SUSTAINABILITY OF CONSUMPTION PATTERNS:

Historic and Future Trends for Europe

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Abstract

The EU FP7 research project "European Policies to Promote Sustainable Consumption Patterns" (EUPOPP) analyses the impacts of policy strategies and instruments on consumption patterns in order to identify which sustainable consumption policies and instruments are effective, can be improved, and be implemented successfully. A focus is on the need areas of food, and housing, i.e. the residential sector excluding transport.

The historic food consumption data showed an increase for the product groups cereals, fruits meat, and vegetables. Only for dairy products a slightly decline occurred. On the base of the historic food consumption, a trend projection of future development in all 27 European member states until 2030 was developed.

The trend projection indicates a slight overall increase of per capita consumption of food products, but was differentiated using cultural and regional context factors. Exceptions of the overall trend are per capita consumption of fruit and vegetables in Southern Europe and in the overall consumption of dairy products which all decline slightly until 2030.

Sustainability potentials were estimated in quantitative terms based on material flow analysis. The potential to reduction of greenhouse-gas emissions by changing the average EU 27 diets towards both sustainable and healthy food was identified to be in the order of 50 million tonnes of CO_2 equivalents, while in the housing sector, the total sustainable potential by 2030 was determined as approx. 700 million t of CO_2 equivalents, taking into account the full life-cycles of energy supply and use. The assessment relates to environmental and economical indicators which allow quantifying primary energy consumption, greenhouse gas emissions, resource use, costs and employment effects.

Keywords: food, housing, sustainability potential, regional consumption patterns, GHG emissions

1. Introduction

Consumption is a key lever to achieve sustainable development: unsustainable consumption patterns are major causes of global environmental deterioration, including the overexploitation of renewable resources and the overuse of non-renewable resources with associated environmental impacts. Since the resulting environmental risks tend to be unequally distributed, and due to their inherently relation with income distribution issues, consumption patterns may also be unsustainable in terms of social equity. In environmental terms, the European Environmental Agency report on ‘Household consumption and the environment’ (EEA 2005) identifies, among others, the need areas of food and housing to be the major areas of household consumption with highest negative environmental impacts. The sectors energy, transport and agriculture are identified as the sectors with the largest environmental impacts in Europe – inducing in particular greenhouse gas (GHG) emissions and air pollution, material consumption and waste generation (EEA 2005). As these impacts are also partly caused by unsustainable production patterns, it is difficult – and inadequate with regard to sustainable consumption goals – to isolate the question of consumption patters from improvements of production and design of products and services. Consumption and production are basically two sides of the same coin, and establish value chains in the economy.

With regard to historic trends, household consumption expenditure per capita in the EU-15 Member states increased approximately by one third during the last fifteen years (EEA 2005). For the future, consumption growth is expected to continue approximately at the same rate as GDP growth (2-3% annually) in the period until 2020. Technological innovations have reduced the energy and material intensity of most products. However, the increasing volumes of consumed goods can outweigh these gains: According to the PRIMES projections, energy use in the EU will grow further until 2030 unless more energy-efficient appliances and buildings are assumed to be used. Household energy consumption is the second most rapidly growing area of energy use after transport, with impacts on the use of natural resources including water, creation of waste, and degradation of biodiversity, as well as ecosystem functions.

Different consumption trends characterize the new Central and East European (CEE) Member States. The consumption expenditure is two to three times lower (expressed in Purchasing Power Parity) than in the EU-15 but has been growing fast recently.

The public opinion considers Western lifestyles with their high consumption levels as an expression of quality of life. Therefore, a significant increase in household consumption is expected in the near future (OECD 2008).

The aim of the EUPOPP ("European Policies to Promote Sustainable Consumption Patterns") project, an EU FP7 research approach, is to explore to which extent SC policies and respective instruments could enhance sustainability in Europe in the two need areas "food" and "housing". For that, first the historic consumption and production trends with sustainability relevance in the EU-27 were researched and compiled. Second, the future potentials of sustainable consumption were identified and quantified on the basis of previous studies.

Both analyses cover households' consumption of energy regarding electricity and heat, and include consumption of food for indicator products such as fruit, meat, etc. and their per-capita consumption. The production mixes for electricity and heat were analyzed including technological developments for household appliances production processes concerning food. The results of the historic trends for the 27 countries are presented in aggregated form using cluster methodology. The sustainability potentials in the need areas by 2030 were analyzed only for the EU 27 total, but the database allows also disaggregation to country clusters and individual Member State levels.

The following paper discusses first results due to the state of the project. Further calculation and modelling will take place in upcoming work steps.

2. Trends and Strategies for Food and Housing

2.1. Cluster Identification

The EU 27 is a very diverse area with significant differences between Member States. To allow for identification of regionally-specific patterns in consumption and production, an aggregation scheme was applied for trend analysis and future trend projections. The cluster scheme based on comparative price levels, due to the fact that price levels were best suited to represent regionally homogenous aggregates. This results in a definition of four regional clusters, as shown in Table 1.

Table 1: Defined Regional Cluster regarding comparative price levels

Cluster	Cluster detailed
Cluster I	Denmark, Finland, Ireland, Sweden
Cluster II	Austria, Belgium, Luxembourg, France, Netherlands, UK, Germany
Cluster III	Cyprus, Greece, Italy, Malta, Slovenia, Portugal, Spain
Cluster IV	Bulgaria, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovakia

2.2. Population

The developments of population, household size and number of households are important factors in determining consumption levels. The average household size in the EU 27 is declining, from 2.6 capita per household in 1995 to a projected average of 1.9 capita per household by 2030 (PRIMES 2009).

2.3. Consumption Trends for Food

For the purpose of EU-regulation food law (EC No178/2002), food means “any substance or product, whether processed, partially processed or unprocessed, intended to be, or reasonably expected to be ingested by humans. Food includes drink, chewing gum and any substance, including water, intentionally incorporated into the food during its manufacture, preparation or treatment.” The selection of relevant products based on an analysis of their specific consumption quantities. They reflect the current food products on the market and their obligatory properties. The following table illustrates the main product groups and related disaggregated products.

Table 2: Defined Product Groups

Product Group	Defined Products
fruits	apples, bananas, grapes, lemon, oranges/mandarine
vegetables	tomatoes, nuts, onions, potatoes
vegetables oil	olive oil, sunflowerseed oil, soyabean oil
cereals	rice, maize, wheat, rye
sugar	sugar refined
beverages	beer, coffee, wine
meat	bovine, pork, poultry
dairy	butter, cheese, cream, eggs, milk
fish	freshwater fish, non-predatory freshwater fishes, diadromous fishes, crustaceans, marine fishes, molluscs

In addition to consumption quantities further data were relevant for the determination of disaggregated food products:

- production price per kg
- consumption price per kg
- kg CO_2 equivalents per kg product
- trade quantities to get an overview on trade relations

The historic total food consumption data showed an increase for nearly all product groups, only dairy products slightly lost importance with a slow decline except in the South cluster.

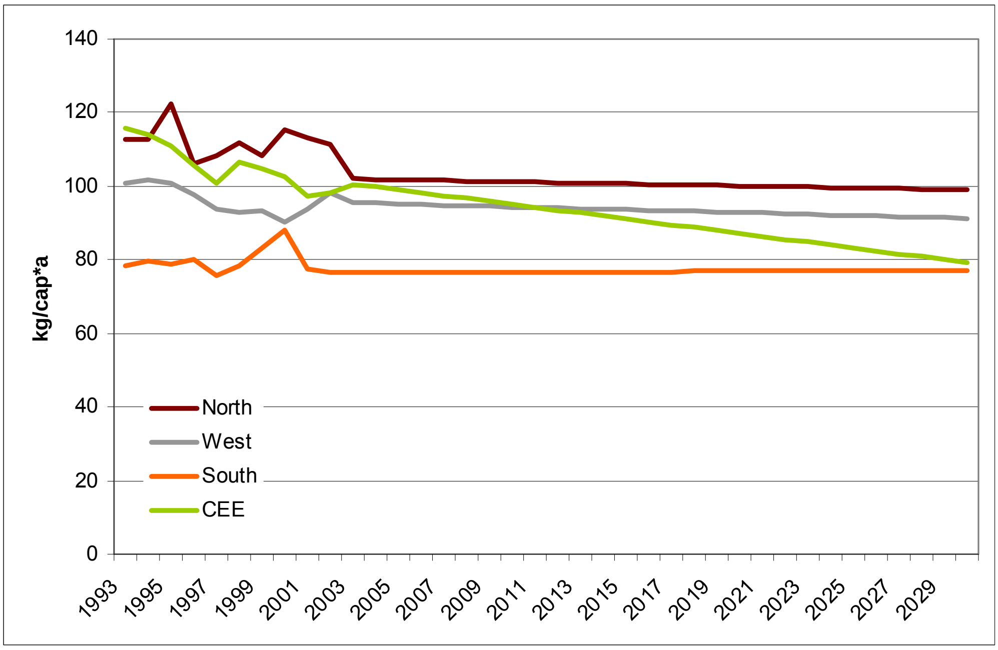

Figure 1: Historic and Future Consumption of Dairy Products within defined Cluster

While growth rates for meat are about the same for the West and South clusters (even though they come from different staring points), the North cluster grows slightly but steady from a low level, while the CEE cluster levels off since the 1970ies.

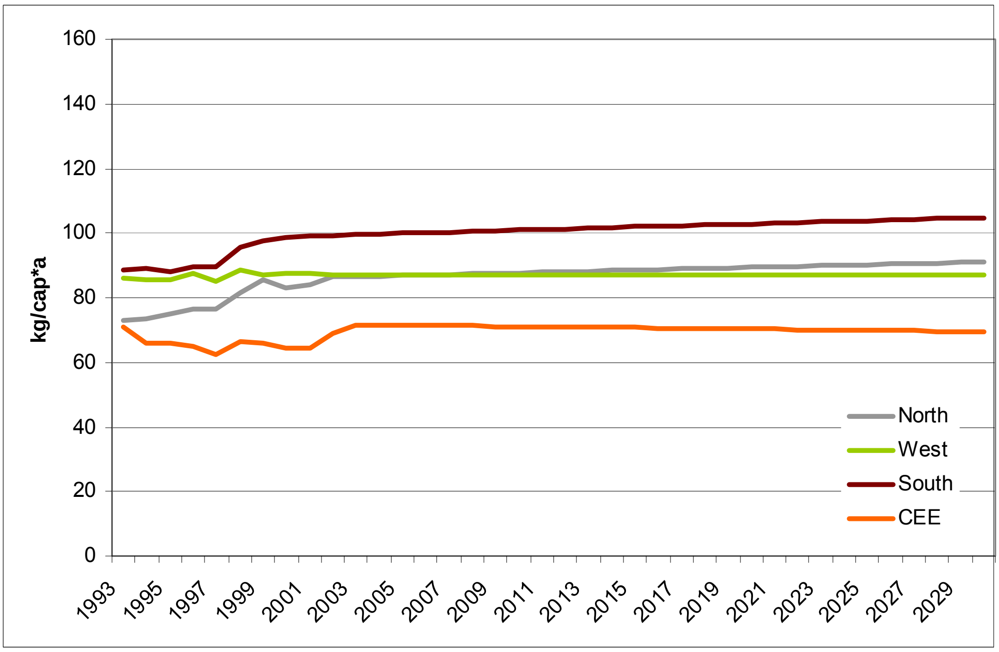

Figure 2: Historic and Future Consumption of Meat Products within defined Cluster

Vegetable consumption varies far more than meat, except for the North cluster which shows a slight and stable incline from a relatively low level. The West and South clusters are developing closely while on a different level. Cereal consumption in the South and CEE clusters appears almost to be at equilibrium, much as the North cluster (but on a lower level). In the mid-1990ies, consumption in the West cluster gains moderate to steep. Regarding fruit consumption, all four clusters can be easily separated: the North cluster following its low level, slightly rising trend, while the CEE cluster follows less steady from a higher starting point. Consumption in the South cluster is rising slightly to moderately with a few recent peaks, similar to those in the West cluster which again has the highest absolute level. As an overall trend, dairy products are losing importance. Starting from a high level, the West cluster shows the steepest downward trend, whereas the South and CEE clusters are comparatively stable in the last years. In the North cluster, a slow decline occurs.

The future trend projection was calculated from the per capita consumption of the product groups. As the purely mathematical continuation of the historic trends is not a valid approach for the longer-term, the calculated trends were corrected to a second approximation by applying a "dampening logic" which reflects future saturation. The per-capita meat consumption is on a slight and stable upwards trend, only the CEE cluster moves towards small reductions in per capita consumption. Vegetable consumption tends to decline slightly in the South and CEE clusters, while a slight growth is apparent for the North and West clusters. For the cereals product group, the South and CEE clusters move towards equilibrium, while in the North and West clusters, small gains occur until 2030. Note that supplied data only focuses on domestic cereal consumption, i.e. mostly for food purposes. Per-capita fruit consumption rises in the North and lowers in the South cluster, with the latter from a much higher starting point. The West and CEE trends are comparatively stable, but on a lower level. For dairy product consumption, most obvious is the low to moderate decline in all clusters, though with an uneven pattern. The CEE cluster has the steepest loss within that aggregation. A modified trend for the North cluster has been used, based on the comments provided so that dairy products will not decline.

2.4. Energy Consumption Trends of Housing

The consumption of electricity and other energy carriers is the key indicator for future trends in housing. In a bottom-up analysis the overall saturation for residential electric appliances levels regarding the number of appliances per household and the respective consumption per appliance (specific electricity use) were determined. With the latter having a rather small regional variation, the key trend issue is the saturation level which is defined as the percentage of households having one of the appliance or energy-using system[1]. It is an average representing the overall number of appliances in a given year, divided by the number of households in that year. Therefore, the number of households influences overall consumption.

Data for the fully disaggregated EU-27 is not completely developed due to the comparatively recent integration of new Member States, so that for countries in the CEE cluster, data gaps were filled with proxy values based on own estimates. The estimates are derived from countries in the same cluster. A key data source for energy trends in the EU is the so-called PRIMES model developed by the E3M-Lab of the Institute of Communication and Computer Systems of the National Technical University of Athens (ICCS-NTUA) which is used since several years by the European Commission's DG TREN to develop energy scenarios for the Community (Manzos 2003; PRIMES 2006)[2].

Electric water heaters include electric instantaneous and electric storage water heaters for primary (>12kW) and secondary usage (<12kW). In Europe, the average hot water consumption is 25 liters per person per day (l/pp/d) and is assumed to grow until 2030 because of increasing comfort levels. Key reasons for this rising trend are:

- more and longer showers (younger Europeans tend to shower more)
- greater capacity of water heaters increase the hot water flow rate
- saturation of the household equipment (especially in CEE)

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[1] If all households would have two appliances, the saturation level would be 200%, and if only half of the households have one appliance, the saturation level would be 50%.

[2] At the time of the analysis reported here, the results of the updated PRIMES reference scenario were not available yet. They are expected to be published in late 2010.

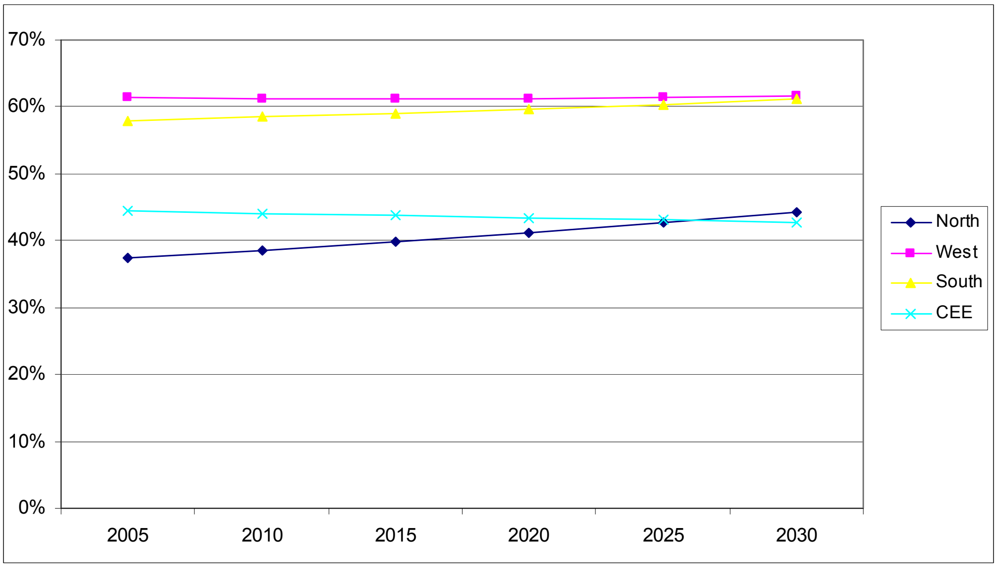

Figure 3: Future Trends in Household Saturation Levels of Electric Hot Water in EU Regional Clusters

The trend projection for electric refrigeration assumes as realistic a saturation level above 100%. If there is enough floor space in the households, old refrigerators continue to operate in cellars or elsewhere. In a survey, (ISIS 2007, p. 262) households where asked if there is a second refrigerator in operation in the household, around 21% answered with “yes”. As can be seen from that, the high levels in both the North and South clusters will very slightly increase further, while in the CEE clusters, a more prominent rise in saturation is projected until 2030. The West cluster will decline slightly[3].

[3] The trend is calculated by the estimated stock development of the Faberi (2007) and the allocation between the countries from PRIMES.

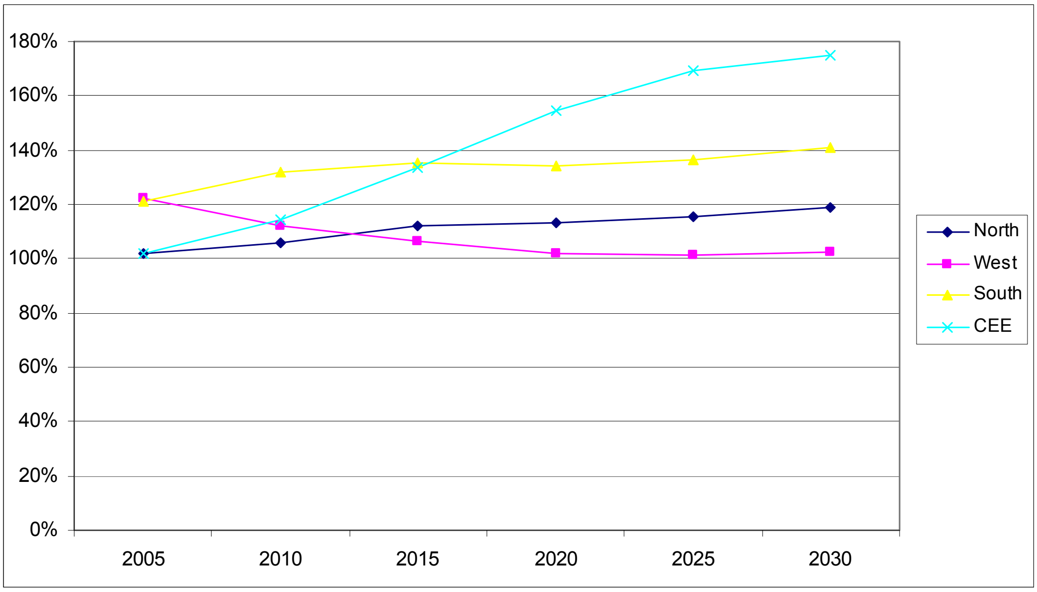

Figure 4: Future Trends in Household Saturation Levels of Freezers in EU Regional Clusters

The dish washer saturation will continue to rise overall in the EU, but especially in the South and CEE clusters. The 65-70% level of the other clusters will not be reached by the CEE cluster, though[4]. For Spain, Finland, France; Italy, Latvia, Luxemburg, Malta and Poland, stock data was used, which can be found on the website of the national statistical offices and gives a more correct value like PRIMES.

As to washing machines, the trend projection indicates saturation levels of 90-100% by 2030 for nearly all clusters. The low saturation level and very slight increase for the north cluster is due to common laundry facilities in apartment blocks. For Austria, Germany, Denmark, Spain, Finland, Hungary, Ireland, Italy, Lithuania, Luxemburg, and UK, stock data was used, which can be found on the website of the national statistical offices and gives a more correct value like PRIMES. The trend for CEE seems to be a bit overstating, but no other sources were given.

[4] The trend is calculated with a logarithmic extrapolation from the historical data in PRIMES.

The saturation of clothes dryer equipment in the trend projection will also rise from the current low levels to 20-40% by 2030, with the North and West clusters leading, and the South and especially CEE clusters following suit[5].

The South cluster tends to level off, as this region is more prone to “natural” clothes drying. Therefore, the saturation level does not rise furthermore and stay below 45%. For Austria, Germany, Denmark, Spain, Ireland, and the UK, stock data was used which can be found on the website of the national statistical offices. These data give better values than PRIMES.

2.5 Trend Projections for Heating and Cooking

The trend projections for heating and cooking[6] do not build on saturation levels, as these services are available to every EU household, but on the consumption levels of the respective buildings, and the heated floor space per household.

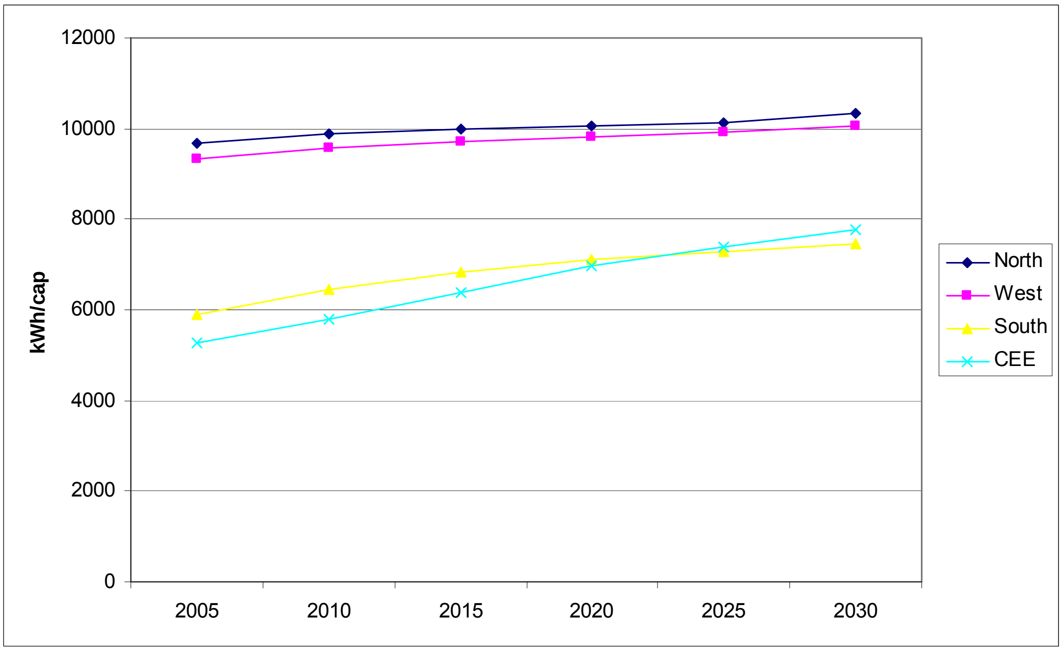

Figure 5: Future Trends in Heating and Cooking Demands in the EU Regional Clusters

[5] The trend is calculated by the estimated stock development in Lefèvre (2008) and the allocation between the countries from PRIMES.

[6] Due to restrictions in EU-wide data availability, trends for heating and cooking could not be separated. In the Annex, data is given for cooking energy trends, though.

2.6 Regional Differentiation of Trends

The availability of information and future trend projections on energy and food is not equal. Concerning energy household consumption, there is more information on energy future trends than concerning food consumption. It is related to the fact that there is a general political consensus on the importance of energy consumption and its environmental impacts. Furthermore, there are models such as PRIMES that elaborate on future trends, and the assumptions on drivers used to define future energy consumption trends are comparatively well-known (i.e. population grow), or widely agreed as overall assumptions (e.g., economic development, energy prices…).

In the case of food, there is no general awareness of food consumption and environmental impacts, and there is less political support for sustainable food than for sustainable energy. Moreover, assumptions to elaborate future trends on food consumption are closely related to social structures. Social issues such as migration, women labour force participation, food prices or country diets are elements that can modify the food consumption future trend. But unlike energy future trends, quantitative values for these assumptions are not enough, it is needed to know the qualitative details to define food consumption in the future (i.e. migration flows: the origins of the migrant are important for the food consumption, and respective dietary preferences).

3. Sustainability Potentials for Food and Housing

Sustainable food is defined in few studies (e.g. Duchin 2004, Wiegmann et al. 2005, UNEP 2010), and no concluding definition has been achieved yet. Within the project, a first estimate for the EU 27 was derived from highly aggregated trend data illustrated before, and aggregated greenhouse-gas emission factors for food. Different studies (e.g. Jungbluth et al. 2000, Eberle et al. 2006, Eder/Delgado 2008) identify meat consumption as a powerful driver impacting food sustainability. Organic share of agriculture, a shift towards dining-out and the share of convenience products have also been acknowledged to hold some potential. Unfortunately, data for dining-out and convenience product trends were too inconsistent and not available for all Member States. Therefore, no “real” future trend projections could be established. In conclusion, only the organic farming share and a reduction of meat consumption hold sustainability potential for the demand-side of food.

Based on this trend and the estimate of an average 35% share of organic farming as an upper limit within the EU 27 by 2030 (based on Eberle et al. 2006), there is no additional potential for increasing the organic farming share.

The little information available concerning GHG emissions associated with organic farming throughout the EU 27 complicates the compilation of any sustainability potential, loading it with uncertainties. Therefore, no GHG reduction potential for increased organic share can be assumed.

3.1 Reduction of Meat as a Sustainability Driver

Due to the production systems for meat, a high GHG relevance is immanent, as one kilogram of meat output does not equal the input of one kilogram of feed, but seven (Federal Ministry of Health and Women 2003). On top of that, methane emissions (especially for beef) during animals' life play their part in making meat a highly climate relevant figure (UNFCCC 2005). A change in the average EU diet, i.e. a shift away from meat, offers potential for sustainability. While meat is comparatively easy to replace either with cereals or vegetables, it is harder for dairy products. Absolute numbers illustrate a stronger interest in meat consumption than in dairy products, which is underlined by the future trends in per capita numbers and assumptions drawn from the so called Mediterranean Diet style[7]. This diet is, according to ECOI (2009), defined by the following product group components:

- high monounsaturated-to-saturated fat ratio (result of high olive oil consumption)
- moderate ethanol consumption (wine is consumed regularly in the meals as a habit, except in Southern Mediterranean countries)
- high consumption of legumes
- high consumption of cereals (including bread)
- high consumption of fruits
- high consumption of vegetables
- low consumption of meat and meat products

On top of that, shifting away from meat does not imply land use change, since feed can be fed straight to people. Assuming a health aware diet style such as the Mediterranean, with a tendency towards vegetables, fruits and cereals, and less meat and high-fat dairy products, a reduction in food-related GHG emissions could occur so that this is called sustainable diet style in the following. The crucial factor regarding meat consumption is the preferred "meat

[7] The Mediterranean diet, traditionally with low intake of animal fats and animal protein and a high consumption of olive oil is one of the healthiest diets to prevent cholesterol and heart diseases (ECOI 2009).

mix", which differs throughout the clusters and generates different future trends. Reducing meat consumption means shifting towards a diet with more other food products but maintaining the protein contents of the diet. According to nutrition studies (e.g. DGE 2000, NAS 2009), reduced meat consumption results in an average increase of 25% of other food product consumption to balance the protein requirements. The sustainability potential is estimated as a 27% reduction of meat consumption by 2030 (compared to the trend) and a corresponding shift to other food product groups (at 25% more consumption) in order to substitute the missing protein intake. Per capita numbers are transferred into absolute numbers per country cluster and in conclusion to an EU 27 value to compute average GHG emissions.

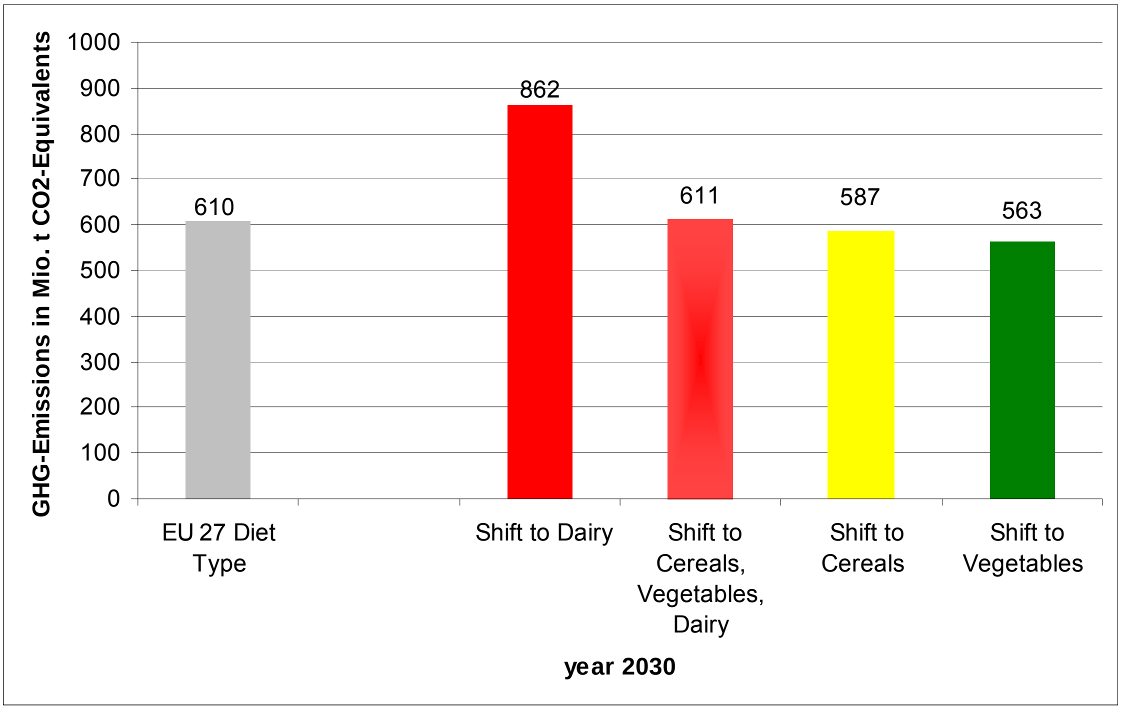

Figure 6: GHG Emissions from Future Trend of EU 27 Diet and Potential Shifts until 2030

Source: own compilation; grey= EU 27 trend diet; dark red = diet shift from meat towards dairy products; light read = diet shift from meat towards cereals, vegetables and dairy products (empiric mix); yellow = shift from meat towards cereals; green = shift from meat towards vegetables

The GHG emissions from the EU 27 future trend diet is shown in the first bar. Shifting opportunities offer a range from worst (shift towards dairy products) to best case (shift towards vegetables). A shift from meat to dairy products would increase GHG emissions, so this offers no reduction potential. An empiric[8] shift – as illustrated by the third bar – would also not yield net GHG emission reductions. A shift to cereals would offer a reduction potential of about 23 million t CO_2-eq. The best case would be a shift from meat towards vegetables which would result in a reduction of 47 million t CO_2-eq. Shifting EU diet styles away from meat and towards vegetables (and or cereals), and not to dairy products, may not be an easy-to-implement policy, but the estimated overall potential is significant.

3.2 Sustainability Potential for Appliances

For the need area "housing", two sustainability potentials were analysed based on the trend projections for household appliances (electricity consumption), and heating energy demands. It was assumed that best available technology (BAT) would be fully applied by the year 2030, given logistical restriction and stock exchange rates. The respective savings in electricity and end-energy were used to derive the respective potentials for GHG reduction in terms of CO_2 equivalents, taking into account the full life-cycles of the energy provision. Based on the trend projections for household appliances (saturation, specific consumption), the trend electricity demand was determined and compared to the demand which would occur if all appliances in 2030 would use BAT. The difference is the potential electricity savings from BAT, representing approx. 300 TWh of avoided electricity generation in the EU 27 in 2030.
Using the EU 27 GHG emission factor for electricity in 2030 (OEKO 2009), this represents a potential GHG emission reduction of 120 million t of CO_2-eq per year.

3.3 Sustainability Potential for Heating

To define the sustainability potential for buildings and heating, an estimate was derived from various statistics and studies[9] for the future trend in new buildings, their energy characteristics, the potential for savings from retrofits in existing building stocks, and the respective annual rates of retrofitting.

For the future trend, it was assumed that new dwellings are built using current energy standards, and that from 2020 onwards, all new buildings are passive houses. Existing buildings are assumed to be retrofitted at an annual rate of 0.5%, and a reduction of 25% of their heat energy demand[10].

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[8] Based on Ungemach (2004), which replaces the shift away from meat to 50% cereals, 40% vegetables and 10% dairy products (a typical omnivorous mixture).

[9] See CEC (2008), JRC-IPTS (2008), Osso (2007) and Prognos (2009).

[10] See Brockmann/Siepe (2009), CEC (2008) and JRC-IPTS (2008).

In the BAT case, it is postulated that new houses can achieve 50% of the current energy standards, and for existing houses, an annual retrofit rate of 2% and a specific reduction rate of 50% is assumed.

From that, the sustainability potential for heating was derived as approx. 280 TWh of end-energy (e.g. natural gas, heating oil etc.), which represents approx. 300 million t of CO_2-eq. per year if – conservatively assumed – gas heating is reduced.

Furthermore, the choice of heating systems – once the building energy efficiency is given – offers another option to reduce GHG emissions by changing from fossil fuels to solar and biomass heat.

Here, the assumption was made that up to 2030, a 35% additional share (compared to the trend) of wood pellet heating and solar thermal hot water would be used.

This would – again conservatively assumed[11] – reduce GHG emissions from natural gas heating by approx. 270 million t of CO_2-eq per year.

3.4 Results for the Sustainability Potential for Housing

The sustainability potential for the EU 27 up to the year 2030 in the need area of housing (i.e. appliances, buildings, heating) would give a total GHG emission reduction of approx. 700 million t of CO_2-eq. per year.

4. Discussion

Several studies in the recent years have been compiled with respect to environmental impacts on consumption (e.g. Tukker 2006, 2010, Weidema 2008, OECD 2008). In spite of different methods the results showed the largest proportion of impacts in the domains food, home building and demolition, mobility and appliances. In comparison with EUPOPP results the studies account similar for 70% to 80% of the impacts in industrialised countries.

Household consumption regarding food and housing include reduction and saving potentials, nevertheless the potential has to be mobilized by making consumption patterns more sustainable. Munasinghe 2010 support the thesis, that a full life cycle analysis to re-examine the entire value chain will help to identify weak areas. In spite of the responsibility of consumers concerning nutrition, also producers can and must strive to make development more sustainable (Munasinghe 2010). Furthermore it will be projected a significantly increase by environmental pressure from households by 2030. Therefore the economic

[11] Life-cycle emissions from pellet heating and solar hot water were included based on data from OEKO (2009).

growth of countries will be key determinants of household consumption, as well as urbanisation and changing lifestyles or ageing of the population (OECD 2008). The question will be how do households respond to a variety of instruments regarding using the saving potentials?

5. Conclusions and Outlook

The availability of (regionalised) data and future trend projections on energy and food is not equal. Concerning energy household consumption, there is more information on energy future trends than for food consumption. This is due to the fact that polities – so far – give a comparatively high importance to energy consumption and its environmental impacts, and there are models such as PRIMES that elaborate future trends. The data background and assumptions on drivers used to define future energy consumption trends are comparatively well-known (i.e. population grow), or widely agreed as overall assumptions (e.g., economic development, energy prices etc.).

In the case of food, though, awareness on the importance of food consumption and its environmental impacts is still low, and less political attention is given to sustainable food than to sustainable energy.

Moreover, assumptions to elaborate future trends on food consumption are closely related to social structures. Social dynamics such as migration or country diets are elements that can modify the food consumption future trend. But unlike for future energy trends, quantitative values for these assumptions are not enough, it is needed to know the qualitative details to define food consumption in the future (i.e. social preferences on diets).

Regarding information on drivers, the main difficulty to create a consistent EU picture on specific drivers is the broad diversity of the official public institutional sources. Lastly, for some clusters there is more information than for others so that consistent qualitative regional differentiation and characterisations can be derived only with significant error margins.

The EUPOPP project will work on those data uncertainties, taking into account further research from the EU Joint Research Centers, the European Roundtable on Sustainable Food, and other sources to derive a reference scenario for food in the EU-27 until 2030, and will contrast this with SC scenarios.

The sustainability potentials in the need areas of food and housing are based on the base year, and it must be noted that they could become smaller in the future, as they will be - at least partially - realised in the BAU scenario.

The “real” impact potential of SC policies will be even lower, as it is not only determined in comparison to BAU, but also will need time to be implemented, and a 2030 time horizon is not long enough to realise e.g. the total potential of building efficiency.

Furthermore, the BAU scenario will also include supply-side changes (e.g. decarbonization of electricity) which lead to lowe impacts in the future (e.g. year 2030 as reference instead of the base year).
Therefore, sustainability impacts of SC policies and instruments can be derived consistently only if an adequate BAU scenario is used as a reference. For the analysis of potentials, a base year as the reference is adequate, but to evaluate the impacts of future SC policies and instruments, both the demand and supply side dynamics of the BAU development must be factored in to avoid overestimation.
Thus, the EUPOPP work on scenarios is a key step in the further project work.

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