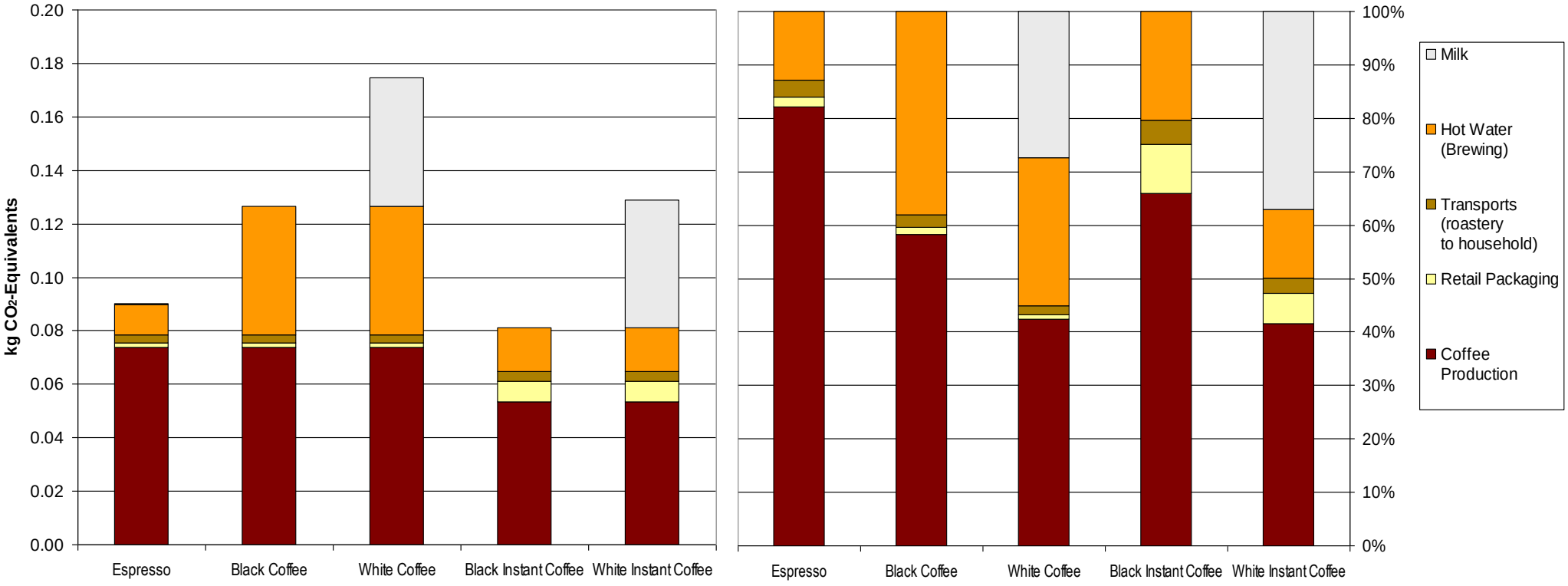
Distribution of mineral water



- Impacts of distribution vary considerably by point of sale
- Not feasible to assist comparisons without considering difference

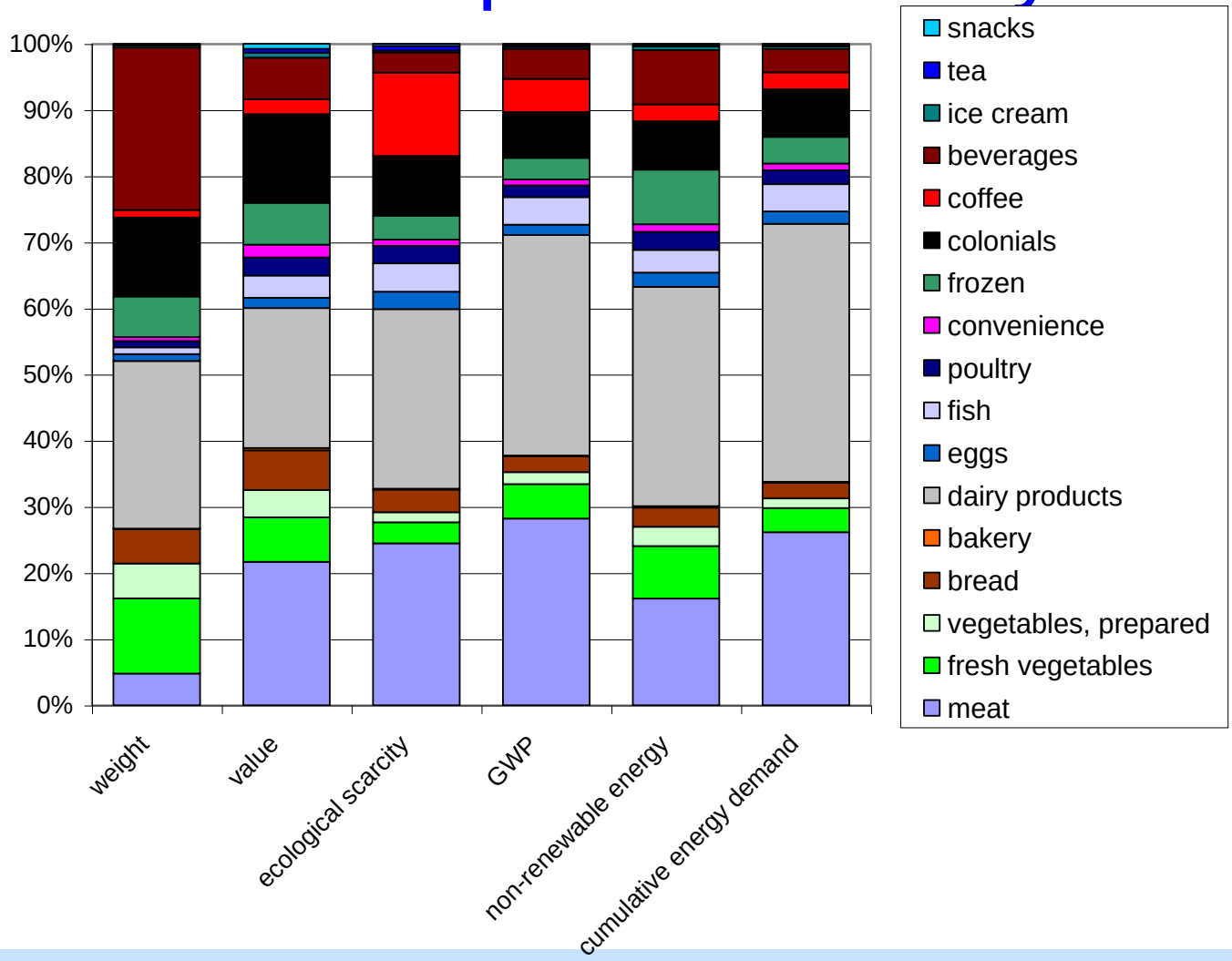
Importance of consumer decisions

Coffee consumption



- Recipe and way of preparation can be important

Indicators of food purchases City of Zurich



- Meat, milk and coffee are environmental hot spots