PATHWAYS project
Exploring transition pathways to sustainable, low carbon societies
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Deliverable 2.2: ‘Analysis of stability and tensions in incumbent socio-technical regimes’

Country report 9: Regime analysis of the Hungarian food system

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Preface

This report is produced in the context of work package 2 (‘Dynamics of transition pathways’) of the FP-7 funded PATHWAYS project (‘Exploring transition pathways to sustainable, low carbon societies’). More precisely, this report provides the HU country study of the food regime for deliverable 2.2. (‘Analysis of stability and tensions in incumbent socio-technical regimes’).

The analysis in this report is based on a research template that is shared between the different contributors to WP2 to enable comparative analysis of findings between countries (UK, Netherlands, Sweden, Portugal, Germany, and Hungary) and empirical domains (electricity, heat, mobility, agro-food and land-use).
Executive summary
This report analyses the stability and tensions in incumbent socio-technical regimes within the Hungarian agro-food domain. Three distinct relatively stable sub-systems or regimes within the agro-food sector have been identified as being the most polluting ones with the highest environmental impact, and also most embedded in global food system: beef, pork and retail regimes. Their pathway is remarkable also because contrary to the EU tendencies they faced development (in beef), contraction (in pig) and stagnation (in retail) in recent decade. Finally the political salience of these agro-food regimes is the highest although their economic significance has remarkably diminished.

As a main conclusion the analysis contends that the tensions within the regimes are not strong enough to ignite radical change, therefore they will lead to adaptation of the regimes. Path-dependencies in the regimes create lock-ins, which cannot be easily changed. Being the most important pressure on the regimes economic tensions started to increase after the crisis in 2009. The financial crisis drastically decreased demand of price-sensitive consumers, and also ignited austerity policies that exploited resources for the agro-food transitions. The analysis also points out that socio-technological innovations gradually push agro-food domain to decrease their impact on biodiversity or GHG emissions.

Any progress is expected to be part of a stepwise and planned process (or accelerated environmentally friendly improvements) within existing regimes. Furthermore, behavioural change and capability to act on the consumers’ side would be an important prerequisite of any incremental change and mitigation of environmental impacts. Some cracks appeared in all regimes and created windows of opportunity for well positioned actors. Still, radical innovation is not to be expected within the agro-food sector.

The main manifestation of landscape pressure in each regime is price squeeze, competition and struggles for economic survival. Actors in beef, pork and retail regimes use different strategies to protect their own innovative niche against predominant market forces. A few actors including a few policymakers build coalitions and perform a protective role for niches to consolidate. Still, these learning processes towards sustainability transitions are relatively weak in the agri-food domain.

Table 1 Overall assessment of agro-food regimes

<table>
<thead>
<tr>
<th>Regimes</th>
<th>Lock-in, stabilising forces</th>
<th>Cracks, tensions, problems and opportunities</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>PORK</strong></td>
<td>STRONG</td>
<td>STRONG</td>
</tr>
<tr>
<td></td>
<td>Very stable market with hegemonic players involved. The production system is locked in through trade-offs between feed-related emissions, manure management, resource efficiency and energy use.</td>
<td></td>
</tr>
<tr>
<td><strong>BEEF</strong></td>
<td>STRONG</td>
<td>WEAK</td>
</tr>
<tr>
<td></td>
<td>Stabilized regime that enjoys continuous policy support. Concerns about economic viability.</td>
<td></td>
</tr>
<tr>
<td><strong>RETAIL</strong></td>
<td>STRONG</td>
<td>WEAK</td>
</tr>
<tr>
<td></td>
<td>Fierce competition in the basic product categories. Large retailers buying power dominates the regime.</td>
<td></td>
</tr>
</tbody>
</table>
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1. Introduction

1.1. Context, goals and research questions:
This report aims to analyse the degrees of stability and tension in the incumbent HU agro-food regime. This regime analysis is an important step in the broader analysis of transition dynamics using the multi-level perspective (MLP). The MLP suggests that transitions come about through interactions between processes at different levels:
1) niche-innovations gradually build up internal momentum (through positive interactions between learning processes, vision articulation, and social network building),
2) exogenous changes (at the so-called ‘landscape level’) create pressures on the regime,
3) destabilization of the regime (cracks and tensions) creates windows of opportunity for wider diffusion of niche-innovations.

The first step has been analysed in deliverable 2.1 of the PATHWAYS project. In deliverable 2.1 the Hungarian niche innovations under study were:
- Organic agriculture
- Vegetarianism/lowering meat consumption
- Localized food chains/regional food production
- Community supported agriculture

Step 2 and 3 will be analysed in this report for the HU agro-food domain. The research questions are:
1) What are the main external landscape developments that affect the HU agro-food regime?
2) Do external pressures and internal problems lead to tensions and destabilisation of the HU agro-food regime? Or is the regime still fairly stable, with (most) actors focusing on incremental change?

The goal of deliverable 2.2 is to asses if, and to what degree, existing regimes are still stable and locked-in, and where (if at all) tensions are emerging. The research question is: To what extent are existing regimes hindering niche innovations to gain momentum? The subsystems under study in this deliverable will be: pork - beef - food retail.

1.2. Analytical framework
Work package 2 uses a socio-technical framework, which makes a distinction between:
- **Socio-technical system**, which refers to the configuration of elements necessary for the achievement of a societal function (such as mobility, heating, sustenance/food and light/power); these elements may include technical artefacts, production facilities, supply chains, infrastructure, markets, consumption patterns, repair facilities, public debates, formal policies.
- **Socio-technical regime**, which refers to the cognitive, normative and regulative institutions (Scott, 1995) that shape the actions, interpretations, and identities of the actors that reproduce elements of the socio-technical system. These actors include: firms, consumers, policymakers, civil society actors, wider publics, scientists.
Although socio-technical system, socio-technical regime and actors are obviously related, it is useful to analytically separate them because they refer to different dimensions of reality and methods. Socio-technical systems refer to relatively ‘tangible’ or ‘objective’ elements that can often be measured quantitatively (e.g. technical performance, price, and market demand). The analysis of socio-technical regimes and actors is often more ‘intangible’ and ‘qualitative’, referring to beliefs, motivations, strategies, alliances, goals, norms that underlie concrete actions. For the analysis of stability and tensions, we will look both at:

- ‘objective’ system developments, e.g. longitudinal market shares, techno-economic performance problems
- qualitative developments in regime and actor perceptions and commitments (e.g. belief in continued viability, confidence, will to defend and improve).

1.3. Characterization of agro-food system and project focus

The agro-food system forms one large, integrated socio-technical system which organises food provision. It is an integrated system, because production and consumption, supply and demand needs to meet and be balanced. Figure 1 presents a schematic socio-technical representation of the agri-food system.

![Figure 1: Schematic representation of the food system. Source: Sage p 31.](image)

In the current food system different functions of production, distribution, and consumption are sharply separated via the supply system. Changes in the practices and dynamics of relatively independent regimes of food production, retail, and consumption can happen without any direct involvement of other constituencies. Niches seek their survival in multiple forms and make an impact on the institutional level by bending the rules in several regimes. In this way the agro-
The food system is comprised of dozens of distinct regimes (existing patterns of provisioning). Some are discriminated as product-specific food commodity chains (dairy, meat, etc.) and consist of suppliers (of seeds, machines, feed, semen), primary producers (farmers), food processors/manufacturers, wholesale, retail (supermarkets), various consumer groups. Retail has a dominant role in the chain and can be considered as a separate regime of the agro-food sector. In this report we made a distinction between production and consumption practices and focused on separate developments in the pork, beef and retail regimes.

1.4. Data-sources
The research was empirically challenging, as it addresses multiple (techno-economic, socio-cognitive, and political) dimensions for identifying destabilisation and internal tensions. Quantitative information for ‘tangible’ system elements has been collected from agro-food statistics sources available from the Hungarian Central Statistical Office and from reports by the Research Institute of Agricultural Economics, Hungarian Meteorological Service, Ministry of Agriculture, and the National Council for Sustainable Development. Qualitative data and interpretations draw on the tacit knowledge of sector experts, secondary sources (books, articles, reports), complemented with semi-structured interviews and expert consultations as well as primary sources on stakeholders statements (grey literature, policy documents, newspapers, company reports, industry journals). Finally, in an interpretive analysis the heterogeneous data was integrated and categorised by meaning-condensation and meaning-interpretation of the relevant PATHWAYS themes provided by the template.

1.5. Report structure
The report is structured as follows. Chapter 2 describes overall system trends and longitudinal developments, e.g. production and consumption, environmental performance, sectorial developments. Chapter 3 identifies the main external landscape developments that affect the agro-food regime. Chapter 4-5-6 describes longitudinal developments in the Hungarian beef, pork and retail regimes (Figure 2). Chapter 7 provides conclusions on stability and cracks in the three regimes.

Figure 2 Graphical representation of analytical framework
In D2.2 we chose to focus on beef, pork and retail regimes. These are the most polluting ones with the highest environmental impact, and also most embedded in global food system. Their pathway is remarkable also because contrary to the EU average they presented growth (in beef), contractions (in pig) and stagnation (in retail) in recent decade. Finally the political salience of these agro-food regimes is the highest although their economic significance has diminished.
2. Overall system trends and longitudinal developments

In deliverable 2.1 the Hungarian niche innovations under study were:
- Organic agriculture
- Vegetarianism/lowering meat consumption
- Localized food chains/regional food production
- Community supported agriculture

Based on these niche innovations, the subsystems under study in this deliverable will be:
- pork meat
- beef
- food retail

2.1. Environmental performance

Overall the environmental performance of the Hungarian agro-food system (in terms of GHG emissions) improved. Still the Hungarian food sector has significant contribution to Carbon Footprint (all GHGs) as Figure 3 shows.

![Figure 3: Sectorial contributions to environmental impact in Hungary](Source: EUREAPA)

Within the food sector the meat and retail regimes are responsible for a high amount of environmental impact (Figure 4).
A growing amount of imported products contributes to an increase in the environmental load as well. Approximately 30% of all food products are imported into Hungary today.

According to the National Emission Ceilings (NEC) Directive Inventory¹ in Hungary the anthropogenic NH3 emissions mainly arise from the agricultural activities (78% form animal breeding and 17% of fertilizer utilization).

Data from the Hungarian Meteorological Service (2011) shows that agriculture was the second largest source of GHG emissions in Hungary (contributing 14% to the total). Emissions from agriculture include methane (CH4) and nitrous oxide (N2O) gases. About one-third of total CH4 emissions are

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emissions could be traced back to livestock, namely cattle, swine, sheep and poultry. Agriculture is the largest source of the N2O emissions: 87.4 per cent of total N2O emissions were generated in agriculture, to a large extent from N-fertilizers in agricultural soils. Emissions from agriculture have decreased by 54% over the period of 1985-2011. The bulk of this decrease occurred in the years between 1985 and 1995, when agricultural production fell by more than 30 percent, and livestock numbers underwent a drastic decrease. The contribution of agriculture to total emissions decreased over the period 1985-2011 from 16.4% to its present share of 13.2%. Decline in animal husbandry also contributed to emission reduction. In 2009, swine population reduced by 11 per cent resulting in lower CH4 and N2O emissions levels (Lovas 2014).

Altogether between 1990 and 2010 the decrease in emissions of methane from agriculture is more than 50%; decrease in aggregated emissions of methane and nitrous oxide from agriculture sector is more than 40%; and decrease in emissions of nitrous oxide from agriculture is more than 30%. Data from UNFCCC on the Hungarian agriculture also illustrates the contraction of annual greenhouse gas emissions (Table 1)

### Table 1: Contraction of annual greenhouse gas emissions in Hungarian agriculture (CO2 equivalents)

<table>
<thead>
<tr>
<th>Category</th>
<th>Base year</th>
<th>1990</th>
<th>2000</th>
<th>2012</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.A Enteric Fermentation</td>
<td>3 368 890,85</td>
<td>3 006 292,63</td>
<td>1 721 769,13</td>
<td>1 502 244,62</td>
</tr>
<tr>
<td>4.B Manure Management</td>
<td>5 288 109,34</td>
<td>4 897 803,49</td>
<td>2 908 795,06</td>
<td>2 104 111,89</td>
</tr>
<tr>
<td>4.C Rice Cultivation</td>
<td>50 542,80</td>
<td>50 400,00</td>
<td>13 532,40</td>
<td>12 427,80</td>
</tr>
<tr>
<td>4.D Agricultural Soils</td>
<td>9 821 827,55</td>
<td>7 204 937,65</td>
<td>4 808 195,26</td>
<td>5 086 706,41</td>
</tr>
<tr>
<td>4.E Prescribed Burning of Savannas</td>
<td>58 846,20</td>
<td>50 400,00</td>
<td>13 532,40</td>
<td>12 427,80</td>
</tr>
<tr>
<td>4.F Field Burning of Agricultural Residues</td>
<td>58 846,20</td>
<td>50 400,00</td>
<td>13 532,40</td>
<td>12 427,80</td>
</tr>
<tr>
<td>4.G Other</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>18 588 216,74</td>
<td>15 159 433,78</td>
<td>9 452 291,84</td>
<td>8 705 490,72</td>
</tr>
</tbody>
</table>

Source: UNFCCC Data Interface

Environmental performance in the Hungarian food sector can also be illustrated on the one hand by Ecological Footprint intensities (Figure 5) and on the other hand values per 10,000 kcal of food consumption (Figure 6):

*Figure 5-6  Ecological Footprint intensities and values per 10,000 kcal of food consumption*  
*Source: Vetőné Mózner (2014)*
As for the total food consumption cold cuts, meat, dairy products and milk have the largest ecological footprint intensity. Interestingly consumers do not reduce their meat consumption in order to consume more healthy food and decrease the environmental impacts, but consuming more fruits and vegetables appears only to be supplementary. The consumption of more potatoes and cereals would be environmentally desirable ( Vetőné Mózner 2014). In practice, it has been cleared that the ecological footprint of green consumption is not better. This is actually pointing to the BIG (Behaviour Impact Gap) problem, meaning that green attitudes and pro-environmental behaviour do not necessarily reduce negative environmental impacts of consumption (Csutora 2012).

2.2. Food production
Since the EU accession (2004) there is a continuous increase in beef production and nowadays it reached 800 thousand animals. The main drive of growth in the beef sector is demand for export. Three fifth of beef is kept by corporate farms (decreasing stock size, average 439), two fifth individual farms (increasing stock size, average 18). Pig production decreased until 2013 and then started to increase to more than 3 million animals in 2014. Three quarter of pigs is kept in corporate farms while one quarter in family farms. New subsidies have been introduced in the pig sector players and with a cut in VAT of live pigs and carcasses a large proportion of import has been panned to be avoided. Both regimes have special quality breeds: the number of Hungarian grey cattle reaches 7500, while the number of Mangalica pigs is about 65 thousand animals. Recent policy also seeks to bring quality beef and pork into the public procurement to cater for 2 million adults and half million children in Hungary.

| Table 2: Livestock numbers per EU Member State, 2013 (million head) |
|----------------------------------|------------------|-----------------|---------------|-----------|
| Bovine animals | Pigs | Sheep | Goats |
| EU-28 | 103,91 | 149,98 | 83,39 | 10,57 |
| Hungary | 0,77 | 2,94 | 1,24 | - |
| Netherlands | 4,09 | 12,01 | 1,07 | - |

| Table 3: Production of meat, by type of animal, 2013 (1 000 tonnes of carcass weight) |
|----------------------------------|----------------|-----------------|---------------|-----------|-----------|
| Bovine animals | Pigs | Sheep | Goats | Poultry (¹) |
| EU-28 | 7271,7 | 21 | 710,5 | 47,5 | 12 765,0 |
| Hungary | 22,6 | 336,7 | 0,3 | 0,0 | 394,5 |
| Netherlands | 379,1 | 1 307,0 | 12,1 | 1,7 | : |

| Table 4: Production of beef and veal, by type of bovine animals, 2013 (1 000 tonnes of carcass weight) |
|----------------------------------|----------------|-------------|-------------|-----------|------------|-----------|
| Total | Calves and young cattle | Heifers | Cows | Bullocks | Bulls |
| EU-28 | 7 271,7 | 1 008,5 | 1 033,2 | 2 140,1 | 623,9 | 2 465,9 |
| Hungary | 22,6 | 0,6 | 1,9 | 15,5 | 0,0 | 4,7 |
| Netherlands | 379,1 | 222,4 | 2,8 | 130,5 | 0,0 | 23,3 |

Source: Eurostat
In sum the meat production including pork and beef is in continuous decline in Hungary. Hungary gave 1.9% of the EU-27 total meat production in 2010, meat production quantity was almost 750 thousand tonnes. Hungary is for long a net pork exporter with 174 thousand tonnes export and 136 thousand tonnes import in 2010. Backyard pork production had long tradition in Hungary. Thirty years ago the total number of pigs was almost 10 million (same as total population in Hungary) whereas the pork consumption reached 43 kg/year/person.

As for animal feed production the main challenge is how to replace soy and find cheap, domestic sources of GMO-free protein. The average feed conversion ratio for beef is 4-5kg/kg and 2.7-3.5 kg/kg for pig, while the Average Cost is 475HUF/kg and 290HUF/kg, respectively. A new government programme has been started to develop alternative protein sources (National Protein Programme) planning the large scale introduction of alternative protein sources (édes csillagfürt, takarmánybab, lőbab, takarmányborsó) in animal feed.

2.3. Food consumption practices
The per capita food consumption presents a decreasing trend. Fat and sugar consumption significantly decreased whereas milk products and milk consumption remained stable and/or increased. Data suggests very low level of fish, fruit and vegetable consumption in Hungary (KSH 2014).

From the consumers’ point of view, in comparison with other EU Member States in Western Europe a very high level of total household income is spent on food (average circa 30%). At the same time, a higher proportion of the population – about one third - is taking an active part in food self-provisioning.

The total amount of consumer spending on food (Figure 7) is 50 billion HUF (circa €1,83 billion).

![Figure 7: Annual food consumption in Hungary. Source: Hungarian Tastes - facebook.com/magyarizek](image-url)
According to Tukker et al (2011) Hungary is part of a Western European cluster (with high calorie intake per person) in terms of vegetable and meat consumption habits.

In contrast with the EU meat (and dairy) consumption in Hungary is decreasing in volume and its proportion within the whole food consumption is not expected to increase in the future. From an environmental point of view this tendency is relatively desirable.

Meanwhile food import sharply increased from 5-10% in 1990 to 30%. Increasing meat import means the biggest increase in environmental harm.

Consumption survey on culinary habits indicated that Hungarian households consume poultry and pig meat every day, beef and fish rarely while wild meat and sheep is consumed only in special events (GFK Hungária 2007). Average meat consumption per person between 1960 and 1970 reached from 50 to 60 kilogram and 73 kilogram in 1980. In 1987 reached its peak with 81,3 kg per person. The 1990ies showed a decrease with 63 kilogram and in 2000 consumption reached again 73 kilogram. After the Millennium the consumption decreased to the level of 40 years before (60 kilogram). Meat consumption has diminished year by year: in 2012, the per capita meat consumption was 56.7 kg/capita/year in Hungary, which was significantly less than in other developed countries. Pork consumption was 25.3 kg/capita/year in Hungary in 2010 (Table 5-7).

<table>
<thead>
<tr>
<th>Year</th>
<th>Pork</th>
<th>Beef</th>
<th>Sheep</th>
<th>Total</th>
<th>Intestines</th>
<th>Poultry</th>
<th>Total meat</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>With bones</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2004</td>
<td>25,9</td>
<td>3,2</td>
<td>0,1</td>
<td>29,2</td>
<td>3,0</td>
<td>27,7</td>
<td>60,9</td>
</tr>
<tr>
<td>2005</td>
<td>26,7</td>
<td>3,1</td>
<td>0,1</td>
<td>30,0</td>
<td>2,7</td>
<td>29,8</td>
<td>63,5</td>
</tr>
<tr>
<td>2006</td>
<td>27,9</td>
<td>3,4</td>
<td>0,1</td>
<td>31,4</td>
<td>2,8</td>
<td>30,8</td>
<td>65,9</td>
</tr>
<tr>
<td>2007</td>
<td>27,6</td>
<td>3,3</td>
<td>0,1</td>
<td>31,0</td>
<td>2,5</td>
<td>28,7</td>
<td>63,2</td>
</tr>
<tr>
<td>2008</td>
<td>25,8</td>
<td>2,8</td>
<td>0,1</td>
<td>28,7</td>
<td>2,8</td>
<td>28,7</td>
<td>61,5</td>
</tr>
<tr>
<td>2009</td>
<td>27,0</td>
<td>2,6</td>
<td>0,1</td>
<td>29,7</td>
<td>2,7</td>
<td>27,8</td>
<td>61,7</td>
</tr>
<tr>
<td>2010</td>
<td>25,3</td>
<td>2,5</td>
<td>0,1</td>
<td>27,9</td>
<td>2,7</td>
<td>24,6</td>
<td>56,7</td>
</tr>
<tr>
<td>2011</td>
<td>24,8</td>
<td>2,7</td>
<td>0,2</td>
<td>27,6</td>
<td>2,2</td>
<td>24,4</td>
<td>55,8</td>
</tr>
</tbody>
</table>

Table 6: Meat production and consumption 2004-2011 (thousand tonnes)

<table>
<thead>
<tr>
<th>Year</th>
<th>Production</th>
<th>Import</th>
<th>Export</th>
<th>Loss</th>
<th>Stock</th>
<th>Domestic use</th>
<th>Consumption</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Thousand tonnes</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>kg</td>
</tr>
<tr>
<td>2004</td>
<td>308.7</td>
<td>66.4</td>
<td>104.0</td>
<td>7.7</td>
<td>19.2</td>
<td>262.1</td>
<td>262.1</td>
</tr>
<tr>
<td>2005</td>
<td>289.9</td>
<td>88.5</td>
<td>102.5</td>
<td>7.8</td>
<td>17.5</td>
<td>269.8</td>
<td>269.8</td>
</tr>
<tr>
<td>2006</td>
<td>314.5</td>
<td>83.2</td>
<td>105.8</td>
<td>10.9</td>
<td>17.2</td>
<td>281.3</td>
<td>281.3</td>
</tr>
<tr>
<td>2007</td>
<td>322.5</td>
<td>81.8</td>
<td>114.1</td>
<td>11.1</td>
<td>19.0</td>
<td>277.3</td>
<td>277.3</td>
</tr>
<tr>
<td>2008</td>
<td>299.9</td>
<td>85.2</td>
<td>115.3</td>
<td>10.7</td>
<td>18.8</td>
<td>259.3</td>
<td>259.3</td>
</tr>
<tr>
<td>2009</td>
<td>298.1</td>
<td>104.0</td>
<td>119.5</td>
<td>11.0</td>
<td>19.5</td>
<td>270.9</td>
<td>270.9</td>
</tr>
<tr>
<td>2010</td>
<td>300.6</td>
<td>136.0</td>
<td>174.3</td>
<td>11.1</td>
<td>17.3</td>
<td>253.4</td>
<td>253.4</td>
</tr>
<tr>
<td>2011</td>
<td>288.4</td>
<td>139.0</td>
<td>171.2</td>
<td>10.6</td>
<td>15.8</td>
<td>247.1</td>
<td>247.1</td>
</tr>
</tbody>
</table>

Source: KSH
In 2012 the per capita meat consumption reached 56 kg that is practically 1 kg per week per person. Although the retail price of meat increased by 10 percent, meat consumption did not significantly decrease.

The regime celebrates the renaissance of traditional Hungarian landraces animal breeds such as Mangalitza, Grey Cattle, as well as wild meat; and rarely used and peculiar types: rabbit, ostrich, emu.

Moreover the functional and convenience food sector is increasing as a result of the food retail expansion which created special product lines in the food sector, such as raw meat with 30-day and cold cut with 120-day shelf life.

The excessive amount of individual meat consumption is hardly questioned and has been stabilised by cultural conventions.

As a result of the new pig strategy the per capita pork consumption is expected to increase.
3. External landscape developments

The Hungarian agri-food system has been affected by several exogenous landscape developments (see Figure 8 with the main actors and developments):

Financial-economic crisis, the impacts of globalisation of the agri-food system and geo-political tensions raised the political salience of food security. Cheap food became a crucial goal and strategic issue for policymakers. On the global and European market Hungary is a major exporter of agri-food products. The agri-food sector is of strategic importance to Hungary, with the food industry traditionally a substantial net exporter. Since the 1990ies domestic food sales decreased by 40% and the export increased by 30%. Ban of meat, fish, and fruit, vegetables, milk, and milk products by the Russian Federation in 2014 seriously hit agricultural exports especially in pork sector. Russia is the most important market for prepared meat products like bacon and also chilled and frozen pork. The crisis badly affected the food system in several ways: a) it decreased demand (especially in the meat sector), b) subsequent austerity policies created pressure on the food industry but also on resources for the agro-food transition, c) food prices became central issue for the majority of consumers.

Paradox of having to reduce climate change impacts and maintain growth. Emissions from the pork subsector are expected to stagnate whereas emission reductions can be achieved through technology modernization and incentives for technology transfer. There are possible environmental co-benefits in the regimes through correlation between mitigation and resource use efficiency. The gradual shift towards an information society is likely to increase the transparency by the web-presence of actors, and also by the use of smart technologies in retail, interactions between suppliers and consumers, and by provision of more information on environmental performance to consumers. Possible further food education and awareness raising may increase sustainable consumption habits in the coming decades.

Dualistic farm structure: From a socio-technical systems viewpoint the Hungarian agro-food sector could be depicted as a dual economy with a large-scale agro-industry and service providers on the one hand and dispersed small producers and organizations on the other. In 2010 there were 8,800 farms functioning as commercial organisations (cooperatives and commercial farms) and 567,000 managed by private individuals. Legal entities (farm enterprises) used on average 337 ha of land, while the average size of individual farms was 4.6 ha. Only 4 per cent of commercial organisations used 1 ha or less, while two thirds of farms managed by individuals were equal to or smaller than 1 ha. The latter were mostly managed using low-intensity methods without and no agro-chemicals. 60 per cent of the 567,000 individual farms produced for self-consumption (KSH, 2012).

Legacies of wild privatisation: After the political transitions in 1989 Hungary saw the rapid and unfettered introduction of various market-based organizational forms under the ideology of neoliberalism and involving privatisation, liberalisation and market-based policies. Given the lack of adequate representation in this period of the public interest, many of the measures are now considered symptomatic of ‘wild capitalism’. The process started with market acquisition by large foreign food companies. Food processing industries were the first targets of privatisation, involving significant foreign direct investment in the agro-food sector. Given the collapse of
Hungary’s export markets in the former Eastern Bloc and widespread corruption involving both domestic players and foreign investors, enterprises in the agri-food sector were often privatized at firesale prices. Many of them have been subsequently liquidated by the new owners, who were often interested only in acquiring market share for imported products. In only ten years foreign ownership in the Hungarian food processing sector exceeded 60 percent (Jansik, 2000).

Reconfigured export markets: Hungary joined the EU in 2004 and recent studies have shown that for the most part the country’s agri-food sector also lost out to EU accession with specific regard to agricultural, agri-environmental and rural performance (Jambor & Sirone Varadi, 2014). The traditionally export-oriented agro-food industry (mostly based on industrial crops - Maize, Wheat, Rapeseed, Barley, Sunflower seed, Pet Food, Cow milk, Glucose and Dextrose, Sunflower oil, Refined Sugar) initially performed promisingly, but export performance has greatly deteriorated over time (Fertő & Hubbard, 2003). Today Hungary’s trade balance in agri-food products with the EU-15 is unrealistically negative, given the country’s agro-ecological potential and traditional role as a food producer. Part of this is explained by weaknesses in Hungarian agri-food export competitiveness, as the sector failed to adapt to changes in demand in its reconfigured export markets (Juhász & Wagner, 2013). Price and quality competitiveness of lower-priced cereal and oilseed commodities shows relative potential in this respect. Studies did not confirm that production of first generation GM crops would improve the productivity or decrease the production costs of farmers to result in increased competitiveness (Matolay, 2013). Since 2012 the Hungarian Constitution has banned the use of GMOs.

Incentives for better environmental performance: For the first time in the agri-food sector significant incentives connected to sustainability goals have been introduced through the Hungarian Agri-Environmental Programme (HAEP). Launched as a pilot project in 2002 HAEP was subject to ongoing political power struggles. The main emphasis remained on the distribution of financial resources, thus original objectives (environmental protection and effective social learning) were not entirely fulfilled (Nemes, 2010). Studies found it difficult to assess the impact on the level of internalisation of environmental issues, or how much of the improvements could be maintained if financial support stopped (Balázs, Bodorhós, Bela, Podmaniczky, & Balázs, 2009). Recent analysis has revealed that both the structure and content of the relevant knowledge needed in the agri-food sector have significantly changed during the past decades: new sustainability requirements and challenges are not appropriately handled by traditional institutions of the agricultural knowledge system (Nemes & High, 2013). In spite of favourable geographic conditions and high potential for organic farming, Hungary has the lowest rate in organic production in the EU at 2.3% (130,609 ha) of the total agricultural land (Drexler & Dezseny, 2013). Various stakeholders of the sector already signed up for a National Action Plan for the Development of Organic Farming (2014-2020).

Momentum for neo-traditional food supply: In Hungary the remnants of an informal economy that evolved as a way of compensating for the supply side deficiencies of the planned economy (Sik, 1992) but that also has deeper cultural roots reaching back to pre-socialist times helped maintain a strong local food culture and some aspects of sustainable agriculture in traditional agricultural family households. Food provisioning is still practised via non-market mechanisms and contributes to a high level of food self-sufficiency (Smith & Jehlička, 2013). Recent simplification of food legislation on short food supply chains (SFSCs) and local food systems
(LFSs) helped traditional food supply systems, such as farmers’ markets, roadside and farm gate sales, you-pick farms, local food festivals and food trails gain widespread attention, whereas other ‘neo-traditional’ supply schemes, typically initiated by urban non-farmers such as local food shops, purchasing groups, CSAs have recently gained momentum (Kneafsey et al., 2013). Although less than one-fifth of the farms are involved in direct sales, national agricultural and rural development policy provides increasingly important institutional support for this sector (see details and reference under policy chapter). Within direct sales, market selling is by far the most important revenue stream for farmers (Benedek et al., 2014).

Policy creates windows of opportunity: The New Agricultural and Rural Development Strategy 2020, a high-level foresight document which is often regarded as a new constitution of rural Hungary, also promotes this enabling environment and renders proportionately much higher allocation of resources for LFSs and SFSCs than any previous high level policy (Balázs, 2012; Kneafsey et al., 2013). Top-down policy processes under the New Agricultural and Rural Development Strategy 2020 open a window of opportunity especially for bottom-up initiatives. In the European Union’s new agricultural and rural development policy 2014-20, thematic (problem-focussed) sub-programmes within rural development programmes will be opened to further enhance the development of LFSs and SFSCs targeting specifically the small scale producers, alternative food systems, local certification schemes, local markets, small scale processing facilities, local food promotion, local added value creation, etc. (Kneafsey et al., 2013).

The strategy also acknowledges low-carbon and biodiversity challenges and outlines national level goals for Hungary. It promotes the maintenance of agro-biodiversity in nature conservation areas through incentive systems and the implementation of payment schemes. It also envisions the revision and modification of support systems that clearly decrease agro-biodiversity. The strategy sets the target for increasing land use and areas that contribute to the maintenance of agricultural biodiversity from 500 thousand ha in 2010 to 1,2 million ha in 2020 (in AEP and Natura2000 areas).
Figure 8: The agro-food sector with the main actors and developments (own figure)
4. Developments in the swine regime

4.1. Developments in (tangible) system elements

**Dominant meat regime:** Pork chain has the largest share in the Hungarian meat market. Production in 2014 was HUF 224 billion reaching to 9 percent of total agricultural output. The main constituents of pork regime cover the followings (Figure 9):

![Figure 9: The main system constituencies of the regime (own figure)](image)

The main system constituencies of the regime

**Breeding: producing boars, semen and sows**
The Hungarian pork production has a dualistic structure with a slight trend in concentration of production in large farms.
9283 small-scale (technically inefficient) farms on average hold 5-7 pigs and altogether raises 50% of the total pig stock. Meanwhile 766 technically efficient larger commercial farms confine 3.3-4.4 thousand pigs (altogether 223 377 sows, 1 484 161 porker).
The average herd size is between 9-16 pigs.
According to breeders associations responsible for cultivation and genetic improvement Hungary maintains appropriate genetic basis for efficient large scale pig production and produce high value conventional products. However, too many breeders cause oversupply of breeding animals. The breeding and production sector is not well integrated. As part of the pig strategy a HUF1.6bn flagship pig breeding programme have been designed to boost pig breeding and consumption of pork in Hungary.

**Farrowing: pig farms with sows and boars producing piglets**
The production cycles in pig husbandry comprises of two moves: (1) farrowing sows for the production of weaned piglets; (2) raising of those piglets, as future breeding animals or as pigs for slaughtering.
**Finishing: raising piglets to pigs**

In Hungary pig fattening is traditionally based on cereals, grain-based feeding. Fodder represents about 60% within total production costs. A stronger feed base (cereals & oil seeds) is regarded as a prerequisite in the sector. In Hungary there are many small feed producers, but feedstuffs are increasingly imported.

The total number of pig is currently 3 million (see Table 8). Commercial mass production is not competitive on an EU and global level.

<table>
<thead>
<tr>
<th>Year</th>
<th>Pigs (million)</th>
<th>Sow (thousand)</th>
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<tbody>
<tr>
<td>1990</td>
<td>8</td>
<td>624</td>
</tr>
<tr>
<td>2000</td>
<td>4.8</td>
<td>348</td>
</tr>
<tr>
<td>2002</td>
<td>5.1</td>
<td>381</td>
</tr>
<tr>
<td>2005</td>
<td>3.8</td>
<td>277</td>
</tr>
<tr>
<td>2010</td>
<td>3.1</td>
<td>219</td>
</tr>
<tr>
<td>2012</td>
<td>Less than 3</td>
<td></td>
</tr>
</tbody>
</table>

Source: KSH

**Slaughtering: produce carcasses and fresh meat**

Nominal capacity of abattoirs: 7.8 m pigs. Bigger capacity slaughterhouses can be found in every 100-120 kilometres; however relocalisation of rural food production requires smaller capacity slaughtering facilities. In Hungary 6 large slaughterhouses already account for over 50% of production (out of a total of 140 slaughterhouses). Two-third of slaughtered pigs conforms to EU quality standards.

**Processing: preparation, deboning, trimming, grading and packing**

The strongest constituent is meat processing; the largest food industry accounting for over 18% of the total Hungarian food processing output. Privatisation of the Hungarian meat industry and its concentration started late, in the mid-1990s, and was characterised by low FDI. In 2005, approximately 40% of total capital was in foreign ownership. The relatively low share of foreign capital and relatively small concentration of the processing sector results in a concentrated and competitive sector.

Largest meat processors, such as Gyulai Húskombinát, is reportedly seeking a rescue package worth around €3.5m (HUF 1bn) from the government in order to stabilise its operations after rising energy, labour and raw material costs caused massive losses. In Hungary a lot of home-processing still takes place. There were about 90 large plants in 2006. Although most production is bulk, some traditional products are also produced. These are developing into an interesting niche market.

**Retail**

Small scale producers can directly market their produce within 40 kilometres and in local public procurement.

Domestic sales of pork (loin, rib and thigh) fell significantly in the recent years due to the decline in demand.
**Consumption**

Consumer associations about pork are more and more connected to unhealthy product values (Szakály et al. 2008). Pork is regarded by the consumers as ‘rather unhealthy, old-fashioned, fatty, rich in cholesterol, strongly masculine, boring product’. According to the author to top the decrease in pork consumption the repositioning of the product chain would be desirable. Still, a recent survey on pork meat consumption habits pointed out that pork meat products are the most prevalent meat products that consumers eat several times a week (Szonda 2013). Many positive associations are also attached to pork consumption. Pork meat of Hungarian origin is preferred especially because of trustworthiness and good quality, although many prefer to buy to support domestic economy. The best-known meat industry brand name Pick is the largest Mangalica meat producing business in the world.

In the pig sector the **competitiveness** is driven by the food industry and the consumer expectations, the most important problems are going beyond the sectorial horizon and extend to taxation and bureaucracy. Further factors of competitiveness analysed in the relevant literature on the pig sector: cooperation and integration deficit, relatively expensive production, heterogeneous quality.

Price competition is triggered by the import, concentrated retail, decreasing consumption. According to expert judgments the competitive production is only 10-15 percent within the sector.

Profitability is a lasting problem. Vertical and horizontal integration has been regarded as a main source of better profitability. Slaughtering and processing facilities need further technological development to be profitable. Subsidies are also available for the modernisation of processing and slaughtering. Profitability also largely depends on the feed.

**Environmental performance** is mostly shaped by feed-related emissions, manure management and energy use in pig supply chains. Behind the overall performance of pork supply chain there is a tradeoff among various levels and constituencies. For example on the farm (production unit) level high emissions can be off-set by lower feed emissions. On the animal level better environmental performance could be achieved by feed balancing and genetics. On the supply chain level reductions are best achieved through energy use efficiency, waste minimization and recycling. Overall the emission reduction of methane could be achieved by more resource use efficiency in husbandry and low energy intensity of feeding, optimised manure management, composting, or biogas production.

According to Latruffe et al. (2013) nitrate pollution could be reduced with no impact on the output level, and pig farmers have incentives to reduce nitrogen pollution in order to increase their efficiency even in the absence of regulation.

**The pork market is relatively open:** Since 2005 Hungary has been a net importer of pigs. Hungary imports 220 thousand tonnes while the domestic production is only 250 thousand tonnes. The export is circa 230 thousand tonnes (including e.g. frozen pork knuckle supplied to China). Main export markets are in Spain, Italy, Japan and Korea. Meat export could be really competitive only if feed could be provided from domestic sources. The import soy used in fattening as fodder is approximately 600-700 thousand tonnes annually.
Quality meat
In the quality sector the specialty fat-type pork chain from Hungary, called Mangalica, being similar to the Iberian ham from Spain pork presents remarkable disease resistance, good adaptability to extensive housing conditions, good fertility, and high meat quality. The extensive breeding of Mangalica also implies higher production costs. Hungaricums from pork, such as csabai and gyulai sausage, Pick and Herz salami have been protected by a special quality trademark.
A new quality assurance scheme and label initiated by the Ministry of Rural Development is aiming to support an increase in pig stocks and in the domestic consumption of Hungarian pork through the introduction of the Outstanding Quality Pork (Kiváló Minőségű Sertéshús) trademark.
Hungarian consumers are willing to pay the highest price premium for organic produced pork (Főldes et al 2012).

4.2. Developments in social groups and (intangible) regime elements

Hungarian pig strategy: a policy intervention to clear out and raise the pork chain
Regulatory and control authorities play a key role in whitening the sector. In 2016 the value added tax (VAT) on pork meat would be lowered from the current 27 to 5 percent. It is estimated that Hungarian consumers will save €81.6m (HUF 25bn). This VAT cut on live and half carcasses aims to stimulate domestic pork consumption and combat illegal trade meat. The main ambitions of the tax decrease is clearing out the economy, organising transparent internal relations, and also increasing consumer demand, and growth in the sector through developing the processing facilities. As a result the policy is expected to counterbalance the trend leading to Hungary becoming a net pork importer country. According to industry experts it will not help the trade of pork and processed pork products.
Radical changes have been urged in the meat sector by most players with special regard to the “whitening of the food chain”, blocking out fraud, and the most important barriers of competitiveness. According to estimations of the tax authority the fraud being committed on sales of pork is very high level. The black market in meat sector is reaching forty percent, forcing out trustworthy players in the sector.
The pig strategy (1323/2012. government decree) gave a new momentum to the sector by focussing on R&D, investments to infrastructure, and marketing. The amount of Pig Subsidy in Hungary in 2013 is 7,396,473,737 €/head. The total of €22,108,06 Million paid after Pigs is divided between animal welfare payment (98,8% ) and support for strategic measures improving the situation of pig sector (1,2%)

1) Industry/firms:
The most important market players in pig processing are Pick, Délhús, Pápai Hús, Kométa and Debreceni Hús Rt. The concentration of the sector is relatively low compared to EU average. The top ten firms account for 53% of the sector’s total revenue and 74% of exports. The top 10 processing companies share of 2004 net revenue did not match the 1997 level and concentration according to export income also dropped (König –Orbanné 2006).
2) Consumers:
Pig meat consumption has been on the rise before the regime change and then drastically fell back. Food scandals although not entailing any illness in Hungary impacted consumers to buy much less pork. In 1970 the average annual consumption was 30 kg per person then in 1980 40 kilogram, reaching in 1989 43 kilogram. Then it started to decrease and in 1994 it was less than 30 kg and in 2010 only 25 kg. Although consumer often associate pork with negative and unhealthy (fatty, rich in cholesterol) product values (Szakály et al 2008), actual consumption habits show that pork is the most prevalent and everyday meat product for Hungarian consumers.

3) Public discourse:
Hungary has a VAT of 27%, which is the highest in the EU. According to the expert and government statements there is broad consensus around cutback of VAT in the meat sector stating in live pig and carcasses. The main political target is to decrease the reliance on import pork and achieve self-sufficiency.

The pork sector does not expect any further direct EU subsidies, but it can rely on the pig strategy for renewal in developing sustainable feeding (protein programme), structural changes and innovation in the sector, financing of infrastructural investments into high value added vertically integrated quality pork production.
5. Developments in beef regime

5.1. Developments in (tangible) system elements

Beef chain has only marginal share in the Hungarian meat market, although Hungary has long traditions in extensive beef production and export (Bartosiewicz, 1997). Since the EU accession (2004) there is a continuous increase in beef production and nowadays it reached 800 thousand animals.

The total beef production reaches 50-60 thousand tonnes, with 60 thousand of veal, of which 95 percent is exported. Compared to pigmeat production, beef production has a longer production cycle, its feed efficiency is lower, slaughtering and manure management is more complex, and the value of individual animals is higher. In beef production Hungary had relative competitive advantage in the Central European region until 2009 which was rapidly lost. The beef sector gives only 2 percent of the total agricultural output (HUF 244 billion) while dairy gives 8 percent.

The breeding and production sector is not well integrated. Three fifth of beef is kept by corporate farms (stagnating stock size, average 439), two fifth individual farms (increasing stock size, average 18).

The main drive of growth in the beef production sector is demand for export. Export markets are maintained through the Beef Protocol which enables the export of Hungarian beef carcasses e.g. to China. Export creates excellent market opportunities for Hungarian beef which can gradually restructure in the sector in Hungary. The Turkish export market opened in 2010 and started to buy remarkable amounts of Simmental and Charolaise breeds. Still, the sector faces continuous decline in other export markets: Lebanon, Austria, Italy, Greece, and Croatia.

The beef sector has limited profitability and is thus sensitive to the level of subsidies. In contrast to the pig sector major subsidies reached the beef sector after the EU accession. The amount of Beef Subsidy in Hungary in 2013 was 203€/head (Poultry is 0,56; Sheep and goat is 12). All 9 months or older animals slaughtered or exported (both within and outside the EU) receive a subsidy of €160. Furthermore, extensification (€ 52) and suckler cow premium (€ 140) are also paid. In EAFRD, beef farms could apply for 450 €/ha in pastures plus 200 €/ha in Natura 2000 areas.

Altogether cattle production is subsidized with €154Million, dividing the support for dairy cattle (64,9% ) and beef cattle (35,1%). Dairy derives subsidy through the EAFRD – Animal welfare in the dairy sector (13,7% ), the National milk subsidy (17,3% ), support of dairy sector due to aflatoxin contamination (0,007%), the school milk programme (4,9%) and the special dairy premium (29% ). Beef cattle production is deriving subsidies for ruminant restructuring (22,2%), Cow – linked to production (7,7% ), Beef cattle – decoupled (4%) and Extensification payment for cattle (1,2% ), and Cattle export subsidy (0,002%).

Still, beef and veal consumption has marginal position: beef and calf consumption reached in 1970 10 kg and decreased to 5 kg per person in 1996 and to 2.5 kg per person in 2010. The relatively low level of beef consumption is partly explained by consumers’ price sensitivity, as
in the beef and veal sector prices are significantly higher. The most expensive and best quality meat is exported. Although the BSE crisis did not present any illnesses in Hungary due to the negative media presentation half of the Hungarian population decreased beef consumption while one out of seven (13.97%) completely excluded beef from their diet (Lakner et al., 2003).

The future prospects of beef production largely depend on potential feed source. Hungary potentially provides unique circumstances and exceptionally good feed basis for beef production. Half of the 1.3 million hectares of potential grasslands and by-products from 1 million hectares of cornfields are underused. The future prospects for beef market in Hungary are further dependent on the increasing demand as well as the modernisation of the supply capacities.

Experts identified several market niches around beef varieties in Hungary. However, the dominant variety, Holstein Fries (55%) is regarded by most experts inappropriate for quality meat production. From the total beef herd in Hungary Hereford represents 5 percent, Aberdeen Angus 7 percent, Charolais 8 percent, Limousine 5 percent, Simmental 15 percent, Grey cattle 5 percent, and the rest is Aubrac, Wagyu, etc.). Production costs of organic beef are too high and cannot generate reliable income for farmers. Beef production in Hungary could be better based on high marbling Simmental (magyartarka) mostly preferred by small scale producers. Depending on the appropriate husbandry practices this variety could best cater the quality meat sector.

A typical breed of the Hungarian Great Plains is the Hungarian Grey Cattle (Bartosiewicz, 1997). Mostly kept in extensively managed pastures at national park territories, Hungarian Grey Cattle requires extensive grazing which beyond producing premium quality meat has also desirable environmental and socio-economic impact in rural communities. Extensive grazing effectively creates a mosaic vegetation structure, which also enables to maintain high species richness in the landscape (Török et al 2014). Since 2003 a product quality certification system has been developed by the breeder association of Hungarian Grey Cattle.

Beef creates the largest environmental impact and highest GHG emission intensity in animal husbandry: 31m² of land is needed to produce 1000kcal beef (whereas cereals require only 1m²). According to FAO (2013) livestock causes 14.5% of all human-induced GHG and particularly beef and cattle milk production make up over 60% of this. The benchmarking of environmental performance shows that traditional beef production technology creates the most negative externality, while extensive and ecological beef farming creates environmentally more desirable arrangements, such as e.g. less imported feed (Bakosné Böröcz - Fogarassy, 2011).

5.2. Developments in social groups and (intangible) regime elements
The image of beef production is paradoxical: it has been often cited as a crisis sector and at the same time a regime with potential progress, ready for take-off. While beef means only marginal share in the meat market in Hungary, it is continuously developing in the last 10 years after dramatic contraction in the 1980-90ies. No surprise, consumers tend to regard quality beef as a luxury meat. The high number of price sensitive consumers is often interpreted as a historically-culturally unique phenomenon in Hungary. However it is important to note that beef prices in
Hungary are relatively high and increasing, whereas buying power of incomes have clearly deteriorated. The active governance style is urged in all main social groups in the beef regime: Industry/firms: feed companies, farmers, slaughters, processors, and distributors would like to increase their market share and maintain the level of subsidies. Consumers: beef is regarded as a meat of high value, but for relatively high price of beef the consumption is very limited and decreasing level. Policymakers: Policy is preoccupied with subsidizing in a way that keeps market competitiveness and environmental externalities in balance without entailing excessive costs. NGOs, social movements: environmental movement in Hungary did not attract much attention to critical animal welfare issues and environmental impacts of food consumption.

Public discourses on beef production and consumption are preoccupied with animal diseases. The presence of antimicrobial agents in meat stock (in Hungary estimated to 192 mg per kilogram, see Figure 10) emerged as a recent issue in the public discourse. Recently, an infection of deadly anthrax has been identified in beef infected via feedstock contaminated by water. The media presentation of such cases can have a negative effect on beef consumption too. Yet beef in the diet is already very exceptional in Hungary, the yearly average beef consumption stabilised below 3 kg.

Extensively held traditional beef cattle have been widely considered as an example of animal welfare. Animal welfare in this context is understood by farmers and consumers as animal health, a decisive factor of food safety and food quality. From production to slaughtering, EU regulations on welfare have been adopted within Hungarian legislation (this includes the EU organic standard which is all important for access to EU markets) (Roe et al, 2009).
6. Developments in the retail regime

6.1. Developments in (tangible) system elements

Profitability of retail: in the food retail regime infrastructure maintenance costs increase while the consumption is decreasing and finally retail actors work with low profitability (profit is abound 1-2 % of revenues).

The retail sector gained necessary innovation capacities, thus novelty creation happens in product quality, food service, logistics, chain management (see Figure 11 on main constituencies in the supply chain management). Incremental technological innovation is visible in provisioning a broader choice of food, more deeply valued consumer benefits, and better service quality and food safety.

![Figure 11: Constituencies in the supply chain management. Source: Erikson Networked Society Lab (2015)](image)

Concentration in food retailing has increased in the last decade. In 2005, the top five companies (CBA, Co-op, Tesco, Metro, Real Hungaria) accounted for 67% of food sales. The food retail sector has been working on a consolidated market.

After the political change the spontaneous privatisation (1989–1990) resulted in the creation of small retail enterprises for avoiding unemployment. First the process of privatisation (1991–1996) increased the number of food retail stores by establishing multinational and Hungarian chains. The liberalised retail sector of Hungary became the primary expansion market for Western retail groups. Retailers’ power in the supply chain became apparent.
From the mid-1990ies the concentration and hyper-marketization of the retail sector started. After the Millennium the concentration accelerated, which pushed out small independent stores to join franchise chains. The hyper-and supermarkets shares increased and their suppliers first had to face difficulties (quality insurance requirements, background conditions, consumer prices, private labels).

After the EU accession (2004) the number of small shops drastically decreased. Hard-discounters (Lidl, Aldi) entered the scene. FDI share of the Hungarian retail sector reached from 80.2% in 2004 to 85.3% in 2012 (see Figure 12).

![Figure 12: FDI share in Hungarian retail sector 2000-2010. Source: Potori et al. (2014)](image)

2004 became a turning point in export-import balance (see Figure 13 below).

![Figure 13: Trends of export and import in the food economy, Hungary. Source: Food Chain Safety Strategy 2014-2020.](image)
Within the retail sector the proportion of hyper-, supermarkets and discount chains has risen above 70% by 2011. Nevertheless, traditional food markets increased their turnover from 70 billion HUF in 2000 to 130 billion HUF in 2011. As Figure 14 shows Traditional food provisioning channels managed to maintain a stable 5% share in the daily consumption of households (Jankuné et al 2012).

![Figure 14: Share of different retail channels in total food sales. Source: AC Nielsen 2014](image)

Today food retail sector in Hungary is competitive and its concentration is below the EU average. The total volume of food sales in 2013 was 13,327 million euro. The sales of top 10 retailers reached 12,211 million euro (or 91.6% of total sales) with a concentration of the top four (CR4) reaching 56.3%. In sum the concentration in retail sector is average (Figure 15).
The concentration led to increased buying power of the retailers (Juhász et al. 2010; Potori et al., 2014) with negative effects on suppliers (Figure 16).

Figure 16: Buying power of retailers: supplier management strategies in food retail stores and its effects on suppliers. Source Juhász et al 2010.
Retail became the major market force in the agri-food chain (Juhász A. et al. 2011; Györe D. et al. 2010; Potori et al. 2014). Their power is illustrated by direct contributions to the national economy, e.g. Tesco retail stores third largest employer in Hungary create over 1 percent of GDP. Retailers gained good bargaining position is the sourcing of bulk product sales and price squeeze. To keep costs down food processors need to buy cheap import. In this way food retailers become gatekeepers, balancing supply and demand in the food chain.

In Hungary we have a strong focus on sourcing products from local suppliers. Local products account for around 85% of our sales, and some categories are even higher. In order to foster local production, we’ve developed a support network for our local suppliers, including seminars and a suppliers’ academy. Our efforts in Hungary have been successful and our suppliers export more than £100 million worth of products from the country to the UK.

Retailers potentially have a decisive role in promoting sustainability transition of the agro-food sector. This is further underlined by the fact that retail outlets have remarkable carbon emission from heating, lighting, air conditioning, ventilation, cooking (e.g. bakery) and most importantly refrigeration.

In practice, the unclear definition of sustainable food and diet creates uncertainty about which products green consumers should prefer, and which product market retailers should develop. Retailers typically create a ‘twin market’ by promoting conventionally produced locally sources food and at the same time fair trade organic products from distant countries. In the quality food sector retailers are typically ‘locked in’ since the production costs of environmentally desirable quality produce is high and consumers’ interest in premium prices for environmental quality is limited.

The Government in Hungary enacted in 2012 the ‘Plaza-stop law’ which prohibited construction of shops with a surface area greater than 300 m2. The main objective was to create the momentum for Hungarian owned retailers CBA and Coop.

![Figure 17: Change in value of food retail sales in Hungary, 2002-2012 (2002=100 percent). Source: KSH 2014.](chart.png)
The Hungarian food retail sector is a highly competitive market. The profitability in the retail regime has been shaped by the expansion of the retailers and the contracting consumption. Retailers’ shops density is high when compared to low purchasing power. Contrary to the public image of the regime altogether the value of food retail sales and profitability of the Hungarian food retail sector is relatively low and decreasing (Figure 17). Until the crisis of 2009 the sales volume increased, but since then the profit fell back and became negative (See Figure 18).

Figure 18: Sales and profit of food retail 2000-2011, Hungary: Source: Potori et al. (2014)

To summarize, the main challenge in food regime is how to maintain profitability in the sector when consumer incomes are constantly in times of stagnation. With decreasing demand and high consumer price-sensitivity retailers deploy various innovative protective measures to maintain their survival by offering ‘best price’. As for private label brands the share in food retail is already relatively high (22 percent) in Hungary (Szántó et al.,). Retailers have also embarked upon online CSR communication with some of their stakeholders; Tesco and Spar developed a customer-centred approach to start sustainability and charity campaigns (Pataki-Szántó 2011); as well as reported total GHG emissions and organised Supplier Carbon Reduction Workshops. To reduce labour costs retailers organise self-service checkouts and recruit multi-task employees. To enhance customer relationship discount stores introduce fresh food sections with bakery products and much wider product assortment and start to look like supermarkets. To cut transaction costs ICT-enabled supply chain management and mobile payment systems have been introduced. New private label product lines have been offered that mimic ‘quality products’ instead of ‘everyday value’. Retailers also offer reward for consumers for every purchase through vouchers, loyalty programmes and Club Cards. Supermarkets introduce ICT-enabled targeted advertising, personalisation of the shopping experience as well as organise online shopping and home delivery.

In sum the food retail regime has been transformed in two directions recently: global retailers (Tesco, Lidl, Aldi) entered the Hungarian market, and domestic chains (CBA, Coop, Real) gained fast momentum. Retail sector faced political pressure to source locally and also to limit
shopping hours. Most retail stores have regional supplier programmes that invite regional small producers to showcase their products.

After the ‘crisis tax’ and ‘plaza stop’ on retail sector the government recently introduced a ‘Sabbath Law’ to ban convenience stores, large retailers, hypermarkets from opening shops or delivering purchases on Sundays. Shops with an area 200 square meters or less may be open, but only if they are operated by the owner or a close family member.

6.2. Developments in social groups and (intangible) regime elements

The strongest actors of the agro-food sector are processors and traders with market advantage in comparison with farmers. Food retail controls the vertical food supply chains. Due to narrow margins and volatility, small-scale producers feel the most pressure and have the least power to influence food supply chains. With the sparing number and weakness of producer associations, individual farmers are normally in weak bargaining position and face enhanced price competition. Between producers and traders it is mostly reputation that plays a decisive role. Larger farmers’ cooperatives (TESZ) could act as successful suppliers of large retail chains, which dominate the food retail market.

Competitive pressures faced by agri-food producers in Hungary hinder the prospects of upscaling small scale agri-food innovations and the development of food quality (Fehér, 2002). In order to invest, producers often need to make use of their own funds because of the high cost of loans and the relative immaturity of the farm credit and crop insurance system, particularly in the small producer segment of the sector. Cooperation between SMEs in the agro-food industry is also hindered by a lack of trust, capital shortage and hostile feelings towards co-operatives and alliances in general. The latter is a residual effect of historic experience with forced cooperation during Hungary’s communist period and perceptions about the value of cooperation change slowly, and as new needs and forms of truly voluntary cooperation emerge.

A for the consumption and purchasing habits, recent research by Nielsen indicated that only 8% of Hungarian consumers are planning to buy food over the Internet. However, this number represents a 33% increase in two years, while the global average is 26%, and the European average is 14% (Nielsen, 2012).

Hungarians most often buy food either in local, small food shops or in supermarkets – both retail venues are frequented by seven out of 10 people. Hypermarkets and farmers’ markets are visited by every second adult to buy food, while two fifths (37%) prefer discount shops. In Budapest, consumers typically prefer supermarkets, hypermarkets and farmers markets, at the same time. People over 60 years of age only rarely go to super- and hypermarkets or discount shops. The 9% who only buy food from supermarkets and hypermarkets are typically younger than 40, and one third of them belong to the highest income category (household income per person in the top quintile). Seventy-eight per cent of respondents agreed (absolutely or rather) that ‘local producers who sell to supermarkets can get into trouble’. Two-thirds of respondents agreed with the statement that ‘with food purchases we do a lot for the livelihood of small-scale producers in distant, poor countries’. Such value statements are accepted above the average by respondents from the capital while only the most educated support the statement that ‘distant and poor countries who sell their produce to supermarkets due to unfavourable conditions can get into trouble’ (Balázs 2012).
Environmental performance assessments or GHG emission reduction needs in food retail in Hungary are completely missing from public discourses. The lack of awareness is partly due to the habitual consumption patterns and dietary routines. As the ‘crisis tax’ (circa 100 m euro annually) on the foreign retail sector has already proved limiting the operations and shopping hours of retailers follows a completely different market restructuring logic. Recently e.g. large supermarkets in Hungary were forced to shut their doors on Sundays. This new policy did not enjoy much public support: 64% of the population wanted stores to be open and only 32% are for closing of stores (Ipsos 2015). The ‘Sabbath Law’ is especially expected to contract sales in large, foreign-owned supermarket chains such as Tesco, Aldi and Auchan. Domestic players, family-owned shops and smaller retailers will not be affected and exceptions have been introduced to the law for their support.
7. Conclusions about stability and tensions

7.1 Overall conclusions on the agro-food sector and the regimes
The complexity of agro-food systems have been often explained through binary opposing frames, narratives or discourses (Grivins&Tisenkopfs, 2015). These discourses are in reality blurred, overlapping, intertextually connected. In WP2 we chose to focus on relatively stable beef, pork and retail regimes. These are the ones with the highest environmental impact, most polluting sub-sectors and most embedded in global food system and vulnerable to the global food crisis. The financial crisis badly affected these regimes in several ways: a) it decreased demand, b) subsequent austerity policies created pressure and soaked up resources for the agro-food transition, c) food prices became central issue for the majority of consumers. In fact, the political salience of these agro-food regimes is very high, and we recorded an active interventionist governance style although the economic significance of the regimes has declined substantially.

Technological innovations are imminent in the regimes with special regard to feed and food ingredients, processing, packaging and transport. Beyond the obvious good practice already present in the regimes (domestic protein based feed, recycling, biodegradable materials, CSR, and coordination among sectorial stakeholders on sustainability issues, etc.) the agro-food domain as a whole is not expected to build on any break-through technologies or innovations in the future that could significantly lower impact on biodiversity or GHG emissions (in the magnitude of 80-90% lower emissions or land use).

Any progress is expected to be part of a stepwise and planned process (or accelerated environmentally friendly improvements) within existing regimes to break out of the niches. Furthermore, behavioural change and capability to act on the consumers’ side is an important prerequisite of any incremental change and mitigation of environmental impacts. However radical innovation is not to be expected within the agro-food sector.

Consumers hardly reduce their meat consumption in order to consume more healthy food and decrease the environmental impacts, whereas consuming more fruits and vegetables appears only to be supplementary. From an ecological footprint perspective green consumption can be problematic, as green attitudes and pro-environmental behaviour do not in fact reduce negative environmental impacts of consumption. The behaviour impact gap, food safety concerns and culturally habituated tastes, preferences of consumers hinder the complete system shift. Furthermore regimes are over-dependent on subsidies, and thus being fairly stable, with (most) actors focusing on incremental change. The external landscape level pressures are mostly related to the economic viability, profitability of farming which creates fluctuating tensions and destabilisation in the regime. In this way the existing regime constantly creates internal tension and facilitates niche innovations to gain internal momentum. As the most important pressure on the regime is economic tensions started to increase after the crisis in 2009.

Cracks appeared in all regimes and created some windows of opportunity for some actors. The main pattern is that well-integrated and institutionalised regimes create some spaces where niche innovation start to fight for survival, then can gradually get incorporated into the regime.
As the section on landscape pressures and institutional context illustrated Hungary as a post-socialist country presents examples for unique (cultural) regime-aspects (dualistic production bases, legacies of wild privatisation, reconfiguring export markets in Asia) that makes transition pathways different compared to Western EU.

Any meaningful change towards sustainable, low carbon societies that seeks support from informed consumer choices should build on a broad consensus-seeking collaboration of food policy makers and food market actors. The broad consensus behind the cutback of VAT in the food sector can also rely on the political target to decrease the reliance on import and achieve self-sufficiency of the regimes. Political conceptualisations and strategies on food and farming often refer rhetorically to build on capacities that extend beyond the market solutions. However the main manifest landscape pressure is price squeeze, competition and economic survival. Actors use different strategies to protect their own innovative niche against predominant market forces. A few actors including a few policymakers build coalitions and perform a protective role for niches to consolidate. Still, these learning processes towards sustainability transitions are relatively weak in the agri-food domain.
7.2. Pork regime

Due to the continuous policy support the pork regime is stable and resilient. It also gives way to quality production and consumption. In contrast with meat consumption trends in the EU in Hungary the contraction of the pork regime might contributes to desirable environmental tendencies. Most environmental harm is created by global actors in the regime (especially boosting export-import). The new pig strategy creates alliance of policymakers and pig production players by offering a very small window of opportunity for renewal in the regime. Financial subsidies can channel innovation into developing sustainable feeding (protein programme), long neglected structural changes in the sector, financing infrastructural investments into high value added vertically integrated quality pork production. In sum, a planned transformation is expected in the regime as actors would gradually reorient themselves by adjusting their beliefs and strategies.

<table>
<thead>
<tr>
<th>PORK</th>
<th>Lock-in, stabilising forces</th>
<th>Cracks, tensions, problems</th>
</tr>
</thead>
<tbody>
<tr>
<td>External landscape pressures</td>
<td>STRONG</td>
<td>STRONG</td>
</tr>
<tr>
<td></td>
<td>High pressure of rising feed prices</td>
<td></td>
</tr>
<tr>
<td>Farmers</td>
<td>STRONG</td>
<td>MODERATE</td>
</tr>
<tr>
<td></td>
<td>Conventional patterns in animal husbandry</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Subsidy further consolidates the regime in traditional production model</td>
<td></td>
</tr>
<tr>
<td>Industry</td>
<td>MODERATE</td>
<td>WEAK</td>
</tr>
<tr>
<td></td>
<td>Concentrated and competitive</td>
<td></td>
</tr>
<tr>
<td>Consumers</td>
<td>STRONG</td>
<td>MODERATE</td>
</tr>
<tr>
<td></td>
<td>Decreasing consumption. Part of everyday culinary culture.</td>
<td></td>
</tr>
<tr>
<td>Policy-makers</td>
<td>STRONG</td>
<td>WEAK</td>
</tr>
<tr>
<td></td>
<td>Interventionist pig policy</td>
<td></td>
</tr>
<tr>
<td>Public debate and opinion</td>
<td>MODERATE</td>
<td>STRONG</td>
</tr>
<tr>
<td></td>
<td>High cost and lowering quality</td>
<td></td>
</tr>
<tr>
<td>Pressure from social movements, NGOs, scientists</td>
<td>WEAK</td>
<td>WEAK</td>
</tr>
<tr>
<td></td>
<td>Breeder association form the most important pressure group</td>
<td></td>
</tr>
<tr>
<td>Overall assessment</td>
<td>STRONG</td>
<td>STRONG</td>
</tr>
<tr>
<td></td>
<td>Requires careful trade-off analysis of feed-related emissions, manure management, resource efficiency and energy use.</td>
<td></td>
</tr>
</tbody>
</table>

*Table 9: Conclusions about stability and tensions in the pig regime*
7.3. Beef regime
Agro-ecological conditions (grasslands, by-products) coupled with external market demand and rural development policy objectives create a favourable hotbed for the development of this regime. Conventional beef production technology involves the most negative externalities (artificial inputs, manure spills) while extensive and ecological beef farming creates environmentally more desirable arrangements, such as e.g. utilising green energy, less imported feed.

<table>
<thead>
<tr>
<th>BEEF</th>
<th>Lock-in, stabilising forces</th>
<th>Cracks, tensions, problems</th>
</tr>
</thead>
</table>
| External landscape pressures | Continuous policy support | - Financial-economic crisis  
- Pressure on regime to address low level of consumption |
| Farmers | STRONG Decline in production  
Beneficiaries of policy | MODERATE  
Outdated farm structures  
Conflicts about distribution of subsidies among sectorial players  
Strong pressure group of breeders  
Criticism of conventional farming |
| Consumers | STRONG price sensitivity | WEAK  
concerns over price, quality, safety issues |
| Policy-makers | STRONG lack of integrative vision | MODERATE  
Cheap food became a crucial goal and strategic issue for policymakers. |
| Public debate and opinion | STRONG convenience food is increasing quality segment is developing | WEAK  
debate on the meat price |
| Pressure from social movements, NGOs, scientists | STRONG campaigning for domestic breeds and calling for more support | WEAK  
Research on the benefits of environmentally friendly farming |
| Overall assessment | STRONG Stabilized Main concern is viability. | WEAK  
The tensions and problems mentioned do not have the power to change the system |
### 7.4. Retail regime

Food retail is a highly competitive regime with fast expansion of the retailers and low purchasing power, high consumer price-sensitivity. Value of food retail sales and profitability is relatively low and decreasing since the crisis. Profitability is a key concern of retailers to engage into low carbon food supply (fresh and seasonal food sections, quality products). The active and conflict-generating government policy targeting large, foreign-owned supermarket chains (‘crisis tax’, ‘plaza stop’, ‘Sabbath Law’) has not generated much public support or taken into account environmental performance assessment.

<table>
<thead>
<tr>
<th>RETAIL</th>
<th>Lock-in, stabilising forces</th>
<th>Cracks, tensions, problems</th>
</tr>
</thead>
<tbody>
<tr>
<td>External landscape pressures</td>
<td>Large global retailers dominating the food sales</td>
<td>MODERATE</td>
</tr>
<tr>
<td></td>
<td>High price-competitiveness</td>
<td>Renaissance of local food markets</td>
</tr>
<tr>
<td>Industry/supermarkets/retailers</td>
<td>STRONG Very strong price squeeze Provisioning of cheap processed food</td>
<td>WEAK</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Concentration of food retail</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Supermarkets also create green food markets.</td>
</tr>
<tr>
<td>Consumers</td>
<td>STRONG Preferred food provisioning by most people</td>
<td>WEAK</td>
</tr>
<tr>
<td></td>
<td></td>
<td>High standards of food safety.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Battle for the attention of the consumer</td>
</tr>
<tr>
<td>Public debate and opinion</td>
<td>WEAK Public concern about price fluctuations</td>
<td>WEAK</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Proactive behaviour of supermarkets,</td>
</tr>
<tr>
<td></td>
<td></td>
<td>positioning themselves as best available</td>
</tr>
<tr>
<td></td>
<td></td>
<td>choice.</td>
</tr>
<tr>
<td>Pressure from social movements, NGOs,</td>
<td>MODERATE Most research supports the development of the retail sector</td>
<td>WEAK</td>
</tr>
<tr>
<td>scientists</td>
<td></td>
<td>Consumer buycotts never targeted</td>
</tr>
<tr>
<td></td>
<td></td>
<td>animal welfare issues or environmental issues.</td>
</tr>
<tr>
<td>Overall assessment</td>
<td>STRONG Fierce competition in the basic product categories</td>
<td>WEAK</td>
</tr>
<tr>
<td></td>
<td>Large retailers buying power dominates the regime.</td>
<td>The cracks and tensions are weak and will</td>
</tr>
<tr>
<td></td>
<td></td>
<td>not change the system that is locked in very</td>
</tr>
<tr>
<td></td>
<td></td>
<td>easily</td>
</tr>
</tbody>
</table>
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