Shopping, Cooking and Eating, Hungary

Final Report

SusHouse Project

July 2000

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SusHouse
Strategies towards the Sustainable Household

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1 Introduction

This report is part of the SusHouse project, it focuses on the household function, Shopping, Cooking and Eating (SCE), which is studied in Hungary, The Netherlands and United Kingdom. The SCE function is one of the most polluting household activities. SusHouse project researcher investigated the shopping, cooking and eating function in total complexity in this project and in co-operation with the stakeholders a long-term vision was developed on possible future sustainable household function. The project applied, combined and further developed a lot of methodological elements. The "factor 20" environmentally efficiency, the creative sessions together with stakeholders, the future workshops (brainstorming and back-casting) were new elements of the Sushouse Project especially for the Hungarian stakeholders.

This document summarises the Hungarian outcome of the research in several sections. Section 1 presents the historical development of the Shopping, Cooking and Eating function. Section 2 contents the main consequences of each project tasks. Section 3 shows the Project Researcher (PR) Task Reports, in the following order: workshops organisation and stakeholder identification, results of the scenario building and the results of different assessments of DOSs (consumer acceptance, environmental assessment and economic analysis). At the end is the evaluation of the results. The Appendix contents the list of the relevant stakeholders.

1.1 The Historical Developments of "SCE Function" in Hungarian Households

Hungary is an economically less developed country than the other four project participants. The income per capita is significantly less than in the other four (in the SCE function three) countries. Because of this the level of food consumption is slightly lower than in the EU and the consumption structure is different from other countries involved in the project.

After the political transition the average income level decreased by 30 percent in the last 10 years. The food consumption also decreased. The differences in the incomes increased hardly: more than one quarter of the population lives on the minimum of subsistence (about 25 thousand HUF/person/month that means 100 Euro) and about 20 percent of the population lives in a good living conditions by European standards.

The agricultural production (crop production and animal husbandry) decreased about 30 percent during the above mentioned time period. The export of agricultural products and processed food also decreased and the import food increased significantly.

There are some unique characteristics originating from the traditions and the previous political system (socialism):

- Hungary has traditionally an important agricultural character. Most of the people produced the food for them-selves and processed them at home for self-consumption. Most of the inhabitants in cities are first-second generation citizens who live mainly in small flat (45-65 m^2). The chaffing of these people to the land and the agriculture is stronger than in West-European countries. Because of this habit and the impossibility of private capital investment in the socialistic system people wanted to buy and/or cultivate only a piece of land (about quarter or half hectare) not only to produce of food but to relax as well. The state helped this aspiration from some reasons what are not interesting from our research. But in consequence of this historical development a lot of people has now small garden around the cities. These families produce mainly fruit and vegetables for self processing, making meals. The share of these products cannot be neglected. The

future of these rural gardens is a big question. Has small gardening long-term future or has not? Is this one of the possible ways of future development for households or not? Can it be one of the possible examples for these households in more developed countries or not?

- Although Hungary is a small country considering its territory, there are important regional differences in the development. Budapest is one of the big European capitals with the population of 2 million people (1/5 of country population). This is the richest and most developed part of Hungary. Beside Budapest the most developed region is Northwest Transdanubia near the Austrian and Slovak borders. This is an industrialised area. On the other hand there is the Great Hungarian Plain (the central and southern part of Hungary) which is mainly an agricultural area with relatively big villages, farms and small market towns. There were some industrialised areas in this part of the country (in the socialist system) which are very deteriorated and very poor regions because of the non-competitive mining and heavy industry. The unemployment rate is high, and the gypsy population concentrates is these areas. There are not wages and salaries only social subsidies for these people. Because of these regional differences there are differences in the level and structure of food consumption, in the way of life and in the characteristics of the households as well. This differentiation is more important and determining than in the other three countries.

1.1.1 Technological Changes

- Major part of the food was purchased on the weekly vegetable and fruit market in the form of raw or less processed food. The meat products were purchased in the form of carcase meat for one meal or for the weekend, for maximum one-week.
- The purchase of daily items was happened in the large number of small shops close to the flats, which were already privatised at that time. They sold their items as general shops. The assortment was poor, it's suitability for the storage of more demanding products (deep-frozen products requiring special treatment) was limited.
- Fast food restaurants were almost entirely unknown. The first fast food restaurant chain, the Mc Donald's appeared only in the second half of the 80's and only in Budapest. Other fast food restaurants were not present at all. The Hungarian initiatives failed due to the lack of know how and franchise.

1.1. 2 Contextual Changes

- After the political transition after 90's, within a short period of time (7-8 years) several considerable social and economic changes happened which compared with the previous circumstances altered the food-consumption in many respects.
- Re-privatisation and privatisation of agricultural land, the elimination of the co-operative land property, the transformation of the co-operatives, the formulation of the legal circumstances for private farming;
- Privatisation of food industry mainly with foreign capital investment;
- The liberalisation of foreign trade, the mass appearance of the supported food from the countries with developed market economy create competition for the exposed, weak, „germinating" Hungarian agricultural market;
- The food retail network has changed; the small scale retailer network was purchased by Hungarian or foreign people and resulted their change and reorganisation (Joker, Hansa, Julius Meinl, Spar); new networks emerged with a completely different new business philosophy and practice (Penny Market, METRO, TESCO) in the form of shopping centres;

- The mass appearance of the western household machines in trade and the substitution of the former ones or the purchase of new one from saves (refrigerators, deep-freezers, microwaves);

1.1.3 Socio-Cultural Changes

- Consequently the share of self-sufficient food increased within food consumption; the ratio of consumption from home grown products and products from the black market was considerable; this went together with the increasing consumption of unhealthy foods;

1.2 The Current Situation and Trends in Hungary

The majority of the Hungarian households (54.3 %) consist of only 1 or 2 person(s). 26.1 % of the households is „one person household". In 28,2 % of the households there is only 2 persons. Beside these the „3 person household" (19.8 %) and the „4 person household" (17.5 %) is characteristic.

Summarising the above-mentioned it can be stated that households with one person, with no child, with old person(s), with more educated people, with higher income are more characteristic of Budapest. While households with more persons, with lower educational level, with lower income are more characteristic of the villages. The population of the cities is younger than it is in the capitol or in the villages. The highest ratio of households with child under 14 is in the cities with population under 50.000.

Medium size supermarkets have significant role in shopping since 75 % of the Hungarian households purchase food in this type of shop with certain regularity. Purchase in farmers' market (piazza) also has significant role with its 68.9 %. This ratio in small shops and discount stores is 63% and 62.8 % respectively. The main selection criteria are availability (distance from home, diverse stock) and financial aspects. Groceries and butcher's emerge from specialised shops generally with their ration of 58 % and 57.4 % respectively. The characteristic of the given settlement is also a determinative element in the selection of different shop types (what kind of shops are in the given settlement).

Purchase in different shops is mainly determined by financial factors. The person with higher income goes to many different shops for the fulfilment of his/her requirements. While person with lower income visits less shop for the same reason. The latter category does not require a wide range of selection.

Purchase in small quantity is characteristic for almost every households. The ratio of households, which never do purchase in large quantity, is 11.6 %. The frequency of purchase in small quantity is daily (50.8%), in large quantity is at least once in a month (45.8 %). The average amount of money spent at purchase in small quantity is 831 HUF. It is 5541 HUF for the purchase in large quantity.

Practically there is cooking in every households with certain frequency (the ratio of households without cooking is 0.7 %). In the majority of households (56 %) there is every day cooking (once a day (53.5 %), more then once a day (2.5 %)). The cooking frequency of 3-4 times per week is outstanding as well (23.5 %). Cooking for 1 or 2 days is the most characteristic for the households.

The consumption of cold meal for breakfast and the consumption of warm meal for lunch is more characteristic. For diner the menu is more diverse but the results show that the consumption of cold meals is a bit more characteristic.

1-2 times per week warm meal is consumed for breakfast in the total number of examined households. The same for cold meals considering breakfast is 5-6 times per week. 6 times per week warm meal, 2-3 times per month cold meal is consumed for lunch. 3 times per week cold meal, every second day warm meal is consumed for dinner.

The main storing place of foods is the refrigerator (97.5 %). The ratio of deep-freezers is high enough, 72.4 % of the households store the food in it (the ratio of households with deep-freezer with the average capacity of 200 litres is 69.8 %). Consequently it can be stated that a considerable part of the households is able to store bigger amount of frozen food. Storing in pantry is also characteristic (72.3 %).

The role of home-grown (not purchased) food among different food types is diverse. The portion of home-grown products from food consumption value of the households is 20.2 %. According to a survey in 1997, 46 % of the households has land property and 30 % has some livestock.

About one quarter of the households (25.4 %) raises pigs and other livestock. 95.5 % of this ratio kill and process the pigs at home. 22.1 % of the households usually purchase or get larger amount of meat and process it at home. 22.4 % gets home processed meat regularly from relatives and/or friends. The significance of non-purchased meat products is considerable as at 32.6 % of the households it amounts to half or even bigger part of consumption. At the same time about half of the households (47.1%) purchase the meat products instead of home processing.

34.7 % of the households raise poultry and it is characteristic for 76.1 % of this group, that they slaughter them at home and store in deep freezer or process them in different way. 18.5 % usually purchase or get poultry in larger amount. They freeze it or process it in different way. 10.2 % of the households usually get poultry from relatives and/or friends. The ratio of non-purchased poultry products is considerable since at 35.9 % of the households it amounts to half or even bigger part of consumption. On the other hand 48.7 % of the households purchase the total quantity of consumed poultry and do not make it at home.

42.6 % of the households grow potato and 92.3 % of these store it in bigger amount as well. 34.9 % of the households purchase or get potato and store it in bigger amount for longer period of time. In the case of potato the role of non-purchased amount in consumption is quite significant, 28.1 % of the households grow the total amount of their consumption at home. At the same time 46 % of the households purchase the whole amount.

Considering fruits and vegetables home growing is important. 62.1 % of the households have hobby garden (own property and tenement land together) and 89.3 % of this ratio grow and process vegetables and fruits in bigger amount. 39.8 % of the households purchase or get vegetables and fruits in bigger amount which will be processed at home. 19.2 % usually get home processed fruit and/or vegetable products. 22.4 % grow all, 22.5 % grow 3/4 of the consumed fruits and vegetables. The ratio of the households where purchase the total consumed amount is only 23.7 %.

2 Summary

2.1 Workshop and stakeholder methodology

One of the basic ideas of the SusHouse Project is to involve stakeholders in the process of (re) designing the fulfilment of a household's needs compatible with the sustainable development. The stakeholders and project researchers were co-operation during the project period especially through the stakeholders' workshops (creative & back casting). The Hungarian team applied that same workshop methodology was developed from van der Wel (1998) and Manzini & Jegou (1998), but after the test workshop the creativity workshops

carried out in three town because the differences of the consumption patterns of the habitant and social and cultural polarisation.

The elements of the 1st workshop were the following:

- Stakeholder identification and involvement & workshop organisation,
- Introduction phase of the workshop - general information about the SusHouse project and Hungarian SCE function,
- Brainstorming session,
- Structuring of ideas and the main determinants of future households.

The number of potential selected and interviewed stakeholders was 200 altogether. They represent the most important current stakeholders (food production - agriculture and food processing whole sale and retail sector, household, service, local government, education institute, researchers, NGO, etc.).The attendance of the stakeholders was total 15-20 per cent on the workshops. The workshops generated about 50 ideas.

The ideas and the current situation were the base of the developed Goals-Strategies-Proposals chart and scenarios.

The 2nd workshop was a back-casting workshop. The Design Orienting Scenarios of the SCE function and the DOS's assessment have been discussed with new (future) and the present stakeholders. The objective of the second workshop was to develop concrete policy recommendation and/or future project initiatives. The participants summarised different preconditions to be essential for the implementation of the realisation of the DOSs.

These methods (see above the workshops) were really unknown practice for the Hungarian agri-food sector except of multinational companies. Most of the participants have never attended on workshops before. The groups concluded that as a result of the workshop they were in a better position to make decisions in their households and/or their own companies. The attitude of the participants and consequently the gathered ideas were strongly depended on the present Hungarian living standard.

2.2 Scenarios

Table 1: Hungarian SCE Design Orienting Scenarios (DOSs)

Local and Green Diet Food is supplied from local, organic sources. People eat in street corner eating-houses, or purchase food in local street corner shops to prepare and eat at home.
High-Tech Rural Garden The system of such hobby gardens which are suitable for regular, low external input, environmentally friendly food production with the most updated technology. Food production in these gardens connected with recreation, practical garden machines and hobby-food produced with environmentally friendly high-tech mainly provide the family needs. At cooking 40-50% of the raw material comes from the hobby gardens of the households
Robo-Kitchen High-Tech-Green High quality food system with environmentally friendly and very effective mass production. It meets the high-tech appliances equipped households. Cooking is international, which means that not local specialities but the widespread types of foods dominate (e.g. pizza, spaghetti, sauces, goulash, seafood, hamburger, fast food, smart food and snack). The programmable kitchen machines can quickly prepare the food while also maintaining their nutrition value. People can choose out of many dishes at home, but can go to restaurants or can order food via the Internet as well.

Table 20 Hungarian SCE function DOS's and their proposals

Proposals of DOS's		
Local and Green Diet (LGD)	*High-Tech Rural Garden (HTRG)*	*Robo-Kitchen High-Tech- Green (RKHTG)*
Local sustainable production systems	Development and spreading of such product groups which make easy the high-tech production in small gardens	Wide production of quickly preparable, healthy, functional and environmentally friendly products
Local "Test Bank" restaurants	Improving services developing supplier chains	Intelligent kitchen appliances
		Development and promotion of monitoring systems for food additive detection in foodstuffs prepared by GMO for all the World
		New generation of packaging-maters, -techniques and waste treatment

2.3 Consumer acceptance

Three focus group sessions were held in Hungary or the function Shopping, Cooking and Eating. Each DOS was evaluated by two focus groups as shown in the next table.

Table 11 Distribution of points between the DOSs and the current situation by the three focus groups

Scenarios Focus groups	LGD	HTRG	RK	Current situation
'Traditional'	5,5	*	1,2	3,3
'Green'	4,1	3,8		2,1
'Dynamic'		2,8	3,7	3,5
Mean	**4,8**	**3,3**	**2,45**	**3**

2.4 Environmental assessment

The environmental assessment of the "Strategies towards the sustainable household" project has carried out by a simplified qualitative LCA. This part of the research presents the environmental impact of the scenarios for the future household in 2050 and compares with the current situation of nutrition (Shopping, Cooking, Eating; further SCE) in the nineties.

The environmental assessment of the Hungarian Shopping Cooking and Eating has shown that the three developed scenarios could do some reduction in current environmental impacts. Of course these assessment contents some uncertainties, because the DOSs were implemented on base of current knowledge, statistical data and expected trends. 50 years is too long distance from nowadays perspective. Probably these scenarios will be implemented in the future only partly, the elements of these DOSs might be mixed. The effect of new information and biotechnological revolution might be much stronger than the researchers and stakeholders could think now.

Concerning the environmental impacts of the DOSs the following statements were concluded:

- It seems that the best is the Local & Green Diet scenario concerning energy requirement. The other two scenarios have also environmental benefit due to alternative energy sources, so these can also fulfil the factor 20 connection with non-renewable energy sources.
- The environmental impact decreases in Local and Green scenario on account of green or bio production. The pesticide-usage is at the same level as today in the other two scenarios, but these will be other pesticides (bio-pesticide or new software helped pesticide with anti dotum, which help decrease the environmental effect to zero level). These are necessary for the fungi-toxin protection of crops and human health.
- Both of scenarios (HTRG and RK) will use a lot of GMO and genetically modified plant. It will be a new revolution and the biggest change. The irrigation decreases because the modified plants will be drought-resistant.
- Efficiency of water management will increase in every DOSs. The largest decrease concerning sewage occurs in the Robo-Kitchen High-Tech-Green scenario - new cleaning method without water.
- The waste decreases 50 % in every DOSs. New technology will be developed for utilisation. The most efficient waste treatment will be connected to the Robo-Kitchen High-Tech-Green.

Table 21 Environmental gains (profit) of DOSs as a result

(Reference scenario=100 %)

	DOS 1 Local and Green Diet	DOS 2 Hi-Tech Rural Gardens	DOS 3 Robo-Kitchen-High-Tech Green
Material	~100	~100	~100
Power (fuels)	? ? ?	?	?
Water	?	? ?	?
Pesticides	? ?		
Fertilisers	? ?	? ?	? ? ? ?
Waste	? ?	? ?	? ? ?
Sewage	?	? ?	? ? ?
Transportation	? ?	?	? ?
Travel	? ?	?	?

? = 0-25 % decreasing   ?   = 0-25 % increasing

2.5 Economic analysis

Table 24 Summarising table of the economic analysis

	LOCAL AND GREEN DIET (LGD)	HIGH-TECH RURAL GARDEN (HTRG)	ROBO-KITCHEN HIGH-TECH-GREEN (RKHTG)
• Households	• Households are small producers of fruits and vegetable for themselves • Reduce of cooking - more healthy and environmental friendly • Large import of durable goods	• Large shift in the relationships with the retail and service sectors - new consumer behaviour in buying and cooking • More work in the buying and cooking • Small decrease of paid work because of the increase of home made meals	• Large shift to different relationships with retail and services, NGO's and government organisations • Entirely new technologies and new skills in the household work • Increase of share of male household SCE work • Large increase of government interventions by subsidies of environmental friendly housing • Large shift to import of durable goods
• Eating out	• Is not applicable	• Increasing eco-efficiency in the "test-bank" restaurants - new market opportunities at local level	• Is not applicable because of the main characteristics of this DOS
• Retail	• Reducing costs, energy and pollution because of the no long term distances, reducing packaging materials etc. At local level	• Reducing cost and pollution because of no long distance transport at local level • Completely specialised new firms entering to industry and service • Large shift to new skills - small decrease of paid work	• Increasing market share and competitiveness by new product-market combinations and product differentiation • Different firm structure - specific selling and storing of eatable and degradable packaged food - new supermarket chains and franchise can be most common
• Whole sales	• Firms leave this sector - direct relations between the agriculture, processing, retail sectors and households • Decrease in total work, in the employment at local level	• Different structures - direct selling more common from the producers and retail by households • Large disadvantages in general • Decrease of firms and employment at local level	• Emerging concentration of firms and increasing role of hyper- and supermarkets • Not applicable to much by proposal 1
• Food processing	• Decreasing competitiveness at local level • Small factories specialise for simple primary processing • Small increase in total work at local level • Small increase of government interventions	• Is not so much relevant (acceptable) because of small gardens grow products mainly for self consumption	• Large increase in competitiveness and market share • Large increase in co-operation with driving firms in packaging-maters in pre-competitive R&D • One hand increase in total work because of growing processing level but decreasing employment other hand because of the industry moves to the less developed countries in general • Large/small increase in government and EU-level (maybe World-level) interventions by standardisation, labelling, control and prohibition etc.

• Agriculture	• One hand small decrease in the competitiveness because of smaller farms at local level but small increase of competitiveness other hand because of new product-market combinations • Small shift to national production	• Specialised new large farms to develop and produce specific products for small gardens • Small increase of local full time employment in these large farms • Small increase of government interventions in control and standards for the large specialised farms	• Farms can increase their market share by product differentiation and targeting specific consumer groups but the proposal 2 cannot so important direct effect on agriculture • The multinational processing firms buy large specialised farms • Entirely new technologies: biotechnology, GMO • Expensive appliances, growing costs of elimination of waste -growing alternative energy using • Not applicable on employment and/or decrease in total work • Large increase in the government interventions mainly in control of pollution and biotechnological methods
• Other inputs in production chain • Biotechnological R&Ð and precision-mechanics industry • Packaging-maters, techniques, waste treatment and recycling industry • Agricultural machinery and chemical industry •	• Good opportunities in the producing of gardening (DIY) materials and equipment	• Repair and maintenance of gardening equipment become more important and intensive with advertising together • New market opportunities by revolutionary new product-market combinations and developing new products & technologies specified for high-tech small gardens	• Large increase in competitiveness by developing and spreading of monitoring systems • Good business in the selected collecting, reusing, recycling packaging materials

3 PR Task Reports

3.1 Workshops & Stakeholders

This part aims to summarise the workshop-related activities, which were carried out in Hungary from the beginning of the project till nowadays. One of the basic ideas of the SusHouse Project is to involve stakeholders in the process of (re)designing the fulfilment of a household's needs compatible with the concept of sustainable development. Achieving a sustainable future is not just a technical issue, but requires enrolment of and co-operation between social actors/stakeholders; such co-operation is a central issue for the achievement of drastic changes in production and consumption patterns and arrangements. Workshops are a powerful tool for achieving stakeholder involvement and are in the Sushouse project the main vehicle for interaction with stakeholders.

The general interests of these workshops within the project can be stated as follows:

- to create interaction between relevant actors by acquaintance of various relevant points of view and interests
- to generate new visions on future need fulfilment, which will be subject to environmental assessment, economic analysis and consumer acceptance analysis
- and, from a methodological point of view: how can this procedure - assessments of broadly endorsed future visions - contribute to a strategy towards the sustainable household.

For the realisation of the above objectives the Hungarian research team organised a test workshop and afterwards two rounds of workshops. In the first round three different workshops were organised since the regional economical differences in Hungary are bigger than in any other project partners' country. (the capital, Budapest is the most developed it is followed by the western part of the country (Sopron) and finally the eastern part (Nyíregyháza) is the least developed.)
In the second round one back-casting workshop was organised in Sopron, it focused on back-casting, implementation and strategies.

3.1.1 Stakeholder identification and management

Applied method for the involvement of stakeholders

- First step: we looked at every component within SCE boundaries.
- Second step: we choose companies with the biggest environmental pollution.
- Third step: we choose the biggest companies and looked their role in the market.
- Forth step: we investigated the role of SME beside the big companies.
- Fifth step: Telephone interviews
- Sixth step: personal interviews. The questions of the interview were:
    - How can they evaluate their economic situation today and in the future?
    - What is their opinion about the environmental performance?
    - Do they know which product have the biggest environmental pollution?
    - Do they thinking about the sustainable production?
    - Could they attend in the SusHouse project research work or not?
- Seventh step: a letter with the SusHouse leaflet, workshop 1 invitation.

Stakeholder groups

Food sector

In the food consumption of the household; the meat consumption has the biggest rate, than milk, cereals, vegetable. We found that the most important stakeholders of food processing are poultry, milk, and bakery, canning industry.

Trade sector

Every type of trade sector was investigated (small shop, supermarkets and hypermarkets). All of them were invited to take part on the first workshops but their attendance was far under our expectations.

Raw material producer, producer of appliances

The stakeholder identification was based on the trademark of kitchen appliances such as Philips, Daewo, Electrolux, Zanussi Lehel, Electermax etc. They did not show any interest.

Governments and other organisations

Ministries of Agriculture, Economy and Environmental, Local governments, Research Institute, NGOs local regional and national level

Identifying of future stakeholder

Starting point was the trends of the food-industrial research, consumption and expected innovation. We found that the most important sectors will be the information and biotechnology in the future. The role of the Internet will increase. We invited basic researchers from biology sciences (safety nutrition), medical science (health nutrition), new technology (biotechnology), software developers, and Internet trader.

The Hungarian research team decided to have a brainstorming session for the identification of potentially interesting stakeholders. This method proved to be successful since the team managed to identify more then 200 potential stakeholders that could have significant contribution to the final outcome of the research.

Before the first round of workshops the members of the Hungarian research team made several telephone calls, stakeholder interviews as it was agreed at Szeged meeting in September 1998. Due to the fact that these workshops were held in Sopron, Budapest and Nyíregyháza, we as research team concentrated on stakeholders working in the cities or surrounding areas. After the evaluation of their answers those were: about 60 per cent of the asked stakeholders shown positive attitude 30 per cent of them were indifference, 20 per cent of them didn't give positive answer and only 10 per cent of the stakeholder showed absolute negative interest. Despite of the preliminary efforts the participation had not reached our expectations. The attendance of the stakeholders was total 15-20 per cent.

Before the second workshop the intention of the Hungarian team was to re-invite the stakeholders participated on one of the creativity workshops and to involve new present or future stakeholders in the evaluation of the existing design orienting scenarios. These scenarios were created on the basis of the ideas generated on creativity workshops. Basing on the experiences gained during the first round of workshops the research team decided to organise a „weekend" workshop which allowed enough time to the participants for getting a better overview of the project objectives and giving their remarks and comments.

Table 1 Stakeholder involvement overview in different stages of the Sushouse project: interviewees and workshop participants

	Interviews	*WS1 attendance*			*WS2 attendance*
		Bp	S	Ny	Sopron
• (Food) Service sector	5	1	1	-	3
• Appliances producers	4	-	-	-	-
• Retail/wholesale	6	-	1	-	2
• Supply chain actors	9	2	5	5	4
• Primary producers (agriculture, cotton, mining)	4	-	1	-	1
• Others	4	1	-	1	2
• Environmental groups	3	-	-	-	-
• Consumer groups	2	-	-	-	-
• Other	5	-	-	-	1
• Ministries & national research councils	5	3	2	-	1
• Local/regional Government	3		2	1	-
• Other	2	-	-		-
Research institutes & universities	13	4	5	2	10
TOTAL	63	11	17	9	24

3.1.2 Expert and stakeholder interviews

From the beginning of the SusHouse project we focused on the nutrition problem and the main stakeholders.

The field of the interviews:

- For the background information we interviewed the following companies, mainly the biggest in meat milk, poultry, canning industry and bakery, but we visited stakeholders as SMEs, companies and farms in agricultural sector, retail and wholesale sector, research institute and producer of raw material, appliances and durable producer. These interviews were more than 60. The questions were related to the following :
  - How does environmental policy proceed in the strategy and mission of your company?
  - Is it worth spending money on environmental protection in Hungary nowadays? If your answer is yes than does it mean any advantage over the competitors?
  - Can you imagine that environmental protection within the companies will be one of the criteria for staying comparative and marketable in the future?
  - What are the most critical points in the production chain at your company from environmental point of view?
  - Do you think that the development of environmentally conscious consumer behaviour affects the profile of your company or the other way around?
  - What is the amount of money Does your company spends on environmental measures, investments or fines? It was form does it happen?
  - What is your opinion about the importance of quality assurance (environmental) systems, which are getting so popular in recent days?
  - How do you see the connection between profit-oriented approach and environmental protection within company management?
- Asking them to connect to the project on the workshops.

- Expert interviews for economic analysis

The answers differ depending on the economical situation of the enterprise, and the environmental impact of production. The main problem were the main unsustainabilities: the sewage water and hazardous waste and the treatment of these, because these require high financial contribution. Most of the participants reacted positively.

3.1.3 Stakeholder management between the workshops

Table 2 Overview stakeholder management, stakeholder re-involvement activities and results

When	Activity	Result
Jan-July 98	Background information for the Country report, interviews	A few new information, general comments
September 98 - Mid January 98	Workshop preparation, stakeholder identification, invitation (personal contact, phone contact, e-mail, mail)	very time consuming - low rate of participating (20-25 %)
February 99- July 99	Sending to the stakeholders a short summary of the results of the workshops, DOSs	1-2 stakeholders reflections
May 99 - August 99	Expert interviews to Economic analysis	17 filled questionnaires
July 99- October 99	Organising of focus group, to consumer acceptance	3 focus group session, filled consumer questionnaire
September 99 - December 99	New stakeholder identification, on basic of the DOSs, environmental groups, researchers, interviews	More new stakeholders on the second workshop 50-50 % old and new stakeholders
January 00	Workshop evaluation by participants / questionnaires/	40 % back sent it /filled/
April 00	Interactive communication between some stakeholders and PRs	Draft project proposal to verify of LDG scenario

Table 3 Identification new & future stakeholders based on constructed DOSs

	DOS 1 Local and Green Diet	DOS 2 High-Tech Rural Garden	DOS 3 Robo-Kitchen Hi-Tech Green
*Driving forces for this DOS**		New technology in the garden and in the kitchen	(new) technology in the kitchen
Necessary actor groups to realise DOS	consumers, retailers, food processing companies (bio-producers) government, local government, farmers, franchise restaurants	researchers, producers of equipment, machines, software, controlling systems, owners of gardens, intelligent services, controlling, monitoring tools producers	Basic researcher, innovative producers, packaging producers, government, domestic appliance producers, whole sale sector, municipal waste, sewage manager

Concrete new stake-holders (groups) to be invited in the 2nd workshop**	local food producers and manufacturing, retailers, green consumers	biological pesticides developer, protein researchers,	Internet trading, biotechnological sector, information-electronic sector, ready to eat meal manufacturing, packaging producers, food industrial companies

* for an explanation, see stakeholder identification documents
** and not present in the 1st workshop

3.1.4 Evaluation of the stakeholder identification and management task

The SusHouse task format proved to be very useful for the Hungarian research team in stakeholder identification and management tasks. This method is quite new for the Hungarians even in the private sector. Due to this the research team had to cope with several difficulties during the task. The main difficulty, which the Hungarian research team had to face with, was stakeholder management between the first and second workshop. It was necessary to develop a personal contact with the stakeholders to be invited. This requires much more time then it was available for the research team members.

Summarising the results achieved in this task, it can be stated despite all difficulties the research team managed to involve more then 100 stakeholders into the research. The stakeholders could apply it in their own companies or institutes by the interpretation of this method which could contribute to the final objective of the SusHouse research project which is sustainable nutrition function in the households.

3.1.5 Workshop Organisation

3.1.5.1 Test workshop

For testing the whole methodology and to get information about the possible reactions of the stakeholders for this new approach the Hungarian research team decided to organise a test-workshop in Szeged. The main observation of the Hungarian project researchers was that the participants could not imagine themselves in a future fictive situation. Many participants were trying to complain on the present economic and social problems that might not be the problems in 2050.

This recognition led the Hungarian team to develop and construct a well-based fiction or story, which helps the participants to imagine them-selves in the desired situation. The visualisation of this was also extremely important.

3.1.5.2 Stakeholder creativity workshop (WS1)

Due to major regional differences in Hungary, the Hungarian research team decided to organise three different workshops in the first round, which were the following:

The first workshop was organised on the 10th of December. Location was in the House of Hungarian Culture Foundation in Budapest; It was only one day.

The second workshop was organised on the 20-20th of January and was located at Sopron University in Sopron;

The third workshop was organised on the 27-28th of January and was located at the Educational Centre in Nyíregyháza.

Table 4 Workshop 1 Programme

Time	Budapest	Sopron	Nyíregyháza
1st day /1st day 17.00-18.00	-	Welcome, brief introduction of program and SusHouse project	
18.00-18.30	-	Introduction of the participants	
18.30-20.00	-	Informal discussion and dinner	
20.00-21.30	-	Presentation of the possible future scenarios by the participants	
10.00-11.00 /2nd day 8.00-8.20 (Sopron, Nyíregyháza)	Welcome, brief introduction of program and SusHouse project	Short evaluation of the previous day	
11.00-11.15 / 8.20-10.00 (Sopron, Nyíregyháza)	Break	Brainstorming session	
11,15-11.30 / 10.00-10.30 (Sopron, Nyíregyháza)	Announcement of the rules of brainstorming	Break (poster session)	
11.30-12.30 / 10.30- 13.00 (Sopron, Nyíregyháza)	Brain storming session I.	Structuring ideas	
12.30-13.15 / 12.00-13.00 (Sopron, Nyíregyháza)	Lunch	Workshop evaluation	
13.15-14.15 / 14.00- (Sopron, Nyíregyháza)	Brain storming session II:	Lunch	
14.30-15.45	Evaluation of the workshop by the participants		

37 stakeholders were attended on the three workshops from different level of the SCE function. The participants were invited from different areas of the function (SCE). Without mentioning all there were representatives of packaging, food industry, Ministry of Economy, Environmental and Agriculture, NGO, architect dealing with alternative energy sources, organic farmer, food retailer etc. The participants did not know each other.

The workshops were facilitated. The members of the Hungarian research team were observers. There were used mainly free-brainstorm-sessions. The sessions began with some instructions by facilitators. Two subgroups was planned in every town but at the end there was one group because some of the participants were there only part time. This creativity method was unknown for most of the participant.

We used the same methods and question lists on every workshop, but there were differences in the duration of the workshops. The facilitators structured the questions into subgroups closely related to each other and they collaborated the two question-lists. The ideas were written on a flip chart. The generated ideas were then structured into technological-cultural matrices. This structuring happened on the workshops in Sopron and Nyíregyháza while after the workshop held in Budapest the Hungarian Project researcher structured the generated ideas.

Table 5 Questions for the main workshop

"A" version	"B" version
What do you consider in everyday household activity in order to be more sustainable? How much would you sacrifice from your income in order not to pollute so much your environment? What kind of kitchen equipment would you buy if your salary increase? How would you reduce the amount of energy and water used in your household? How would you reduce the amount of communal waste and how would you put them out not to pollute the environment? Can you see a connection between self-produced agricultural products and striving for healthy lifestyle and more sustainable household? What do you think value-rate between shopping-cooking-dish-washing is right? Which changes of lifestyle help or make the chance of sustainable household's worse? What way can we influence the attitude of people in order to put a premium on sustainability concerning SCE function? What kind of changes of technical development help or make the chance of sustainable household worse? How do you connect business interest (in agriculture, food-processing industry, and commerce) with the demand of sustainable household?	Will the features of the households remain the same in the future or they will go through a complete transformation? How could you describe the future food-processing sector? How can you describe the relationship between the domestic research results and innovation? What is your opinion about the genetically modified food as a Researcher, Producer Consumer? What is your opinion about the functional foods? What kind of change will be in the consumer acceptance in 2050? How could you harmonise the questions of health care, environmental protection and the increase of economic results? What kind of possible solutions can you mention for the increasing of energy efficiency? Can you see any possibilities for the reduction of present water usage? What are the preconditions of the emergence of waste management as a new potential industrial sector?

After structuring the ideas into technological-cultural matrices, the project researchers developed a GSP chart, which proved to be a very useful tool for the generation of proto-scenarios.

The overall outcome of these workshops is that the participants better aware of the environmental effect of the households mainly SCE household function. Sometimes they were surprised about the today's situation and the possible effects on their future life, position etc. Most of the participants signed their intention to attend on the next steps of the research process. They would have liked to get the results of the research, the processed experiences of these workshops. They were interested in the method of scenario building and expressed their readiness to participate on the 2nd workshop phase.

These methods were really unknown practice for the Hungarian agricultural-food sector except for multinational companies. Most of the participants never attended on workshops before. The groups concluded that as a result of the workshop they were in a better position to make decisions in their households and/or their own companies. The attitude of the participants and consequently the gathered ideas were strongly depended on the present level of Hungarian living standard. Almost for every participant the imagination of 50 years seemed rather difficult. In the last 10 years there had been a huge change both in the social and economic situation.

Evaluation
- In spite of the fact that the facilitator did not know much about the project it was useful to hire an independent, young and dynamic person as facilitator.
- The statistics show regional differences. These differences were not represented by the workshop outputs. The reasons have to be further investigated.

- Stakeholders have to be re-assessed. The interest of the business sphere was very poor. Trade was almost entirely missing. The reasons have to be assessed, it has to be completed by interviews and they should be involved in the next phase.
- It seems that the conservative feature of food consumption disappeared or decreased dramatically. It is conservative only in traditional tastes. People get acquainted with more thousands of food types in the super- and hypermarkets and they try them all. Beside the local demand there is global supply in the food sector, which indicates fast changes. A good example for this is the drastic transformation of the Hungarian food consumption, shopping and cooking in the last 10 years. Consumption can also be altered consciously, consequently under proper circumstances consumption can be transformed into sustainable one. It should be examined in the future.
- The participants of the workshops were not realised that sustainability and healthy food consumption are not parallel. There is a considerable lack of knowledge concerning sustainability (for example nobody mentioned that the food, which was produced in a sustainable way, is not necessarily healthy). Therefore the formulation of public awareness is extremely important.

3.1.5.3 Implementation and strategy workshop (WS2)

The objective of the second workshop was the development of concrete policy recommendations or future project initiatives, which could lead the society to the implementation of different elements of the scenarios that it could result major environmental gain in the household SCE function.

Our workshop was held in Sopron, on 10-12 December. We gave a title for this workshop: *"Future Scenarios of the nutrition in the sustainable household"* - Shopping-Cooking -Eating in Hungary in 2050.

Several stakeholders were invited for the second workshop. The representatives of different sectors such as universities and research institutes, NGOs, governmental bodies, companies in the food sector attended on the workshop.

This workshop was longer than the 1st stakeholder workshops one year ago. On the basis of our earlier experiences we thought that more time was necessary for the stakeholders to discuss, because it is a new method, what they didn't know before the workshops.

In the first part the workshop the researchers provided information on the essence of the project background and methodology but they got some documents in writing before the workshop. These were:

- DOS summaries;
- environmental assessment of DOSs;
- results of the consumer questionnaires evaluation and focus group session;
- summary of DOS economic analysis.

Workshop 2 Programme

10 December	Friday
1600 - 1730	Registration
1730 - 1740	Opening
1740 - 1900	Presentations of the last year results of the SusHouse project.
1900	Diner
11 December	Saturday
730 - 830	Breakfast

830 - 900	Summary of previous day work
900 –920	Presentation of DOSs. Evaluation of the consumers opinions
	Project researchers
920 - 940	Presentation of the environmental assessment of the DOSs
940 - 1000	Results of the economic analysis of the DOSs
1000 -1015	Break
1015 - 1200	Workshop in 3 subgroups. Back casting 1
	1. Representatives of producers and government
	2. Participants of media, NGO and education-research institute
	3. Representatives of trade sector and households
	Moderators: dr. Gábor Szabó, Zsolt Szekeres, László Szûts,
1200 - 1230	Reports of the subgroup work
1230 - 1330	Lunch
1330-1400	Methodological aspects of the economic analysis (Dr. László Tóth)
1400 - 1515	Workshops in 3 subgroups Back casting 2.
	Which is the requirement of DOSs towards stakeholder?
	Which concrete steps are necessary in the DOSs to reach the sustainability?
	Which elements are not acceptable in the DOSs?
	Moderators: Dr. Gábor Szabó, Zsolt Szekeres, László Szûts,
1515 - 1530	Break
1530 - 1600	Summarising of the back casting session
1600	Free program
12 December	Sunday
730 - 900	Breakfast
900 - 1015	Plenary session
	Summarising of the back casting session
1015 - 1030	Break
1030 - 1200	Proposals and priorities
1200 - 1300	Lunch

The expected results of the ongoing workshop were also mentioned to the participants. Most of the participants were previously informed about the project since they attended on the first round of workshops as well. Meanwhile considerable numbers of new stakeholders were also participated. Considering this the project researchers decided to give detailed presentation.

After the informative part the participants were separated into three subgroups. A facilitator guided every subgroup. The subgroup session was divided into two parts such as back-casting I. and back-casting II. On these sessions the work was structured by different provocative questions which were prepared in advance by the project researchers.

Table 6 Extract of facilitator guide

Back-casting 1	Back-casting 2
Which technologies and technological changes are necessary? What Cultural and Behavioural changes are necessary? What kind of changes would be necessary in the institutional system? SWOT analysis of the possible future situation described in the Robo kitchen scenario	On this section the following questions were presented to the audience : What concrete short term oriented steps and activities towards implementation of proposals and supporting ideas could be done? Who should do this step (stakeholder co-operation)? How could this step be organised and funded?

Who would support it? And who would oppose it How can barriers reduced? What kind of changes would be necessary on decision making level? What research agenda related to changes and barriers is necessary?	What policy recommendations could help this step or activity? Which technologies are necessary? Behaviour (al changes)? Which products and services? What does the solution mean for different types of household organisation? Which trend fit? Which trends are contrary? Which actors are necessary for introduction or implementation? Who will oppose is? How could it be introduced?

After the two back-casting subgroup session the participants summarised the different ideas arose during back-casting sessions. These preconditions proved to be essential for the implementation of the DOSs.

3.1.5.4 Some preconditions for the realisation of the DOSs

- Adaptation of EU directives;
- protection of agricultural production, predictable codification (authorities, parliament);
- monitoring and controlling, R&D (the role of NGOs, research institutes and higher educational institutes);
- authorities, chambers, development institutes;
- involvement of PHARE and other EU financial sources;
- redistribution of tax income on the level of different sectors; .
- development of interest representing bodies of small scale producers (farmers);
- governmental control;
- EU accession;
- continuity, predictability and stability of economic strategy;

After discussing all the above mentioned essential preconditions the participants were asked to set up priority order among the different priorities emerged during the two working day. The following priority order was determined more or less as a result of consensus:

- Pilot projects: almost all of the participants mentioned the importance of follow up pilot projects aiming to introduce the described sustainable system of local and green production or high tech rural gardens. The participants showed their intention to participate in one of these projects if possible.
- Application of evaluation methods: Some of the economists stressed that a different evaluation method for environmental burdens should be developed by which environmental awareness can be expressed in financial assets.
- National subsidies for „green" technologies: the elaboration of a system promoting environmentally friendly technologies and techniques was a general requirement from the side of the participants.
- Formulation of public awareness: this is the most important measure by which in long term could lead the society to a better environmental situation.
- Relationship between „developed" and „underdeveloped" societies. More developed societies tend to behave more sustainable way then less developed societies.
- Relationship between the state and multinationals: multinationals can play an important role in these new sustainable systems, since they have the power to interfere the producers. Although a complete change in their behaviour is essential.

- R&D for this topic, communicators
- GMOs: will be important for the innovation but have to know the impacts too, and for it needs the basic science work. The biotechnology and informative will be the most important elements of the new revolution.
- „Factor 20" applied to Hungary: At explaining the major driving force of the Sushouse project to the participants many of them reacted as the application of „factor 20" for the special Hungarian circumstances is essential. According to the opinion of the participants this factor is less in case of Hungary then it is in EU countries.
- Development of different methods helping the interrelations among science-politics-practice.

3.1.5.5 Evaluation of the workshop

From the perspective of the participants

The participants evaluated the workshop by questionnaires, which were sent back to the PRs after the workshop. 70 % of the participants gave critical comments. The workshop opens new horizon for their thinking, not only relationship with household but also either to their work. Some of them found new partner for the research. Everybody would like to stay in contact with the PRs and each other.

Table 7 Evaluation question

1a. What is your opinion on the workshop (as a whole)?
1b. What is your opinion on the brainstorm session (morning)?   *(For example: how did it go, what do you think of the results, what did you think of the composition, size and facilitation of your subgroup)*
1c. What is your opinion on the back-casting session (afternoon)?   *(For example: how did it go, what do you think of the results, what did you think of the composition, size and facilitation of your subgroup)*
1d. In the programme, did you miss anything, or were some elements superfluous? Were some elements too short, or too long, in your opinion?
2. Did you have enough possibilities to make your contributions, during the day?
3. What is your opinion on the facilitation by the day facilitator?
4a. To what extent the workshop has been a useful / interesting day to yourself?
4b. Did you gain any ideas that you might be able to use in your organisation or work?
5a. Have you been informed satisfactory on the goals, focus and function of the workshop, beforehand? *(by means of the conversations, correspondence and the background material)*
5b. Do you have any remarks or suggestions concerning the background document?
6. Room for other remark suggestions.
7. Would you like to keep being involved in the project?

They were interested in:
- taking part in a new project;
- for example verification of the scenarios or proposals: Local and Green, or Hi-Tech Rural Garden;
- "local taste bank", as a "Local agenda" methodology and practise for the sustainable franchise system/network/;
- "sustainable rural area" as a pilot project for two regions of Hungary and other (SusHouse) countries;
- opportunity of a new work plan together with some stakeholder, recommendation for the policymaker.

From the perspective of the SusHouse project

The project evaluated the workshop on the base of facilitator's summaries, flipchart and personal impression and evaluated the answers of stakeholders and opinion. The two evaluations were in convergence. The most important messages of this workshop are as follows:

- The future scenarios, which were developed in SCE function, are considered as achievable ones in the opinion of the stakeholders although their combinations are more probable.
- For the implementation of the described situations the development of a better communication among the multinationals, small and medium size enterprises and R&D sector has to be achieved.
- In this process the involvement of the Media is of great importance.
- Continuous two way communication is necessary. Model like advertisements should be developed in order to formulate a collective change of environmental awareness.
- The results of this research project should be spread as widely as it is possible among the different actors within the system boundaries of the SCE function.
- The development of Quality Assurance Systems for the above scenarios, with special attention to Local and Green and High -Tech Rural Garden, is extremely important.

3.1.5.6 Evaluation of the workshop task

The prepared task format was very useful for the Hungarian research team, because it gave a lot of new knowledge and experiences. It seems that the involvement of stakeholders for strategic planning is an efficient method for other disciplines as well.

- Hiring a professional facilitator is essential for the success of the workshops although it is difficult to find skilled facilitator in Hungary.
- The SCE approach was a completely new one for the participants, most of them profess that the solution of the problem resides in the increasing economic welfare.
- The time horizon of the participants and the researchers were different, thinking ahead 50 years was unworkable for the participants.
- Too much uncertainty - is it workable?
- We are not able to abstract from the present - differences in creativity. The changes are so fast that the adaptation to this is difficult as well.
- There was positive feedback where we considered the workshops less efficient.
- The participants were surprised at the disinterest - the researchers were not so.

The two evaluations (of stakeholder and PRs) were in convergence. The important conclusions of this workshop were:

- The future scenarios, which were developed in SCE function, are available

- The requirement of much more, continuous two-way communication with the stakeholders;

- The involvement of the media is also important

3. 2 The Hungarian Scenarios

The results of the workshops were the Design Orienting Scenarios (DOS) which developed by the Hungarian research team (Methodology of scenario building was developed by Manzini &Jégou1999). First step of scenario building was the investigation of current situation and trends. During this process the stakeholders had important role. After it the concept of proto-scenario was created and ideas were gathered from stakeholders by the brainstorming workshop. The ideas were structured (GSP chart) and by these the Hungarian PRs worked out the following DOSs and proposals. For the easier visualisation some pictures had presented each proposal. The DOS consists of a vision, a storyboard, proposals and preliminary assessments. The Hungarian team developed three DOSs. Each DOSs have some proposals as it is indicated in this table below. These ones were examined and evaluated by Project Researchers (PRs) and stakeholders (question lists, expert interview, 2nd workshop).

Table 8 DOSs and proposals

DOSs	Proposals
DOS 1: Local and Green Diet (LGD)	1 Local sustainable production systems 2 Local "taste bank" restaurant
DOS 2: High tech Rural Garden (HTRG)	1 Development and spreading of such product groups which make easy the high-tech production in small gardens. 2 Improving services developing supplier chains
DOS 3:Robo-Kitchen High-Tech Green (RKHTG)	1 Wide production of quickly preparable, healthy, functional and environmentally friendly products 2 Intelligent kitchen appliances 3 Development and promotion of monitoring systems for food additive detection in foodstuffs prepared by GMO for the World. 4 New generation of packaging - matters, -techniques -and waste treatment

3.2.1 Short description of DOSs

3.2.1.1 Local and Green Diet (LGD)

Vision

Food is supplied from local, organic sources. By this procedure the mitigation of environmental burden caused by long transportation of foods can be achieved. The production and distribution networks have to be organised in a way, which provide foods especially characteristic for the given region. Products, which can not be produced in the region, are also available but considerably expensive. The agricultural producers can only be subsidised if they run environmentally friendly (organic) production system. The soil and other important natural resource are protected by this technology.

People purchase food in local street corner shops and local farmers' market to prepare and eat at home. People preferably consume such dishes, which consisting ingredients with the lowest possible environmental burden. On the label of different products different indications can be read about its environmental friendliness. The consumer will select the different ingredients from the shelf on the basis of this label. Due to the limited transportation locally produced food will be cheaper than the ones imported from far countries. The consumers do not purchase imported basic ingredients, which can be substituted with local ones. Aspects of healthy lifestyle are focused on consumption and expressed in chemical free foods. Our kitchen is well equipped and ensures the opportunity of preparing delicious and varied food preserving the nutrients. Consuming healthy, tasty food, rich in nutritive materials, avoiding unnecessary food, which is not vital and often even harmful for the human organism. Restaurants and Take Away complying to new values and expectations with local „taste-banks" to help popularise the traditional dishes of the region.

Selective waste collection and handling is common which is organised by local communities and authorities. The household uses less packaging and non-decomposable polyesters. Recycling biological waste, bio-gas, bio-compost, alternative energy is essential characteristic of the system.

Appropriate storage places for selective waste collection will be developed individually or groups. New enterprises are necessary for handling the waste, which was collected selectively. Local small processing plants will be established for the supplying shops and taste banks in the neighbourhood. The shop assistant informs consumers about actual prices, the origin and ingredients of goods.

Story board

Starting our typical food shopping day we bicycle to the local farmers' market where we buy some vegetables and locally grown fruit. Some food we bought is locally processed, i.e. locally frozen, stored and preserved by simple technology (like souring). The only food bought is seasonal. Food is stored by using traditional methods (e.g. pit-storage) which have under up-to-date electronically controlled conditions.

Preparing and eating meals at home have a special role within the household. Food is mostly prepared in the household with tasks and equipment being shared between several households. We prepare a meal by simple and efficient ways of cooking using up to date devices, but at the same time require less water and energy. Nowadays we avoid semi-finished and ready-to-cook food as well as exotic foods. Waste generating from food is utilised as bio-waste (i.e. compost, with another 'sector-link'). The amount of waste is less than it is usual due to the fact that there is no need for packaging. Sometimes (twice a week) we go to a local "taste-bank" restaurant to try traditional dishes of the region.

Context

The members of household live in family like households, mainly elder children, young family with children and elder couple. About 39 per cent of the family will organise to fulfil this way of SCE function. They cook at home and go eating out also in half-and-half part.

Techno-cultural options:

This scenario requires the implementation of local production system, not only sustainable food chain, at least one third organic, very organised infrastructure, logistic network, and education program. The detailed DOSs is found in the internal document Tóth & al.1999.

- Technological options
  - Requires alternative technology development:
    - for the different soil type,
    - for different region,
    - for different type and size of enterprises, with combination of
  - Waste minimisation technology or the best environmental practice and quality assurance system;
  - Developing of franchise "Taste Bank" network for LGPS.

- Cultural expectations
  - Requires special education system;
    - Everybody but especially for gypsy's, not only young population but elder too.
    - Traditional producing in new green style;
  - Knowledge of traditional manufacturing industry with new equipment;
  - Grandmother's cooking method "old taste-new meals";
  - Possibilities of using of the by-products and waste in arts, for gifts, for plays.

Socio-organisational possibilities

- Preventive NGOs necessary for monitoring for the bottlenecks of LGPS;

- New institutional system for local continuous rural education system;
- Local media program developing to presentation of new behaviours;
- Social/collective behaviour heavy parallel with individual closed family;
- Helpfully, value productive, ethical and real value -simple, clear, fit;

Goals

- New "Green revolution" for developing of rural area;
- Maintenance of employment in the small village, town;
- Eco-efficient and eco-benefits equate sustainable living community development;
- To decrease the differences in the rural and urban living standard level;
- To increase the cultural level in food consumption;

Strategies

- Investigation of the rural area which is equate to the local sustainable production system;
- Demographic background solution method implementation, for;
- Both of undeveloped area, low level cultural level, bad soil quality;
- It should be ensured the Gypsy population could graduate the secondary school in 2050;
- Develop the best waste prevention and waste treatment technology;

Proposals

- Developing new models for the Local sustainable production system in every opportunities activities;
- Developing the best practise technology for Taste Bank franchise network;
- Revised the education program, new subject in the school;
- Living village community - living eco centre - to present the sustainable practice, in the production, kitchen, restaurant, culture;
- Charitable (NGOs) organisation for helping to the raising of the standard level, life style;

3.2.1.2 High-Tech Rural Garden (HTRG)

Vision

The system of such hobby gardens which are suitable for regular, low external input, environmentally friendly food production with the most updated technology. Food production in these gardens connected with recreation, practical garden machines and hobby-food produced with environmentally friendly high-tech mainly provide the family needs. Purchasing foods varies on wide range. Only food supplements and foods that can not be produced in the region are bought in supermarkets.

The households for self-consumption produce most of the food but the surplus is collected and sold by local enterprises. Food can be purchased from small local shops, supermarkets, and farmers' market or ordered by Internet. Changing of food between friends, neighbours, relatives is also common. Eating together with the family is regular. Eating mainly happens together with the family. Beside this there are local small restaurants available where home made type meals are served. At cooking 40-50% of the raw material comes from the hobby gardens of the households. They use energy saving cooking methods which preserve vitamins and valuable nutrients and meet the requirements of healthy nutrition. The type of the storing depends on the product feature. For the winter period they use traditional conservation or freezing method. In the gardens, stores (pantry, cellar) also belong to small buildings, which is used for storing the products in fresh state.

After finishing cooking and consumption the wastes are collected separately. They take the organic wastes back to the garden for composition. During production the use of chemicals is low, the creation of wastes is excluded, since the wastes arisen get back into the production.

Story board

On a regular Monday sometimes during lunchtime or after work we go (preferably environmentally friendly way of transportation) and check the computerised production system in our rural garden. In considerable number of cases working place is in the households or hobby gardens. We pick some fruits and vegetable for daily consumption. On Tuesday we buy some foods from the local entrepreneur after checking his or her home page on the Internet. On Wednesday we check the chemical residues in our locally grown products. On Thursday we attend to a "garden forum" which aims the exchange of knowledge and different tools between the hobby gardeners. On this forum the family can have great relaxation. Friday is recreational day when the whole family is in the garden studying the different methods of computerised farming systems. On the weekend we visit some restaurants having specialities of the hobby gardens.

Context

Similar to the Local and Green DOS, approximately 40 % of the households could imagine this one. This DOS is attractive mainly for the family with children and older couple. This DOS is family like, but has some community aspects.

Techno-cultural options
This scenario requires the implementation of very efficient high-tech technology in the local production system. It is adaptable mainly small scale (garden, 1000-2000m^2) production, especially vegetable, fruit and poultry, goat etc. It requires high-tech intelligent equipment and service and environment-conscious training. It requires the development of a new type service and information systems and infrastructure furthermore development of education. Reliable prised technological equipment developed for households above the average income of the population, and after use improvement of destroying technology.

- Technological options
  - High-tech machinery (computerised) in the gardens close to the households, smart machines;
  - Local enterprises which collect, change and/or sell home grown foods;
  - Continuous and up to date information about the product is needed to produce;
  - More spare time to spend for hobby like activities;
  - Aesthetic and chemical free, exact ingredients expectation;
  - Appropriate storage place for selective waste collection individually or groups;
  - High level service.

- Cultural expectations
  - Requires special education system;
  - Traditional producing in new green style;
  - Knowledge of traditional manufacturing industry with new equipment;
  - Grandmother's cooking method "old taste-new meals";
  - Possibilities of using of the by-products and waste in arts, for gifts, for plays;
  - Cohesive role in the family;
  - Recreation in the garden beside work.

Socio-organisational possibilities

- Preventive NGO-s necessary for monitoring for the bottlenecks of HTRG system;
- New institutional system for local continuous rural education system;
- Local media program developing to presentation of new behaviours
  - Social/collective behaviour heavy   parallel with individual closed family

- Helpfully, value productive - ethical and real value -simple, clear, fit;
- Tax on non controlled products;

Goals

It can preserve the value of home growing food (known what are eaten, recreation, hobby activity, can reserve and strengthen the family lifestyle and can serve following example for other countries)

Ensure the environmental friendly garden production by high-tech on local/micro level.

Strategies

Working and recreation on same place near the nature.

Labelled food HTRG in hypermarkets

Proposals

Multifunctional intelligent tools and equipment by which the production is environmentally friendly, effective, controllable, continuous and less labour intensive.

Continuous and updated information on the product that is needed to produce (Internet).

New services support for the smart garden machine equipment.

New collaboration form between gardeners and the retailer sector on regional level .

New services and control test method for the pesticides residuum, food safety, GMOs etc.

Common labelling system for the local community gardeners.

Leasing and credit constructions, renting systems from the building of the households till the buying of the equipment.

3.2.1.3 Robo-Kitchen, High-Tech Green (RKHTG)

Vision

The food system is high quality, environmentally friendly and very effective mass production. It meets the high-tech appliances equipped households.

Shopping in super-, hyper- and megastores is a complex family programme including entertainment. This family shopping is done once a week or even once a month travelling to the site by electric cars.

The consumers store the food at home. Big storage rooms are electronically monitored, cool storage are heavily used.

Cooking is international, which means that not local specialities but the widespread types of foods dominate (e.g. pizza, spaghetti, sauces, goulash, seafood, hamburger, fast food, smart food and snack). The programmable kitchen machines can quickly prepare the food while also maintaining their nutrition value. Kitchen machines have a display to show the actual change in nutrition values of food while it is prepared. The computerised cooking technology is adjustable, controllable and safe. Computer programs promote the creation of healthy menus. Everybody can prepare his or her favourite dish. People can choose out of many dishes at home, but can go to restaurants or can order food via the Internet as well.

The time of meals and the way they are eaten can be varied according to the needs of the family members: when, what and where they want to eat. According to customer demands,

alternative recipes are provided for healthy and/or functional menus. Eating in and eating out can be conveniently varied depending on the conditions.

Selective waste collecting and handling is common which is organised by local communities and authorities. The household uses less packaging and decomposable polyesters. Waste and garbage handling solved at a high technical level and in an environmentally friendly way. Time spent on cleaning or washing up after meals is minimal. Built-in waste handling and waste recycling systems are working in the flats. There is no waste problem: everything is mechanised.

Story board

The climate larder monitored by computer gives a sharp alarm on Thursday morning It means the food is coming to an end. We need to control our healthy statement. The detector shows it needs more minerals and vitamins but less carbohydrate for our body. We run a program on a special computer, which can show us what kind of menu needs for us and concerning it can calculate and optimise, the raw materials or meals have to bought. After the computer printing out the menus we can show the mass of the foods have to buy for the next week. Saturday we organise a family-shopping program by rented electric car. By the Internet ordered fresh foods we can pill wash and clean in the supermarket without water with little alternative energy use. We participate on an exhibition of hi-tech kitchen appliances.

Context

This DOS mainly equate for the single, busy young people. Approximately 10-15 % of the households could imagine this one.

Techno - cultural options:

This scenario requires the implementation of high-tech equipment and intelligent kitchen machines, cooking pots. It requires development of a new type service and information systems and infrastructure, and development of education. Reliable prised technological equipment developed for households above the average income of the population, and after use improvement of destroying technology. The kitchens will became international that means many international varieties of foods will spread.

- Technological options: application of high tech durable on every level of the SCE function (raw material production, food industry, trade, household and after consumption. The first three levels support the operation of Robo Kitchen in the households.
- Cultural expectations: the same as previous DOSs.

Socio-organisational possibilities

It requires organisation of standardisation, eco-labelling, control and monitoring by firms, NGOs, government etc.

Goals

Reduce of energy using in every level of the SCE function.
Efficiency alternative energy sources.
Efficiency of cooking/processing techniques.
Reduce the shopping km's.
Reduce the consumable goods waste.
Packaging habits and culture changing.

Strategies

Supporting the alternative new energy resources uses and development;
Disappeared the eco-intelligent technological line (best for environment) and equipment;
Efficiency catering system network;
Internet in the everyday life;
Environmental industry developing;

Proposals

Developing efficient controllable (pressure, temperature) equipment for every level in different size,
Intelligent cooking pots, high pressure cooking equipment developing, intelligent SCE service
Developing of more food storage without cooling energy,
Developing the room-bicycle for kitchen activity,
Adaptation of NASA technology

3.2.2 Analysis of DOSs

Concerning the "design orienting" and/or "policy orienting" characteristics of Hungarian DOSs the following statements can be summarised:

- DOS LGD: This scenario is rather Policy Orienting Scenario than DOS since mainly new regulations and legislation are needed for the implementation of this scenario.
- DOS HTRG: This scenario is the mixture of DOS and POS since beside new policies and regulations (the introduction of size effective new farms) for the implementation of this scenario new technological development is also necessary.
- DOS RKHTG: this scenario is pure design orienting one since this scenario focuses on the highly developed, environmentally friendly kitchen equipment and technology.

These scenarios will not start on their own since for that new ideas, technologies, education and legislation should be developed. These interventions could accelerate this process.

The basic requirement for starting the implementation of these DOSs is the development of proper environmental awareness. . This can achieved by continuos environmental education from beginning (on nursery, primary level and secondary level). Every household member should bear high knowledge concerning environmental issues. Furthermore continuous R+D activities are necessary and communication between the stakeholders. Pilot project could verify the socio-economic and environmental vitality of the scenarios.

- DOS 1: Strengthening local production instead of globalisation. Multinational companies should be flagships for local initiatives towards local and green diet (LGD). (Multinational should change from conventional food to organic one).
- DOS 2: The core idea in the development of this scenario was the fact that these small Hobby gardens are characteristics for Hungary. The research team tried to develop - on base of stakeholder workshops – something typical Hungarian.
- DOS 3: The basic concept in the development of this scenario was the comfort and healthy/safety and sustainable nutrition.

Non of the scenarios fulfil the core idea itself. The types of the DOSs are different because of their different characteristics. Due to this they can combined for instance Local and Green Diet + Robo-Kitchen High-Tech Green etc. It can be interesting to evaluate the different combinations of the DOSs as well.

The scenarios are mainly thought as concept, which can be implemented in the future since during the second workshop the stakeholder verified it. The following ideas appeared on the 2nd workshop and follow up stakeholder evaluation as starting point of implementation:

- Pilot projects for LGD as "Local sustainable production system" (in Hungary, SusHouse countries and other countries)
- Franchise system for local Taste Bank network
- Software application for local farmers on high tech rural gardening
- Software application for healthy and sustainable nutrition

3.2.3 Conclusion

These scenarios accepted by the stakeholders on the second workshop. No contextual changes/evaluation were made. All of the three scenarios are imaginable for some layers of the society. The stakeholders agreed that the future would probably look like the combination of different scenarios.

We can say, that these DOSs have the following characteristics in approach of Manzini and Jégou (2000) clusters (soft care, easy car):

- Robo-Kitchen High-Tech-Green: "easy care" household in which high-tech equipment help users in their daily life. The SCE demands very low personal involvement. Shopping is done virtually and delivered at home. Automatic cookers prepare food in the kitchen.
- Local and Green Diet: this scenario means " high-care" household, which based on a life-style in line with natural models. The household consumes mainly seasonal food from the local region.
- High-Tech Rural Garden: This scenario can be characterised as mainly "soft care" scenario. Part of the food comes from the high-tech garden. The life style careful for the environment by high-tech infrastructure.

3.3 Consumer acceptance

For the assessment we applied the methodology of consumer focus group and questionnaires for the Hungarian SCE situation, which developed by Bode (1999). It meant a quantitative analysis of the questionnaires that were filled in by the focus-group (mainstream, green, dynamic) participants and on the qualitative focus-group evaluation. The workshops for the consumer acceptance analysis were organised in July and September at Szeged University, College of Food Industry. The scenarios of SCE function had been presented in verbal and in picture were visualised. The consumer aspects of the DOSs have been collected by questionnaires and during discussion on workshops.

The evaluation of DOSs which have been developed as result of first workshop - made by consumer on the following way:

- Consumer test workshops - consumer focus group (July and September),
- Questionnaires
- Consumer interviews (September, October)

We tested the future scenarios with helping of three consumer groups. These groups were differ on base of consumption patterns and behaviour. The consumer said themselves as green, or traditional etc. The consumer groups had been named such as: traditional or mainstream, dynamic and green.

The first focus group workshop had been organised in July 1999. The participants were mainly middle age people (female and male) 12 person altogether. The second group was

named "green" postgraduate students (16 persons) at the environmental course at the University of Szeged, and the members (5 persons) of the third group, who were also students at the College of Food Industry were the dynamic consumer. There are working mainly in the food industry.

The three focus group workshops were organised on 3 different places and time. While the first was in July the other two were in the middle and at the end of September 1999. During the workshops we tried to verify the consumer green focus group opinion by consumer interview as well. They usually buy in bio shop because they would like to eat healthier.

Each group had got background information about the aim of the research, the applied method and the results of workshop, especially the DOSs had been presented. And they filled the questionnaires.

In the first workshop the consumer questioner contained 3 DOSs while on the following two workshops the participants compared 2-2 DOSs.

Table 9 Overall characteristic of the participants and the examined DOSs:

Characteristics	Traditional consumer	Dynamic group	Green consumers
Date of workshop	16. July 1999.	25. September 1999.	18. September 1999.
Participants (ps)	12	5	16
Female	9	4	10
Male	3	1	6
Average age	45	32	25
DOS I. Local and green diet	X		X
DOS II. High tech rural garden	X	X	X
DOS III. Robo kitchen	X	X	

3.3.1 Results of the consumer analysis

The questionnaires, which were filled by participants of the three focus groups, were evaluated by qualitative way and with using of SPSS software. The results of the analysis are summarised hereinafter.

On the workshops the participants compared 2-2 DOSs.

Table 9 Overall characteristic of the participants and the examined DOSs:

Characteristics	Green consumers	Dynamic group	Traditional consumer
Date of workshop	18 September 1999	25 September 1999	16 July 1999
Participants (ps)	16	5	12
Female	10	4	9
Male	6	1	3
Average age	25	32	45
DOS I. Local and green diet	X		X
DOS II. High tech rural garden	X	X	X
DOS III. Robo kitchen		X	X

Table 10 Description of the participating groups

	Traditional	Dynamic	Green

| Values	Mixture of post-materialistic socially oriented and individually oriented values although social oriented values are the strongest.	Mix of post-materialistic, socially and individually oriented values, although individual orientation seems a bit stronger.	Mixture of post-materialistic socially and individually oriented values, although a bit more individually oriented than the other two groups.
Way of living	The group is rather active and family oriented than passive. Activities related to work are often bear with higher priority than the ones related to leisure.	Rather mixed. Career is of great importance, leisure and culture are also important for this group.	Calm well structured way of living, the importance of domestic atmosphere is dominated. Sport and relaxation is also important.
Eco-lifestyle	Moderate to high eco-oriented lifestyle, though lower scores than the other two groups	Moderate eco-oriented lifestyle.	High eco-oriented lifestyle (higher scores than the other two groups).

Traditional

Mean
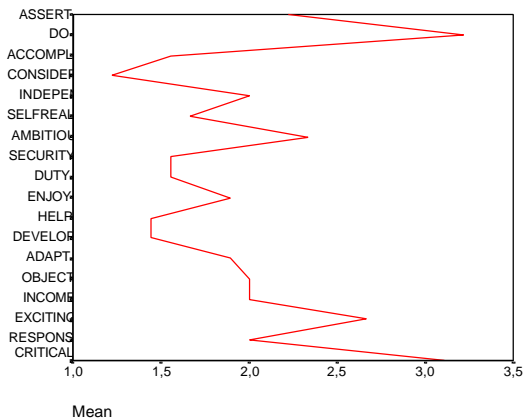
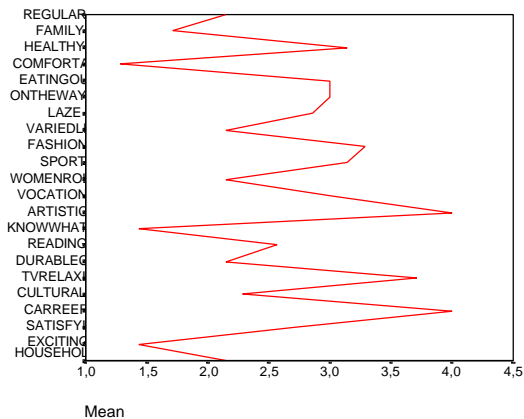**Figure 1 Traditional lifestyle profile evaluative dimension:value**

Mean

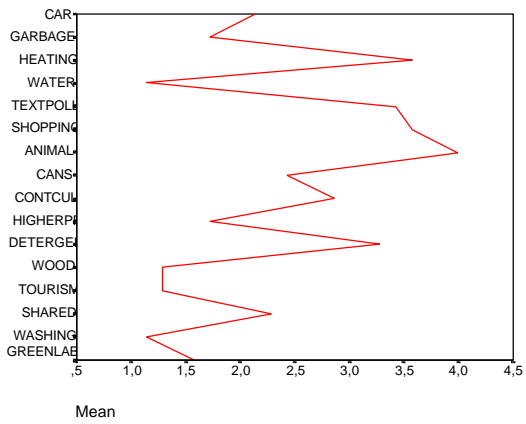**Figure 2 Traditional way of living**

Figure 3 Traditional focus group - ecolife style
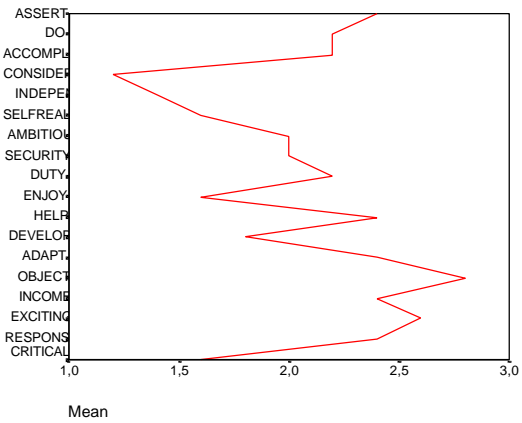
Dynamic

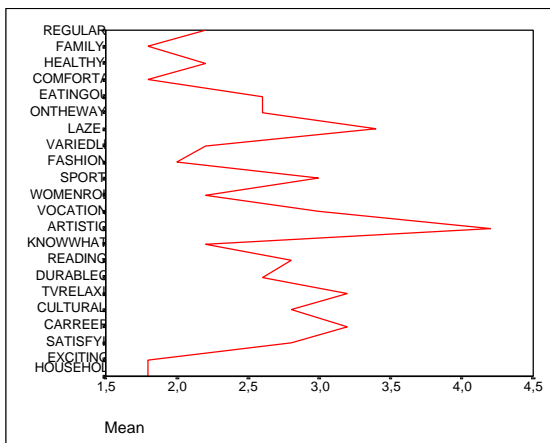**Figure 4 Dynamic lifestyle profile- evaluative dimension: values**
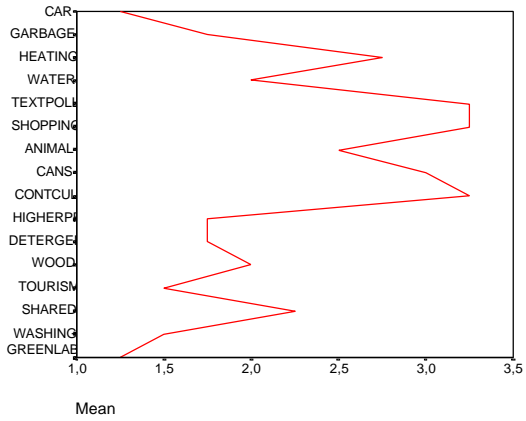

Figure 5 Dynamic Way of living
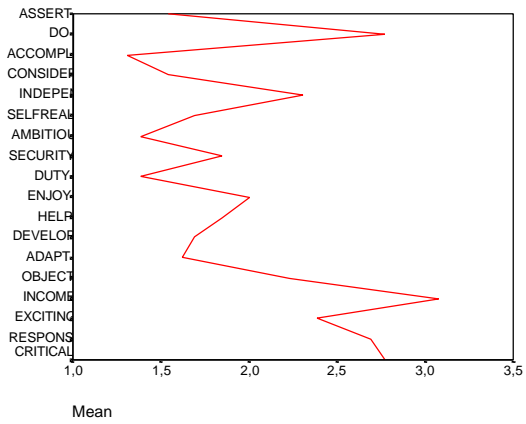
Figure 6 Dynamic eco lifestyle

Green

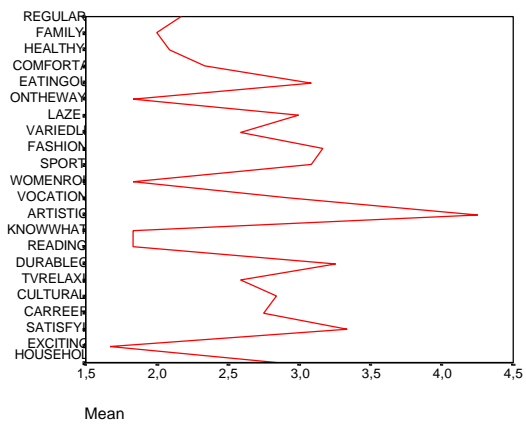**Figure 7 Green lifestyle profile: evaluative dimension: values**

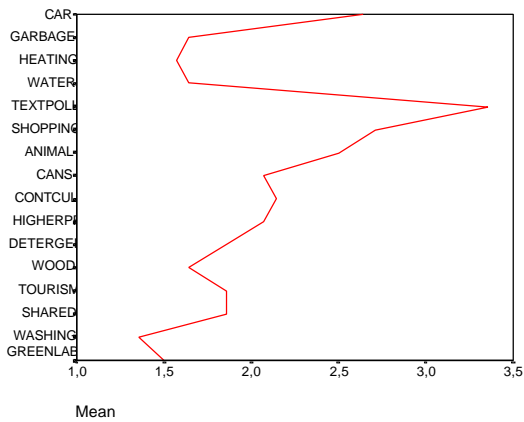**Figure 8 Green focus group: way of living**

Figure 9 Green eco-lifestyle

3.3.2 Consumer acceptance of DOSs

By evaluating the points which were given by the participants for the DOSs and current situation the following results came up:

- The Local and Green Diet DOS was the most positively evaluated within both traditional and green groups.
- The HTRG was evaluated differently by the related groups but the difference was smaller than in the case of Robo Kitchen High-Tech Green DOS.
- The dynamic group evaluated RKHTG as the most favourite one.
- The evaluation of Current situation was more or less the same in traditional and dynamic groups although it got lower values by the green group.

Table 11 Distribution of points between the DOSs and the current situation by the three focus groups

Scenarios Focus groups	LGD	HTRG	RKHTG	Current situation
'Traditional	5,5	*	1,2	3,3
'Green'	4,1	3,8		2,1
'Dynamic'		2,8	3,7	3,5
Mean	**4,8**	**3,3**	**2,45**	**3**

* Although the traditional group evaluated all of the three DOSs in this document we intended to include only two of them.

3.3.2.1 Local and Green Diet

This scenario was evaluated by the traditional and green focus group. Generally the following statements can be made which were stated in both of the focus groups:

- The positive aspects at the evaluation of this DOS were that this is family oriented and it has high cohesive role. Furthermore it supports sporty lifestyle.
- The negative aspects of this DOS are that everybody liked the diversification and the participants of both groups were agreed on that seasonal foods are boring. This DOS is also time-consuming.

Table 12 Summary of the different aspects concerning LGD

	Attractive aspects of LGD	Non-attractive aspects of LGD
Both groups	• controlled quality • perfect recycling • home made food • this is the right direction • waste management	• sharing tasks and equipment between the households • poverty hampers • restricted shopping • change in the way of thinking is necessary
Additional in Traditional group	• local traditions • this is the closest to the present situation	• it is not OK buying local foods always • shopping by bike
Additional in green group	• provision of food from local organic sources • the dominating Bio food	• eating in will not be general

As it can be seen from the above summary table most of the positive remarks were commonly made by both of the focus groups. Everybody liked that by the realisation of this scenario a completely controlled production can be achieved, which would result healthier and more environmentally friendly nutrition patterns. Both groups were stressed that by the application of this system modern waste management can be realised.

Sharing tasks and equipment was not acceptable by the two focus groups. In Hungary this attitude is not imaginable at all.

The **Traditional** focus group added that in this scenario local traditions and tastes could be maintained which in their opinion makes this scenario as the closest one to the present situation.

The **Green** focus group stated that the provision of food should be based on local organic sources that contribute to the success of this DOS. The production systems basing on the local agro-ecological potentials are the main advantages of Local and Green Diet scenario.

3.3.2.2 High-Tech Rural Garden

This scenario was evaluated by the dynamic and green focus groups. This DOS was highly preferred by the green group compared with dynamic. The positive aspect of the green group concerning this scenario was that the work and recreation can be combined in this scenario. Furthermore this is based on local circumstances and specialities instead of globalisation. This scenario meant the following for the green group: "back to the nature".

The dynamic group stressed that this scenario can be combined with Robo kitchen since both scenarios contain elements dealing with high technology. HTRG involves high tech in production, RK involves high tech at the household. The dynamic group found that the two DOSs (HTRG, RK) can not be compared since the first one is mainly focusing on production while the other one puts the kitchen into the focus.

Table 13 Summary of the different aspects concerning HTRG

	Attractive aspects of HTRG	Non-attractive aspects of HTRG
Both groups	• cohesive role in the family • storage of food • local production • waste management and food storage	• production is mainly around the house instead of hobby gardens (time consuming transport) • hobby gardens are mainly for additional income
Additional in Green group	• working beside recreation • common eating in the family	• I do not think that all the agricultural production should be controlled by machines !
Additional in Dynamic group	• High tech control of production • Can be combined with Robo kitchen	• the ratio of home grown food will not be 40-50 % • it is too far from the Hungarian farmer (at least 150 years)

The above summary of the outlined positive and negative aspects show that both focus group underlined the cohesive role of this scenario in the family. According to both focus groups by the realisation of this scenario a sustainable waste management and food storage can be obtained.

The common negative aspect of this scenario is that according to the opinion of the participants hobby gardens are mainly used for additional income generating activities instead of profit making production.

3.3.2.3 Robo-Kitchen High-Tech Green

This scenario was evaluated by the traditional and dynamic focus group. The positive aspects of this DOS were the following: comfort, rapidity, time saving techniques, effectiveness and wide range of foods.

The negative aspect of the outlined scenario was that the participant could not accept that a machine could tell them the right way of nutrition. They would rather prefer freedom in the choice of every day foods by the help of the high tech machines in the preservation of nutrition values.

Table 14 Summary of the different aspects concerning RKHTG

	Attractive aspects of RKHTG	Non-attractive aspects of RKHTG
• Both groups	• comfort • complete controlling system • waste management • simplicity	• expensive equipment
Additional in Traditional group	• shopping provides recreation for the family	• over-mechanised • computerised nutrition and eatable packaging is nonsense • computerised diet is not acceptable • most of the people likes cooking, by this it is gone • unhealthy "international" foods • full of illusions • impersonal • eating is too futuristic • change in the way of thinking is necessary

| Additional in dynamic group | • easy and fast shopping
• high level computerisation in the kitchen
• fully automatic
• installed waste management and recycling system | |

Summarising the above table it can be stated that this scenario provides a comfortable solution for the activities carried out in the kitchen. Both focus groups underlined that by the realisation of this DOS a system with complete control can be achieved which results simplicity in the kitchen activities.

In the case of this scenario most of the negative aspects were mentioned by the **traditional** focus group. An over-mechanised, computerised nutrition and eatable packaging is just not imaginable. As traditional people say most of us like cooking and by the realisation of this DOS it would disappear. Another problem would be if cooking and other nutrition related kitchen activities would become impersonal.

3.4 Environmental assessment of DOSs

In the SusHouse project it is the first time we have made a complex examination of the environmental impact of households, including an analysis about the load on environment caused by food consumption, and, as it is a strategic research. There will be an impact study concerning nutrition (shopping, cooking, eating) in England, the Netherlands and Hungary in 2050, the next century. To achieve this, a realistic general survey is needed on LCA basis examination to get knowledge about the effects of our present eating habits on the environment. This is a pioneer work both in contents and methods, so it will show the symptoms of „children's diseases".

Task leaders guide the steps of the analysis. (We used the study of Welleman et al.1999, Bras, 99 and Knot, 99). First we evaluated the reference-scenario then the Design Orienting Scenarios (here after DOS), of the end we evaluated the results. All these issues have been discussed on the 2. Workshop meeting and it was taken into consideration when compiling the material.

The present condition of the environment in Hungary is due to several kinds of factors including everyday household activities.

Now, at the millennium, the Hungarian environmental situation might be a little better than the developed western countries, although the appearance of the consumer society accelerates the problems here, especially when the production and the consumption neglects efficient environmental protection and prevention. It can be seen even today, that owing to the disposable bulk products, the enormous quantity of household rubbish is getting to be one of the most unpleasant harms of civilisation. We also have to consider the waste in material and power consumption.

3.4.1 The objective of the research

The objective of the analysis is to achieve an environmentally more acceptable future aspect of the household eating function. As the basic concept of the SusHouse project is the fact, that by 2050 the consumption will have increased fivefold and the population will have been doubled while the living-space will only be the half of the present one. Sustainability can be achieved only by reducing the load to the one-twentieth part, which is known as factor 20 in professional literature (Vergragt, 1997).

Definition of the SusHouse Shopping, Cooking and Eating function means the following point of view of the household:

- obtaining food (from take-away and in restaurants and, through *shopping*, from supermarkets and special food shops and markets; this will also include food obtained from household gardens and semi-subsistence farms);
- *storing* bought food in cupboards and refrigerators;
- preparing and *cooking* the food using a range of kitchen equipment;
- *eating* the food itself (at home or eating out) and
- *clearing away* all the packaging and food scraps, and washing up

The *functional unit* has been defined as the eaten nutrition material (foods) quantity {kg} for one average Hungarian household for one year.

The number of persons in average Hungarian household: 2.5, number of household 4011 x 10^3 (Each calculation will be done by this statistical average.)

The focus of the scenarios of the SusHouse project concerning the SCE function. The core of SCE function is defined all activities of the household *directly* associated with the purchase, storage, cooking, eating and clearing up of food and drink, *"from supermarket door to home waste disposal"*. Beside assessment of the core of this function it is necessary to assess the environmental impacts of the broader system of the food chain. Carried out the LCA logic analysing from "cradle to grave". The system includes the food production (agriculture and food processing, home growing food, import foods, usage of chemicals pesticides, fertilisers) and production of consumables and durable. Furthermore the investigated system includes the phase of the after consumption stage as well, e.g. waste collection, treatment etc.

The function Shopping Cooking Eating can be divided into the following phases and elements, in Table 15.

Table 15 Overview of function phases and elements

	Phase elements in the SCE function	Sub-phases and sub-elements
Production	This phase is the cradle of SCE assessment	Food production in the agriculture; Home growing of foods; Food production and processing; Production and use of consumables and durable (e.g. chemicals, pesticides, etc.);
Consumption Acquisition/Use	This phase includes the different elements until the foods reach the households.	Shopping of foods; Shopping consumables & durable; Travel and transportation;
	Includes the specific activities related to the consumption of foods.	Preparation; Storing; Cooking; Eating; Cleaning up;
After consumption (Disposal)	This phase includes disposal activities as sorting of waste; Selective collecting, bringing glass to reuse, to make compost;	Reuse; Recycling; Bio composting; Landfill; Incineration; Travel for disposal;

This is why we analyse the 3 DOS within a certain system pre-determined by a SCE team concerning the expected environmental profits and how they effect on the global environmental problems.

Exports

Chemicals

export,

Import foods

Production of
Consumables &
Durable

Airpollution
wastewater

Agriculture

Homegrown

Food Industry

Energy,
Water

Transoport

Acquisition

Air pollution

EATING IN / EATING OUT
Takeaway

Energy,
Water

Shopping
Storing
Cooking
Eating
Cleaning up/ dishes

Sewage water

Waste collection

Transport

Waste

Sewage
treatment

irrigation

Incenerating

Airpollution,

Energy,
Water

Recycling

Reusing

Food craps
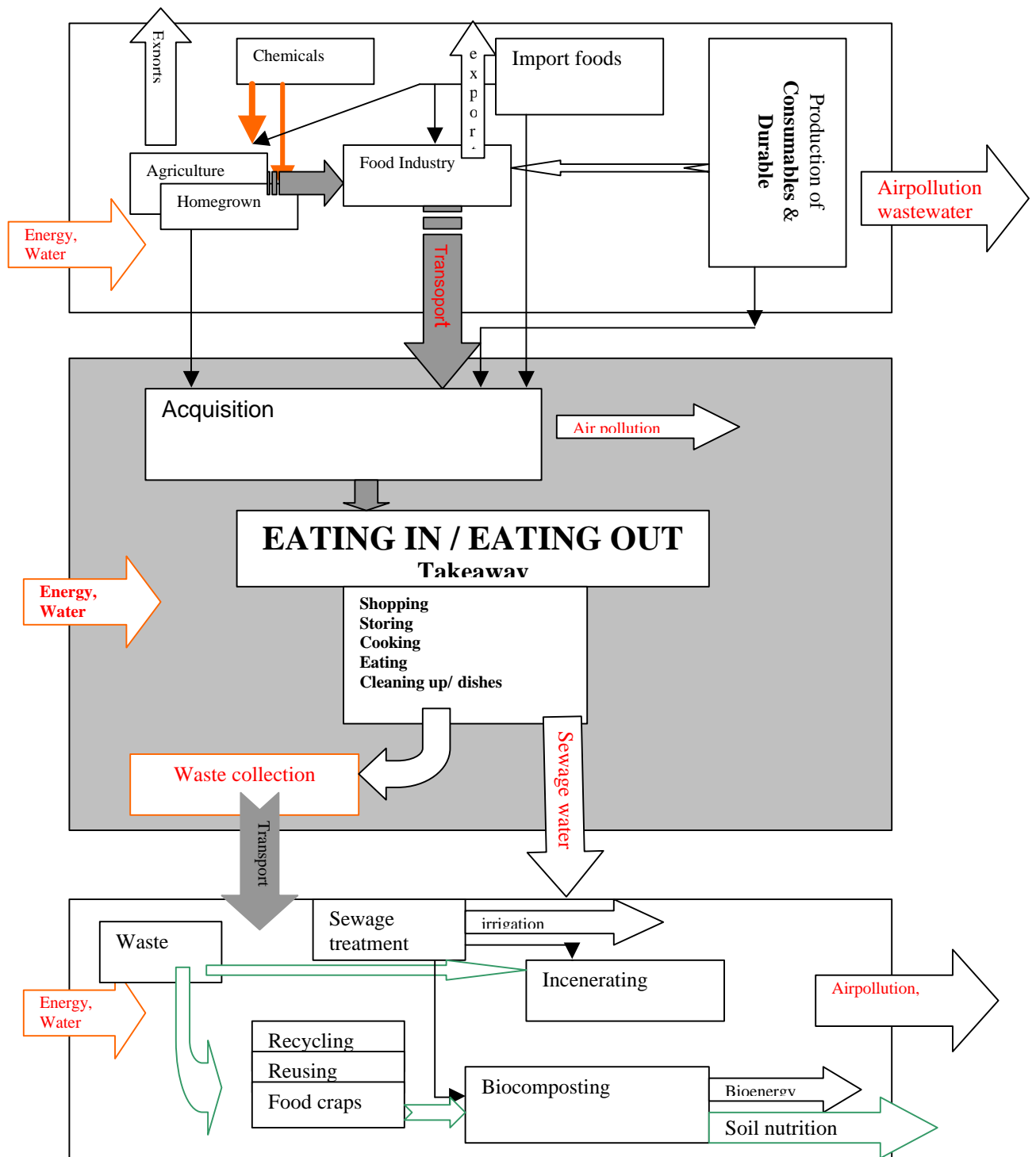
Biocomposting

Bioenergy

Soil nutrition

Figure 10 Process tree of Shopping Cooking Eating

Table 16 Indicators used in the environmental assessment

Indicator	Unit	Explanation
Materials	kg	Home growing, fresh, processed,
Energy	MJ	Energy [MJ] is divided by sources of energy (coal, petrol, etc.) and 'renewable' and 'non-renewable'. Since most data sources mention the primary energy, this indicator is used. Energy is a part of every function phases from plant-production to after consumption.
Water	m^3	Water is an important resource because this is used to produce foods (irrigation and raw materials) and in the SCE (kitchen activities), and also food-industrial raw material (bread, canned food)
Pesticides	mg	Used during the agriculture production phase (home growing, industrial agricultural production). It means fungicide, insecticide and herbicide together.
Fertiliser	kg	Used during the agriculture production phase (home growing, industrial agricultural production) as N, P, K.
Consumables	kg	Consumables used in the usage phase, e.g. detergents
Durable	pieces	Durable goods consist of kitchen equipment, such as storing, cooking, cooling, machines and other durable used in the consumption phase. Equipment for production, waste recycling etc. is however not included.
Household sewage	m^3	Waste water of households. Waste water of industry hadn't investigated.
Solid Waste	kg	Household waste consists of food scrap-compostable organic material, packaging materials-metal, glass, plastic, paper and textile, waste of durable. Other waste, e.g. production waste, is not included.
Emissions	kg	The indicator 'emissions', refers to all other emissions (to air, water and soil) occurring in households or during production processes.
Freight transport	tkm	Transport by truck, aeroplane, train etc. of one ton over a distance of one kilometre.
Personnel travel	km	The travel by persons by bike, car, public transport for shopping, going to restaurants and other activities.

Comments:

- The energy, resources used to produce durable, consumables and for transport of goods and personal transport are not assessed.
- Waste emissions etc. of durable and consumables, transport and travel are not assessed as well to prevent double counts.
- At the end-of-life cycle, the energy and resources etc. are not assessed. Only the quantity of household waste is used as indicator.

To assess this would have been very difficult and the results very uncertain, especially for 2050.

The objective of the analysis is to specify the strong and weak points of the particular aspects and to compare them both nationally and internationally. Besides it is an important goal that the analysis should provide help for the definition of a target-method-product system promoting the sustainable nutrition step by step.

The examined system analyse our home food industry (agriculture, small farms and food process), considering foreign trade balance, but not including data on the production of import products. It takes account of the pesticides but it does not examine the machinery, equipment and other expendable things. As for the *purchase*, only the transportation ton kilometre (tkm) is given and the distance that has to be covered in order to purchase.

The use-phase, which is practically the centre part of the examination, can be divided into further phases, such as storing, preparing, cooking, eating, washing-up and waste collection. The final stage of the examination is the waste management. The function-unit of the examined system is the amount of food consumed in an average Hungarian household within a year, excluding beverages (soft drinks, beer, wine, etc.) and stimulants like coffee and cigarette. The indicators examined in the system are shown in the table below.

Table 17 Hungarian data of present situation

Basic data and assumptions:	
Population (thousands)*	10 065
Population over 15 (%)	82,5
Number of households (thousands)	4 011
One-person household (%)	26,1
Two-persons households (%)	68,2
Two-family-household (%)	2,9
Average number of persons per household	2,5
State of Shopping Cooking Eating (1997)	
Average spent per household on food per year (ECU)	1,028.18
Proportion on food shopping (%)	33,1
Food and nutritive material consumption per household (MJ/year)	11 245
Food and nutritive material consumption per household (kg per year)	1 473,75
Average food and nutritive material consumption per household detailed,	kg per year**
Protein	
Meat, meat products, fish	156,25
Milk and dairy products	340
Eggs	37,5
Fat	
Fats and oils kg per year	90
Carbohydrate	
Cereals	220,5
Sugar	94
Potatoes	165,5
Vegetables	220
Fruits	150
Proportion of eating out (%)	3,0
Proportion of take-away (%)	1,0

* 30 June 1999

Table 18 Relevant indicators of the examined system

	Material [kg]	Power [MJ]	Water [m³]	Pesticides [mg]	Fertiliser [g]	Transportation	Travel [km]	Sewage [m³]	Waste [kg]	Emission [kg]
Food production	X	X	X	X	X	X		X		
Purchase	X					X				
Use	X	X	X					X	X	X
Waste management						X				

In the examined system the quantitative analysis of the environmental impacts needs a lot of time and it is difficult as well due to the lack or contingency of data. We have reliable data on the quantity, compounds and nourishing value (energy, protein, fat) of the food consumed as well as on the costs of food in HUF.

However, the percentage of food components given in kilograms does not correlate in every case. So further research and surveys are necessary to examine the process-degree proportion of the food.

There are more uncertain points concerning energy. We know the total energy consumption of the relevant industrial sectors and within that the proportion of energy by fuels, but there are no data on energy-proportion within a certain technology of the various products, unless individual surveys have been done. In this way, the difference between the home and the foreign energy-input couldn't be seen. Mass ratio allocation is general in industry, although we are aware of the fact, that the energy-requirements of the various products are different. But we reflected the energy necessary for the procession to all households, deducting certainly the energy ratio of export food. It is true, that a certain part of the national food consumption takes place in canteens, hospitals and restaurants, but we think it is not a major mistake to include them, as the per capita food consumption does not only mean food eaten in the household. The possible variants of the energy calculation can be found in the appendix of the detailed analysis (13-5).

The data on water are partly estimated, partly statistical and partly based on industrial sources. The pesticide and fertiliser consumption per household has been calculated from the annual statistical data. As for the waste, we calculated only household waste, which can be mostly organic food-waste or packing material.

The ton-kilometre of the transported food has been calculated from the statistical data reflected on all households. The transport-distance has been estimated on the basis of questionnaires.

In the case of the wastes we worked on the basis of sector-norms and surveys, considering study cases and our own questionnaires as well.

The quantity of sewage is less than the quantity of the drinking water used up, due to irrigation, production and cooking. Its composition, however, depends on consumption habits. We could not give the quantity of the emission concerning the nutrition function.

3.4.3 The impact of the present nutrition as a reference scenario

In the household the environmental impact of nutrition depends on:

- the amount of the consumed food (549-929 kg/person in the past 10 years);
- the extension of the household (1, 2, 3, 4, 5 or more persons);
- consumer habits (cook and have meal regularly at home or dine out);
- the components of the food (a lot of fruit, vegetables or fatty diet);
- the degree and technology of food-procession(fresh, semi-finished, ready-to-cook food) ;
- specific water and energy needs;
- the amount of the waste;

 (The detailed assessment comprises details in Environmental Assessment of Shopping, Cooking and Eating scenarios, Hungary, Background Report, SusHouse Project for each phase.)

Some characteristics are in figures:

Drinking water production per capita with public piped (m3)
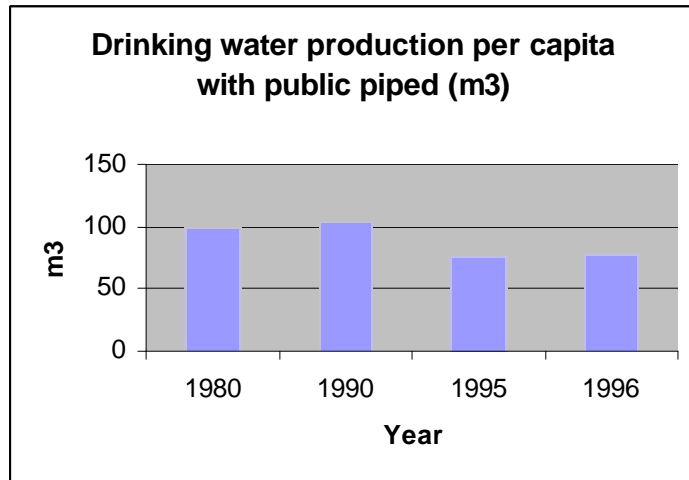
Figure 11 Drinking water production per capita with public piped m^3
Source: CSO Statistical Yearbook of Hungary 1997

Sharing of Household Energy usage, in %
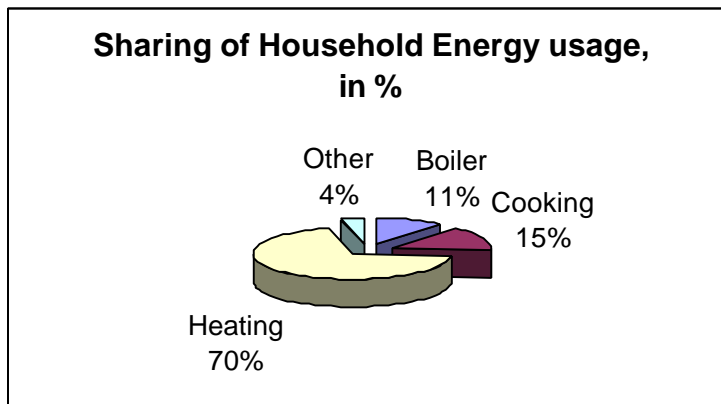
Figure 12 Sharing of Household Energy usage in per cent
Source: CSO Energy usage of Households 1998

Energy consumption for Cooking, 1997
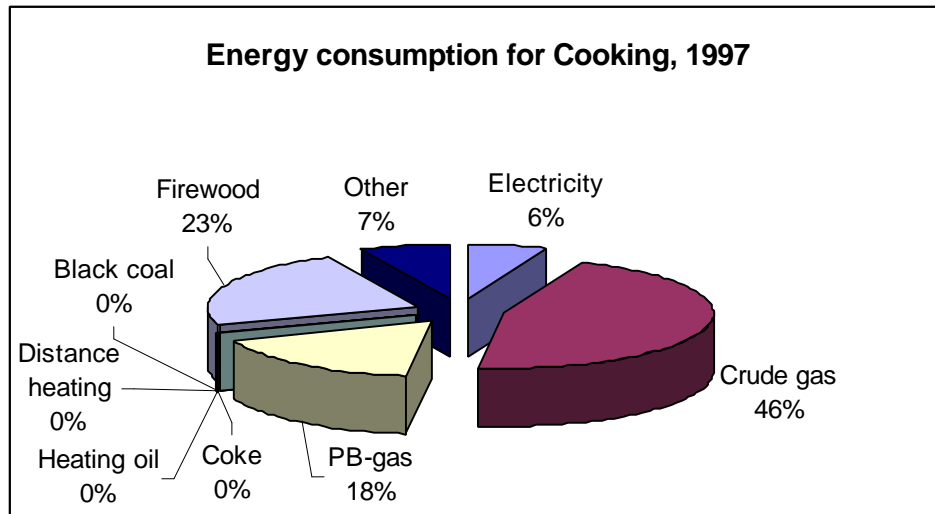
Figure 13 Structure of Energy consumption for SCE function in Hungary 1997

Pesticides and Herbicides usage per capita/year
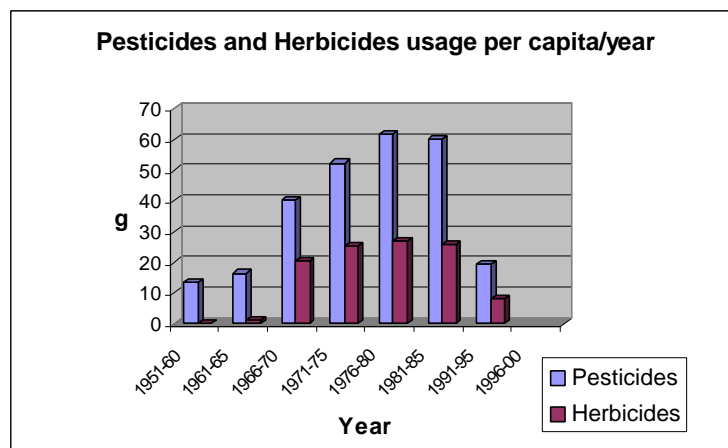
Figure 14 Pesticides and Herbicides usage per capita per year

Source: CSO Agricultural Statistical Yearbooks ECOSTAT 1998
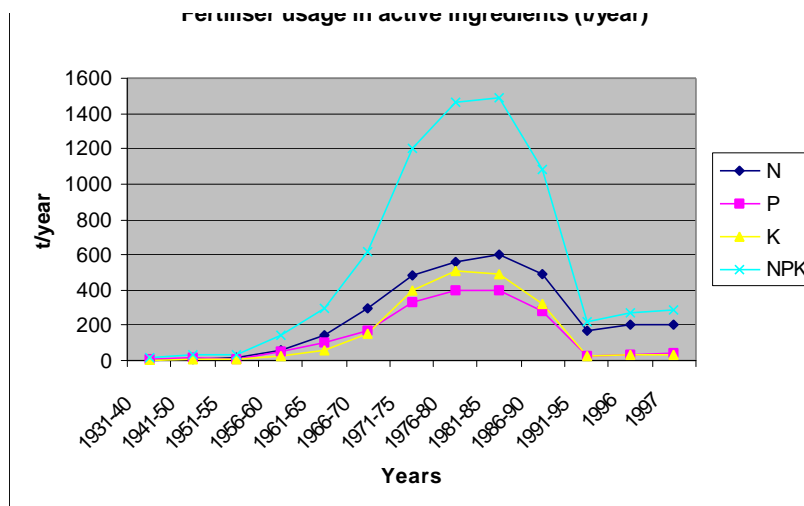
Figure 15 Fertiliser usage in active ingredients t/ha

Source: www.ktg.gau/KTM/fmv/alapok/2.htm
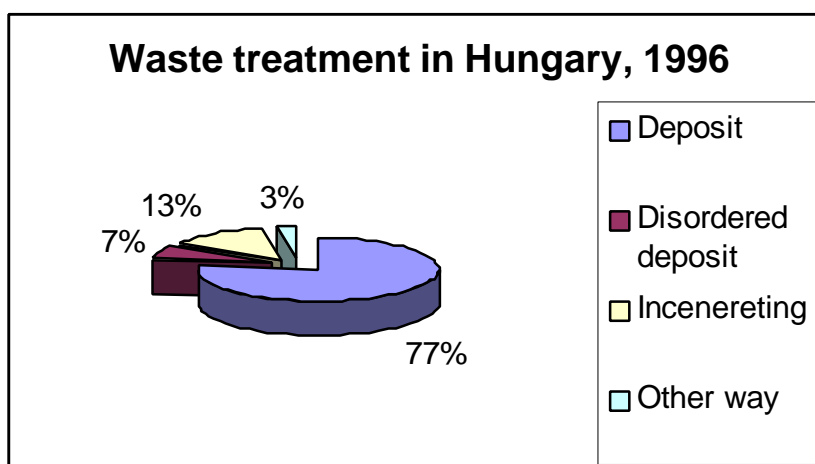
Figure 16 Municipal waste treatment in Hungary

Sources: Environmental statistic data 1996

Table 19 Services of public water works

	1980	1990	1994	1995	1996
Population with public piped water supply, thousands	8065	9580	9802	9810	9825
Population living on areas connected to public sewerage, thousands	4340	5450	5673	5700	5720

Table 20 Main conclusion of environmental impact

|	Annual average data[1] per household	Observations /Environmental problems/
The amount of consumed food [kg]	1475	The consumption of almost all types of food decreased in the past 10 years. The most significant decrease can be seen in the case of meat consumption, and owing to this the emission of environmentally polluting substances reduced. Nevertheless the indicators of the utility of environmental sources became worse.
		The extreme values vary depending on the income of the household. Between 549 and 929 kg/capita/year
		The nourishing energy consumed is 4500 MJ/year/household. In the case of those with lower income the nourishing energy is provided by a higher ratio of fats.
The energy requirements of food products [MJ]	32 500	The process, within the system, requiring the highest energy is cooking done in the household (60 % of the households cook everyday). Storage (freezing) needs less energy than cooking and the washing up follows it. The preparation of meals requires minimal energy (time-consuming live labour instead). More than 80 % of the energy is not regenerated. Wood can be considered a regenerating source of energy. /ozone layer, greenhouse effect/
Water requirement [m^3]	58	The water requirement is the highest in private vegetable growing, and what is more, the water used for irrigation is mostly of drinking water quality. /reducing water supplies/
Pesticides [mg]	650	The usage of pesticides is considerably under the EU average, less than the desired amount. In small enterprises (gardens) the consumption of pesticides is above the national average. The dose used in Hungary is 2-3 kg/ha, while in England it is 1,4 times more and in the Netherlands it is six-fold. The dangerous Aldicarb, paraquit and ethyl-parathion are strictly restricted. /human toxicity, biodiversity/
Fertilisers [kg]	0,07	The use of fertilisers declined in the past ten years. This amount is not enough to give back the nourishing value of the soil, it does not come up to 10 % of the Dutch consumption. (In The Netherlands 11 times more, in England 7,5 times more is used. /acid rains/
Transportation [tkm]	310	The environmental impact of transportation is felt in energy consumption, air pollution and noise. 1-10 ton vehicles transport the majority of food-products. Their energy (fuel) requirement is high. As for the energy (fuel) consumption, the proportion of more desirable ways of transportation, such as railway and waterway, is insignificant. Since the vehicles are rather old (9-10 years), their outdated engines cause greater air-pollution. /global heating, escaping of ozone/
Distance [km^2]	300-500	Most households do the major part of their shopping by car, and their number is still growing, especially with the appearance and spread of the large hypermarkets, increasing distances between household and shop. According to our survey, the families with a car (36%) do their shopping in a large shopping centre at least every second month. /toxic substances/
Waste [kg]	208	25-30% of the mixed waste from households is organic waste. 30 % paper-based packing material, 20 % compound material and 20 % metal is deposited. The waste of durable consumer goods gets into a waste-yard. The ratio of selective waste collection and recycling is under 5%. /erosion of the soil/

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[1] The data change more times during the assessment (newer data, revising of assessment, critical remarks etc.)

Sewage [m3]	30	30 % of the household-sewage comes from areas without drainage, and goes to an outdated clarifying system or directly into the soil. Another part of the sewage pours into live waters (rivers, lakes and oceans) without any cleaning or clarification. The kitchen sewage is characteristic of its high fat-proportion and, consequently, high detergent-concentration and settling floating-tarlatan. This is why the BOI_5 value is high as well. /*eutrofication*/
Emissions [kg]	No data	Mostly have a link with the energy (fuel)-use. (CO_2, NO_x, CH_n), and transportation (dust). Besides, emission can be found in food production and procession (pollen, volatile substances, NH_3, CH_4) and during kitchen work (dust, volatile substances), and the present wax of waste management also causes emission ($SO2$, NO_x, heavy metals, PCD, dust, volatile substances). /*greenhouse effect, acid rains*/
Durable kitchen equipment [item]	3,6	During the last ten years the significant part of refrigerators and cookers in the households were changed, and new types of equipment appeared (deep-freezer, microwave oven, pressure cookers, fryers etc.) The average life-span of all these is more than 10 years. 18-20-year-old equipment is common in the households. Their impact on the environment depends on their poor efficiency. Their average life-span is 10-15 years. /*ozone layer, greenhouse effect*/

Key uncertainties

- The quantity of consumed food is uncertain since it is highly depending on household income and consumption pattern.
- The exact ration of processed and semi-processed food.
- The exact quantity of waste, as it has already been mentioned. The ratio of different waste utilisation (composting, recycling etc.)
- The standard deviation in statistical data and data from questioners is high.
- Energy related data of production varies depending on data sources and allocation.
- Industrial sewage water component and the effectiveness of cleaning is unknown.

3.4.4 Environmental assessment on future aspects

The situation in the nineties is described above. For the exact comparison of the future scenarios (2050) with the present situation the following statements should be considered:

There are different assumptions considering population in 2050. According to a part of it there will be a dramatic increase meanwhile others say that it will decrease. The amount of the consumed food (kg/person) didn't change much in the last 50 years and it will not change essentially in the coming 50 years, neither in quantity nor in nourishing value. The average food consumption is about the same as in the EU, except meat, vegetable and fruit consumption.

The decrease of the population is more considerable as ever, however the number of households has been increased, so the extension of the household got smaller. The fallback in the extension of the households usually increases the specific environmental impact, at the same time an extended family (illiterate gypsy family) does not necessarily mean environmental advantage.
As for the components, in 2050 our diet will possibly be healthier than it is today. Experts and consumers agreed on the fact, that, beside the processed, instant or ready-to-cook meals we

will have traditional and national dishes as well. The environmental impact will completely change. The structure of energy will be transformed. The present quantities of energy (fuel) can be reduced only together with an increase in their efficiency at the same time, and the regenerating energy (fuels) will be dominant.

Eating patterns also have considerable effect on SCE. The ration between eating in and eating out will probably differ from present situation. The relatively high ration of households with everyday cooking (65%) will probably decrease considerably. This will lead a dramatic environmental benefit since cooking is responsible for the major part of energy consumption. The consumption of ready to eat deep-frozen food will increase.

The nutrition consumption per capita will slightly increase approaching to the EU average. Energy efficiency in food industry will increase rapidly since new energy saving technologies and alternative energy sources are being applied.

The role of logistical services will increase dramatically.

Water usage will decrease, and the cleaning efficacy will increase.

Production waste will be mainly recycled (reproduction, energy production). The quantity of packaging materials will decrease, recycling and reuse will increase.

The recent level of pesticide and fertiliser application is not enough. We can say on base of the experts opinion: twice of presently applied quantity is necessary, but it should be applied with a special new DOSs and antidotum, that allows only necessary and enough quantity usage.

Table 21 The environmental gains (profit) of DOSs as a result

(reference scenario=100 %)

	DOS 1 Local and Green Diet	DOS 2 High-Tech Rural Gardens	DOS 3 Robo-Kitchen High-Tech-Green
Material	~100	~100	~100
Energy (fuels)	? ? ?	?	?
Water	?	? ?	?
Pesticides	? ?		
Fertilisers	? ?	? ?	? ? ? ?
Waste	? ?	? ?	? ? ?
Sewage	?	? ?	? ? ?
Transportation	? ?	?	? ?
Travel	? ?	?	?

? = 0-25 % decreasing, ? = 0-25 % increasing

3.4.5 Conclusions of the environmental assessment of DOSs:

- It seems that the best is the Local and Green Diet scenario concerning energy requirement. The other two scenarios have also environmental benefit due to alternative energy sources, so these can also fulfil the factor 20 connection with non-renewable energy sources.
- The decrease in Local and Green scenario because of green or bio production. In the other two scenarios pesticide-usage is at the same level as today. These will be other pesticides (bio-pesticide or new software helped pesticide with anti dotum, which help decrease the environmental effect to zero level). These are necessary for the fungi-toxin protection of crops and human health.

- HTRG and RKHTG scenarios will use a lot of GMO, genetically modified plant. It will be a new revolution and the biggest change. The irrigation decreases because the modified plants will be drought-resistant.
- Efficiency of water management will increase in every DOSs. The largest decrease concerning sewage occurs in the RKHTG scenario - new cleaning method without water.
- The waste decreases 50 % in every DOSs. New technology will be developed for utilisation. The most efficient waste treatment will be connected to the Robo kitchen.

The Hungarian Shopping, Cooking and Eating environmental assessment has shown that the three developed scenarios could done some reduction in current environmental impacts. Of course these assessment content some uncertainties, because the DOSs were implemented on base of current knowledge and statistical data and expected trends, but the 50 years is too long distance from the nowadays. Probably these DOSs will be implemented in the future only partly, the elements of these DOSs might mixed. The effect of new information & biotechnological revolution might much stronger as the researchers and stakeholders could think.

Table 22 The analysis of DOSs

	Strong points	Weak points
DOS 1-LGD	-the proportion of seasonal and bio-products will increase, they will be grown in the same area, their quantity will not change- *energy usage decrease;* -25-50 % reduce in energy (fuels); -more efficient water management; -minimal pesticides; -less transportation; -waste management in the same area	-more labour-requiring -monitoring is necessary
DOS 2-HTRG	-beside the consumption of fresh, unprocessed products the proportion of dining out will increase -efficient machinery, using alternative energy (fuels) -more efficient water management -hi-tech production-systems -quantity of pesticides will increase, new types of GM plants -the use of fertilisers will increase -transportation will decrease -small gardens will be multifunctional - the distance of travel will be greater -efficient waste management	-16 % increase in energy - antidotum is necessary - no human toxicity, bio-diversity is known -quick-tests, wide range controlling is necessary -more travel
DOS 3-RKHTG	-highly processed food -25% decrease in energy -more efficient water management -less transport -efficient waste management	-fertiliser-use doubles
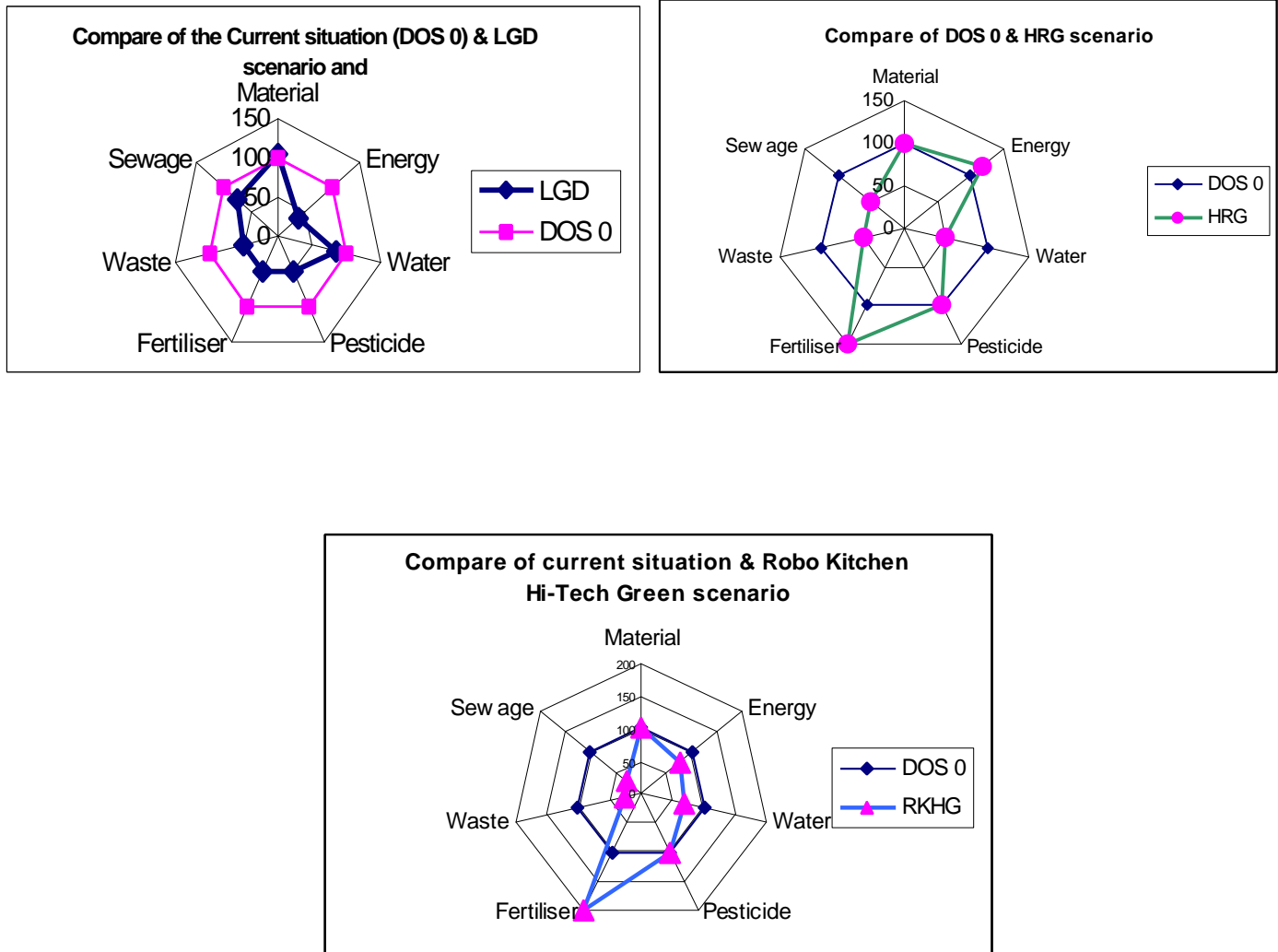
Figure 12-14 Compare of the Future scenarios & current situation

3.4.6 Environmental observation by stakeholders

- All three DOSs are acceptable. To assess their environmental gains (profit) verification is needed.
- Model projects should be worked out to examine the environmental impact of the DOSs. As long as the first 2 DOS can be organised on the basis of the food-economy and can set an example for rural life-style, the Robo-Kitchen can be examined on each level of household, and preference must be given to multifunctional communal houses.
- Politicians must be won to work out a new supporting and stimulating system.
- Evaluation methods must be worked out or adapted for local circumstances, factor 20 is exaggerated in Hungarian circumstances.
- People of undeveloped areas must be taught to be aware of environmental problems
- Educational programmes are needed to reduce illiteracy and to teach the right way of life

- New interactive educational programme. Kitchen and environment – in school and in mass media as well.

3.5 Economic analysis of DOSs

The economic assessment used a questionnaire (developed by Simms and Young, 1999) to assess every each scenario proposals for economic credibility with helping experts and experts interview. Summary of the questionnaire has been made. The verbal evaluation and economical comparative analysis of the DOSs are present in this chapter.

The special characteristics of the food supply chain depend on the general economic situation of the country. There are some differences from the developed Western European countries what we must consider in the analysis. It should be important from the point of view of the sustainable households in the future enlarged EU.

The first part of these characteristics determine long term trends:

- The lesson is not only to perfecting a developed market economy and a democratic system for the most of the future member states of EU in the beginning in the first decade of 21st century but to change the economic and political heritage of the former regime. It is likely more complicated and more hectic process than the development in the developed market economies. This process is longer than it was thought immediately afterwards of the change in the political system.
- One of the main characteristics of this process is the privatisation. A lot of the new owners of enterprises have not experiences in the consolidated market economy ethically and culturally. There is no rare the break of the law and the „gentlemen's agreement".
- These countries have a big (foreign and inside) debt stock. Because of this the government must pay off from the in the budget a big share what limits the amount of the financial resources for the restructuring of the economic structure and the developing if the necessary infrastructure.
- The legal and organisational institutions of market economy are enough new and they have not enough experiences. The harmonisation process the EU-law and the derogation must continue after the joining of Hungary to EU. These two processes are the hardest in the environmental and the agricultural (food industrial) spheres what direct effect on the future household SCE function.

The second part of the characteristic influences the thinking of the stakeholders (and the researchers) on the future formation of the households:

- There is a permanent recession in the agriculture and food processing industry from the beginning of 1990's. The profitability in the agriculture is permanently very low with the temporary overproduction in some industries (pig and poultry meat production, milk production, cereals) while the total agricultural production decreases (Index of agricultural production 1991-1995/1986-1990: 72.6 % - FAO Quarterly Bulletin of Statistics 1997/3-4).
- Because of the high and hectic inflation rate the price and calculation has a big uncertainty for the enterprises and renders difficult the long-term thinking and development.
- The demand for the food decreased because of the decreasing in the consumer incomes. The prices of agricultural products (row materials for the food processing industry and the services) increased less than the average increasing of the consumer prices (The ratio between prices of agricultural and industrial products was 137.3 percent from 1990 to 1997).

- In consequence of above mentioned the investment in the agriculture is in a very low level: only 3 percent in the total national investment. (from 10 percent in the end of 1980's). The equipment and the appliances are old and used up. The production costs are high (expect the labour cost) and the production process is not efficient. Because of the lack in the financial resources the use of the chemicals in the plant production is in a low level also. The quality of the animal feed is not good. For example in consequence of this the required weight of the feed for one-kilogram pig meat production is 4.3-4.4 kg while in Western Europe 3.5kg. Sometimes the quality of the products is not good for the export markets.
- The privatised processing industry by foreign capital invested more than the agriculture mainly in the sweet industry, milk processing, meat industry, soft drink industry, brewery and wine production.
- The gross production of the agriculture is 1200 billion HUF per year (4.7 billion Euro) but the loss of the producers because of the smaller growing in the agricultural farm gate price is 72 billion HUF (202 million Euro).
- The industry of household equipment was privatised mainly by the big multinational companies (Zanussi, Phillips, Siemens etc.). The R+D activities of these firms are in the home or other developed countries. The managers of these firms in Hungary cannot say everything on the R+D strategies of the company. Most of the household equipment are imported from the industrial developed Western countries and the Far East.
- In the wholesale and retail sectors are occupied more and more share by the super (hyper) market and discount chains. The discount trade chains on the food (e.g. Metro) have about 20 percent of total trade and the hypermarkets (Auchan, Cora, Tesco) have 8 percent (One year ego was only 3 percent!). The share of the small shops is 30 percent (One year ego 32 percent.) and of the small discounts have 8 percent (One year ego was 10 percent.). The highest trade volume per m^2 per year is 3.32 million HUF(13 thousand Euro) in the G-Roby discount chain (what is in Hungarian property).
- Per capita gross domestic product (GDP) is 841 thousand HUF in 1997(330 Euro).
- The growing rate of the national economy is increased at the last two years (about 8 percent in 1998 and 3-4 percent in the first half of 1999) but the basic level was very low and its effect on the bigger part of consumer was not too much.

3.5.1 Economic structures involved in the SCE Function

Size and importance of the SCE Function

The size of the SCE Function in the national economy characterised by the stages in the supply network:

> Agriculture,
>
> Processing,
>
> Wholesale,
>
> Retail,
>
> Service (eating out),
>
> Households.

Contribution of SCE function to national output

There are some different indicator for the output of the sectors and industries: gross output, gross value added. The Hungarian official statistical system is different from our

requirements. We must estimate some data. In this case we add the consideration or/and the method of the estimation. The decisive parts of the data concerns 1996 because of the newest official data are only this year.

We can estimate the importance of the food supply chain in the national economy from viewpoint of household's SCE function by its share in the gross output. It is more precise than the shares in the gross value added or gross domestic product because the output contains the real products what are produced and sold by the producers and traders.

The share of the agriculture and the food processing industry is reported directly by the Hungarian Statistical Office.

It is more difficult to estimate the importance of trade, transport and storage of agricultural products and foods. The statistical data are cumulated on the total economy (4.8+3.4+3.0+1.2=12.5). We presume that the food consumption gives an enough good possibility to estimate the share of food trade, transport and storage. The share of the food, beverages and tobacco is about 40 % in total household expenditure. We suppose that the share in the food trade, transport and storage in total is similar to the share of food consumption in total. Thus the share of these branches together in the gross national output estimated about 5 % (40 % of 12.5 is 5).

The share of hotels and restaurants is 1.6 % in total. By some experts we estimate that the gross output of restaurants from this is about 80 %. Thus the share of restaurants (eating out) is about 1.3.

After all, the estimated share of food supply chain in the gross output is about 20 % (20.3 %) without eating out and 21.6 % with this together.

- The differences of these functions result from the nature of the consumable goods. Consumer goods are used only once in this function. Most of them are perishable in different stages of production and processing, need specific transportation and storage circumstances. The rest of the raw materials, meals is very dangerous waste not only in the food supply chain in general but in the households too.
- The frequency of consumption (and shopping, cooking, eating) is daily or more frequent. Because of this the consumers can change their used goods (food) from different reasons every day. It can cause changes in prises, quality, assortment, places, promotion etc.
- The national, local and family traditions and habits play an important role and can cause significant differences in the food consumption and also in the household activities. The cultural effects are important (but decreasingly because of the increasing tourism, telecommunication, activities of multinational firms etc.) in the differences of food production, processing and consumption between the different countries, nations and ethnic groups.
- The food supply chain means long and very different processes from the agricultural machine industry, chemistry and kitchen appliances industry to the shops, restaurants etc. The identification and selection of the different stages is difficult sometimes. The environmental and economic effects of every change in the elements of the supply chain are very ramifying and can follow and measure them with difficulty. The organisations and the functions can mix in the different situations (for example the food wholesale sector can function in independent organisations, enterprises but also in common frames with the processing and/or retail together.)
- The probable increasing of volume of the food per capita in the most developed, wealthiest countries is very limited in a long term period (50 years). The more important consumption increase only in value because of more processed, more valuable and variable and specific consumer demand food (healthy, functional etc.). The increasing food consumption in volume is possible in the less developed countries in Europe in the first 2-3 (3-4) decade of the 21 century (We must calculate also with the gradual enlargement of EU.).

- The decrease and the structural changes of population have more important effect on food consumption than on other household functions. Firstly the total food consumption increases in decreasing time, stops or decrease in the next 50 years period. Secondly significantly increases the share of the elder people in the total population. The total food consumption decreases because of it too. The structure of the consumption also changes because of the different food demand of the elder people (less meat, more milk and milk products etc.)

3.5.2 Methodology

The number of experts for evaluation of questionnaire was limited. Because of it the answers were contradictory. In these cases the final evaluation reflect the opinion of PR.
Sometimes it was difficult to identify exactly the content of the stage "services" in the DOS's LGD and RKHTG because the stage "eating out" cannot be interpreted. In these cases the "service" meant the service of garden and kitchen equipment. Sometimes the supply chain must complete with specific important stages (for example packaging-maters, techniques and waste treatment and recycling industry, agricultural machinery and chemical industry etc.)
What was mentioned before the types of the DOSs are different because of their different main characteristics. Because of this it can combine them, for example Local and Green Diet + Robo-Kitchen High-Tech-Green etc. It can be interesting to evaluate the different combinations of the DOS' also. (What are the possible and probable combinations and what are their main characteristics.)

3.5.3 Summaries of DOSs in economical approach

3.5.3.1 Overall summary of LGD DOS by proposals

Agriculture
- Small decrease in the competitiveness because of the smaller farms at local level but small increase of the competitiveness because of the new product-market combination - small increase of market share in local (regional) level;
- Large intensification of existing farm structure at local level;
- Increase in the co-operation between the firms;
- Small increase in total work activity and large increase in the local employment;
- Small increase in the government intervention;
- Small shift to national production with small increase of the export together;

Food processing
- Small decrease in the competitiveness at local level because of the decreasing of economies of scale and no processing on the high level;
- Large shift in the relationships with the other sectors at local level;
- Small factories specialised for simple primary processing - large intensification of the existing firm structure in the traditional processing industry;
- Small increase in total work at local level;
- Small increase of the government interventions in control and subsidies;

- Small increase of the export of possible surpluses;

Food wholesales
- Direct relations between the agriculture, processing, retail sectors and households - firms leave this sector;
- Large decrease of the firms and employment in total work at local level;

Food retail and service
- Small increase of eco-efficiency and competitiveness because of the reducing costs, no long transport distance, reduced packaging materials etc.
- Increasing eco-efficiency in the "taste bank" restaurants, creating new market opportunities at local level - they sell meals and raw materials also;
- Changing the use of existing products back to traditional trade - weighting and sorting for the consumers in the shops;
- Large shift to new transactions between firms and households because of the permanent and direct relationships;
- Completely new firms entering the industry and services;
- Large shift to new skills;
- Increase in total work at local level;
- Increasing helping government interventions;

Households
- Large shift in the relationships with the retail and service sectors - new consumer behaviour in the buying and using of food;
- More work in the buying and cooking - more part-time work;
- Small shift to import durable good - kitchen machines and equipment;
- Increasing co-operation with the retail and service sectors based on intangible knowledge;
- Small decrease of paid work because of increasing home made meals;
- Shift to new skills in the preparing of meals;

3.5.3.2 Overall summary of HTRG DOS by proposals

Biotechnology manufactures, agricultural machinery and chemical industry firms
- New market opportunities: developing new products and technologies for high-tech small gardens;
- Development specific high-tech equipment and machines for small gardens;
- Increasing co-operation mainly between the retail and serviced firms in the maintenance and advertising;

Agriculture
- Specialised new large farms to develop and produce specific products for small gardens (seeds, fruit trees for propagation);
- Increase in the co-operation between firms to engage in pre-competitive R&D and to exchange of intangible knowledge;
- Small shift to full time employment in the specialised large farms and small increase in the local employment;
- Small increase of the government control, prohibiting and /or limiting the use of chemicals, requiring standards and labelling in the large farms specialised to produce for the small gardens;

Food processing

- Is not so much relevant (acceptable) because the small gardens grow products mainly for self consumption;
- Small decrease of the industry, in the market opportunities of competitiveness;

Food wholesales

- Large shift to different structures - direct selling and buying from the producers and retail;
- Large disadvantages because of the above mentioned direct contacts;
- Decrease of the number of firms and local employment;

Food retail and services

- New combinations: product selling, servicing and advising together;
- Specialised small shops near the gardens to sell and to buy the local surpluses;
- Extension and intensification of relationships and financial transactions with gardeners;
- Shift away to different structure - possible virtual shops in Internet to buy the specific seeds, trees, for propagation;
- Less packaging materials - more environmental friendly;
- Small shift to self-employment, part-time and temporary employment because of seasonable;

Retail of products of propagation and gardening equipment

- Specialised small shops near the gardens to sell these products maybe with local agricultural products together - more concession, franchises;
- More specialised supermarkets or specialised departments for gardening (D.I.A.) materials and tools;
- More import of the equipment;

Service

- The eating out is not applicable;
- The repair and maintenance of gardening equipment become more important and intensive with advising together;

Households

- The households are small producers of fruits and vegetables for themselves
- People eat more fresh food and reduce the cooking - more healthy and more environmental friendly;
- Large increase of the co-operation between gardeners - without market relationships;
- Large import of durable goods - maybe small increase specific small garden products (e.g. alternative products, "Hungaricum's" collecting by co-operatives);

3.5.3.3 Overall summary of RKHTG DOS by proposals

Biotechnological R&D and precision-mechanics industry

- Large increase in competitiveness - development and spreading of monitoring systems;

Packaging-maters, techniques and waste treatment and recycling industry

- Growing market share and competitiveness by revolutionary new product-market combinations;
- Good business in the selected collecting, recycling packaging materials;

Agriculture

- Farms can try their market share by product differentiation and targeting specific consumer groups (proposals 1, 3 & 4) or not so important direct effects on agriculture (2 proposal);
- The multinational processing firms buy large specialised farms -the number of farms decrease - their competitiveness can grow;
- Entirely new technologies: biotechnological methods, GMO products;
- Large increase in the co-operation between agricultural and other firms in supply chain based on mutual dependence and exploitation of new technologies;
- Expensive appliance, growing costs of elimination of wastes but less energy cost because of the growing energy efficiency - growing alternative energy using;
- Not applicable on employment and/or decrease in total work - small shift of employers from the countries out of EU;
- Large increase in the government interventions mainly in control of pollution and biotechnological methods (GMO's), in international standards and in waste management;

Food processing

- Large increase of market share, in the competitiveness by developing new product-market combinations and monitoring systems;
- Large intensification of the existing firm structure the number of firms decreases;
- Large increase in co-operation with driving firms of packaging-maters in pre-competitive R & D;
- Increase in total work because of the increasing processing level but increasing of efficiency;
- Small improvement in working conditions;
- Employment would decrease in Europe, small shift away form Western Europe;
- Large/small increase of government and EU intervention by standardisation, labelling, control and prohibition etc.

Food wholesales

- Decrease of the number of firms because of emerging concentration and increasing role of hyper- and supermarkets;
- Not applicable to much by proposal 1.

Food retail and service

- Increase in market share sand competitiveness by product differentiation, new product-market combinations (e.g. food shopping & monitoring system developing together and because of virtual shopping & services together;
- Shift to different firm structure - specific selling and storing of eatable an degradable packaged food - new supermarket chains, franchise can most common;
- Increase of new service units to control of food and to maintenance of equipment, tools for monitoring and controlling;
- Large increase in co-operation between firms in different stages of supply chain to apply harmonised the new results of R & D;
- Shift to new skills in waste management;
- Increase in total work because of new functions of this stage (monitoring, franchising, servicing computerising etc.);

Households

- Large shift to different relationships with retail and service, NGO's and government organisations;
- Entirely new technologies in meal making, automatic additive detection and waste management;
- Large increase of co-operation with service sector, government control institutes, consumer movements and other households;
- New skills in the household work;
- Increase of share of male work;
- Large increase of government interventions mainly by subsidies (lower tax) for selecting collection of waste and utilisation of rest of packaging materials;
- Large shift to import durable goods;

Note: If we combine this DOS with the other two DOS's can be more characteristics (e.g. HTRG with together RKHTG)

Table 23 Summarising of SCE DOSs proposals

	LOCAL & GREEN DIET (LGD)	HIGH-TECH RURAL GARDEN (HTRG)	ROBO-KITCHEN HIGH-TECH-GREEN (RKHTG)
Core idea - Vision	- Food is supplied from local, organic sources - The production and distribution networks organised in the given region - Consumers prefer healthy, tasty chemical free food, rich in nutritive materials - Food mostly prepared in the household - Sometimes the housewife goes to a local "test bank" restaurant to try traditional dishes of the region	- System of hobby gardens producing low external inputs, environmental friendly with the most updated technology - Food production is connected with recreation - The gardens mainly provide the family needs, the surpluses changes between friends neighbours or sold to local enterprises - The garden keeper check regularly the computerised production system and collect the ripe and daily need fruits and vegetable	- High quality food system with environmentally friendly and very effective mass production meets the high-tech appliances equipped households - The computerised cooking technology is adjustable, controllable and safe - People can choose out of many dishes at home or can go to restaurants or can order food via Internet as well - The climat lader monitored by computer the coming end of food - Detector controls the healthy statements and calculates and optimises the raw materials, promotes menus
Lifestyle features	- Sustainability - Local (regional) values - Family oriented	- Sustainability - Active relaxing and recreating, hobby - Family orienting - Neighbourhood oriented gardening	- Programmable and computerised kitchen machines with easy household work - High level independence of each family members preparing meals, eating in-eating out, etc.

Household type	• Conventional, traditional family (parents with children)	• Conventional, traditional family, living in town flat and having small garden near town	• Different types of families, no specifics
Shopping	• Local street corner shops and local farmer's markets • "Taste Bank" restaurants – eating out for experiences • Shopping by bicycle	• Small local shops, supermarkets, farmer's market, Internet	• Super- hyper- and megastores • Shopping is a complex family programme at weekends • Travelling to the site by electric car
Storing	• Small fridge, traditional pantry	• Small fridge, traditional pantry at home, small buildings (cellars) for the winter storing in the garden •	• Large fridge, climate larder, freezer, with automatic monitoring systems
Cooking	• Preparing meals by simple and efficient ways of cooking at home • Less water and energy using	• 40-50 % of raw materials come from hobby gardens • Use energy saving cooking methods	• Computerised cooking technology - adjustable, controllable and safe • Everybody can prepare his/her favourable meals
Eating	• Eating has a specific role within the household • The family eating is common two or three times per day	• Common eating, weekdays in the flat, weekends and summertime (evenings) in the garden (sometimes with neighbours together)	• Alternatively common or separately and different times at home or at restaurant
Cleaning & Washing	• Manual dishwashing or dishwasher • Waste is utilised as bio-waste (i.e. compost, with another 'sector-link') • The amount of waste is less because of the lack of packaging	• Mainly manual dishwashing • The wastes are collected separately and used in the garden for composition	• Dishwasher and/or up-scaled dishwashing • Selective waste collecting and handling is common which is organised by local communities or authorities • Built-in waste handling and recycling systems are working in the flats (houses)
Food products	• Sustainable ready, home made fresh meals • Raw materials from the local markets • Not prepared and conserved in a high processing level	• Home made meals mainly from home grown fresh fruits and vegetables • Pre-processed ingredients, components from supermarkets	• Widespread types of high processed (pre-processed) foods • Dominate internationally known foods (e.g. pizza, spaghetti, sauces, goulash, seafood, hamburgers, fast food, smart food, snack etc.)
Environment al. Benefit	• System optimisation on family and local (regional) level • Waste and energy reduction	• System optimisation on family level • Waste reduction and re-use	• System optimisation on family (and world ?) level • Waste re-use
Proposals	• Local sustainable production system • Local "Test Bank" restaurants	• Development & spreading of such product groups which make easy the high-tech production in small gardens • Improving services developing supplier chains	• Wide production of quickly preparable, Healthy, Functional & environmentally friendly products • Intelligent kitchen appliances • Development & promotion of monitoring systems and food additive detection in foodstuffs prepared by GMO for all World • New generation of

			packaging-maters, -techniques & waste treatment

Table 24 Summarising table of economic analysis

	LOCAL @ GREEN DIET (LGD)	HIGH-TECH RURAL GARDEN (HTRG)	ROBO-KITCHEN HIGH-TECH-GREEN (RKHTG)
Households	• Households are small producers of fruits and vegetable for themselves • Reduce of cooking - more healthy and environmental friendly • Large import of durable goods	• Large shift in the relationships with the retail and service sectors - new consumer behaviour in buying and cooking • More work in the buying and cooking • Small decrease of paid work because of the increase of home made meals	• Large shift to different relationships with retail and services, NGO's and government organisations • Entirely new technologies and new skills in the household work • Increase of share of male household SCE work • Large increase of government interventions by subsidies of environmental friendly housing • Large shift to import of durable goods
Eating out	• Is not applicable	• Increasing eco-efficiency in the "test-bank" restaurants - new market opportunities at local level	• Is not applicable because of the main characteristics of this DOS
Retail	• Reducing costs, energy and pollution because of the no long term distances, reducing packaging materials etc. At local level	• Reducing cost and pollution because of no long distance transport at local level • Completely specialised new firms entering to industry and service • Large shift to new skills - small decrease of paid work	• Increasing market share and competitiveness by new product-market combinations and product differentiation • Different firm structure - specific selling and storing of eatable and degradable packaged food - new supermarket chains and franchise can be most common
Wholesale	• Firms leave this sector - direct relations between the agriculture, processing, retail sectors and households • Decrease in total work, in the employment at local level	• Different structures - direct selling more common from the producers and retail by households • Large disadvantages in general • Decrease of firms and employment at local level	• Emerging concentration of firms and increasing role of hyper- and supermarkets • Not applicable to much by proposal 1
Food processing	• Decreasing competitiveness at local level • Small factories specialise for simple primary processing • Small increase in total work at local level • Small increase of government interventions	• Is not so much relevant (acceptable) because of small gardens grow products mainly for self consumption	• Large increase in competitiveness and market share • Large increase in co-operation with driving firms in packaging-maters in pre-competitive R&D • One hand increase in total work because of growing processing level but decreasing employment other hand because of the industry moves to the less developed countries in general • Large/small increase in government and EU-level (maybe World-level) interventions by standardisation, labelling, control and prohibition etc.

Agriculture	• One hand small decrease in the competitiveness because of smaller farms at local level but small increase of competitiveness other hand because of new product-market combinations • Small shift to national production	• Specialised new large farms to develop and produce specific products for small gardens • Small increase of local full time employment in these large farms • Small increase of government interventions in control and standards for the large specialised farms	• Farms can increase their market share by product differentiation and targeting specific consumer groups but the proposal 2 cannot so important direct effect on agriculture • The multinational processing firms buy large specialised farms • Entirely new technologies: biotechnology, GMO • Expensive appliances, growing costs of elimination of waste -growing alternative energy using • Not applicable on employment and/or decrease in total work • Large increase in the government interventions mainly in control of pollution and biotechnological methods
Other inputs in production chain Biotechnological R&Đ and precision-mechanics industry Packaging-maters, techniques, waste treatment and recycling industry Agricultural machinery and chemical industry	• Good opportunities in the producing of gardening (DIY). materials and equipment	• Repair and maintenance of gardening equipment become more important and intensive with advertising together • New market opportunities by revolutionary new product-market combinations and developing new products & technologies specified for high-tech small gardens	• Large increase in competitiveness by developing and spreading of monitoring systems • Good business in the selected collecting, reusing, recycling packaging materials

4 Evaluation of results and processes

Five DOSs were obtained in the SCE household function. From these DOS's the Hungarian team investigated three. One of them - the Local and Green Diet was investigated in all of the three countries (U.K, the Netherlands and Hungary). The second - Robo Kitchen High-Tech-Green - was also investigated in three countries under different names. The third - High-Tech Rural Garden - was constructed only by the Hungarian team.

By the clustering of DOSs (see Manzini-Jégou March 2000) five household types were mapping. From the Hungarian SCE DOSs the Local and Green Diet became the part of HIGH CARE household type with together the Natural Living (shelter) and Eternal (clothing care). The Robo-Kitchen DOSs the component of the EASY CARE with together Active house (shelter), Easy Care (clothing care), E-shopping and Cooking Machine (SCE). The High-Tech-Rural-Garden is a component partly of the SOFT CARE type with together Soft Care Wearables (clothing care) and Edumation (shelter).

- The two first DOSs - take into consideration the consideration the specific Hungarian situation (less economic development, transition to the market economy and to the EU membership, differences in the historical backgrounds and traditions etc.) – are relatively closely to the DOSs worked out by the Netherlands and British team. These DOSs good harmonise with the DOSs of the other two function DOSs into the HIGH CARE and EASY CARE household types.
- There are some problems of the clustering of the specific Hungarian High-Tech Rural Garden. This is same in some characteristics of the Local and Green Diet but is different is some others. It characterised by the seasonal, local and DIY characteristics also. But there are significant differences:
  - The agricultural activities are not main jobs of the producers, and they produce not for the market (they could sell only the occasional surpluses) but more for themselves in a small mass. The producers have own flats in the towns and they have small hobby gardens only.
  - The producer and the consumer are not divided. The members of family produce some kind of fruits, vegetables and possible poultry meat and they cook and eat these themselves. They buy the other food in the shops.
  - The neighbourhood takes an important role in the gardening. The neighbours help each other in the gardening and give the surpluses to them and vice versa. There are very important values the helping, friendship, familiarity, confidence etc. The relations are not market-oriented.
- But the High-Tech Rural Garden could be enough eco-efficient and economically advantageous also the future of this type of households depends on a lot of uncertainties:
  - the social values could be change – the society can be more individual or more collective
  - growth of the claim to the healthy living style and relaxing in the natural environment
  - increase of the living standard of the poorer people
  - the changes of the towns – how many blocks will be destroyed and how many new, bigger and more comfortable flats and houses will be built
- These uncertainties are important because of the changes in the generations these gardens can lift by the owners relatively easily. After 10-15-20 years the today's children and young people have new orientations, new ideas etc. and they could choose other lifestyle than their parents.
- The DOS proposals are different in the two DOSs which were worked out parallel with other countries. It reflects the specific characteristics of the countries concerning traditions, development, importance of different problem solving, socio-organisational possibilities etc.. The third, High-Tech Rural Garden was worked out only the Hungarian team. This DOS reflects mostly the specific Hungarian characteristics. It is similar the

Local and Green Diet but there are differences in the food supply chain structure (mainly in the agricultural production). This DOS could give inspirations to rethinking some future advantages for the revitalisation of rural areas in Western European EU countries. The Hungarian practice could add some experiences to solve the sustainability of household-activities also common and individual ways.

- One the other hand Hungarian households have some gains from the experiences of the more developed countries. Instead of applying polluting technologies in the developing processes now Hungary could apply those new technologies that are used today and will be used in the future in these more developed countries. It is a specific contribution to the global sustainable development.
- The stakeholders accepted the developed scenarios in limited acceptance. It means that at first they anticipated not pure DOSs but a mixture of the DOSs (in the cases of LGD and HTRG). Secondly they thought that these DOSs don't include the total food supply chain but only 10-15% of it.
- The realisation of these scenarios depends mainly on the education and the policy-making (regulation, subsidising etc.).
- The research work was successful from the viewpoint of combining different disciplines. Between the research process the researchers could learn from each other and could rethinking their conclusions, future steps etc.
- The Hungarian collaboration was limited in the work of the research team because it focused on only one household function (SCE) and the team had a lack of earlier experience in the EU joint research work. Despite of this the Hungarian research team is convinced of the positive contribution to the results of project. These results can be used in the development of the Hungarian practice and future research works.

4.1 Evaluation, recommendations and conclusions

4.1.1 Methodological aspects

The most important methodological novelty of the research work is the building process and working out of the Design Orienting Scenarios for the household functions and their clustering to the household types by socio-organisational possibilities. During the development of DOSs a methodologically important result was on one hand the identification of the present and possible future stakeholders, on the other hand to involve these stakeholders into the DOSs developing process. This iterative process was realised through creativity and back-casting workshops. The specialisation of the workshops into pre- and post identification of DOSs can be mentioned as another important result of this methodology. This scenario developing methodology can be adapted to other future problems not only to the sustainable households. One other possible developing way can be to put together the relevant proposals of developed DOSs by three country groups and to combine the DOSs in SCE function which characterise the households from different view points (for example High-Tech Rural Garden with Robo-Kitchen High-Tech-Green). Some weak points of the research work can also be mentioned and in order to use this methodology in other researches these weak points should be further developed. At first the content of the DOSs built by each country group on the basis of the different proposals were different. While these differences can help to emphasise the cultural and social-economical differences between the countries it resulted some difficulties in the comparison of the possible future effects of the changes. The stakeholder identification and the stakeholder activity were the weak points of the research work as well. Summarising the results achieved in this task, it can be stated despite all difficulties and the research team managed to involve more then 100 stakeholders into the research. Because of the very changeable situation in

the company ownership and the uncertainty of the local management of the multinational companies, the participation and the activity of bigger enterprises was more limited than it could be desirable. The project could not induce their interests in a way, which was expected by the researchers in this common work. They started to be more active only the last phase of the project (after the acquaintance of the input document of second workshop). The problem is not only the lack of interest but the time management respectively that the participation in the project is rather time-consuming as well.

The environmental assessment was fulfilled in Hungary in two ways: mainly in a qualitative but a little bit quantitative oriented. The main result of the project from the environmental assessment is the complex system analysis of the future possible environmental input-output effects of different DOSs.

Consumer acceptance was investigated by qualitative and quantitative way by the help of focus groups. These focus groups represented different consumer attitudes (traditional, green, and dynamic). The scenarios of SCE function have been presented to the focus groups in verbal way and by visualisation. The positive and negative opinions of the groups were considered in the evaluation of the three DOSs. Participants' general opinion was in the focus group discussion that the future would be the mixture of these and other possibilities. The participants agreed that every DOSs have parts which are already considered as desirable. The Local and Green Diet was the most positively evaluated within both traditional and green groups. The High-Tech Rural Garden was evaluated differently by the related groups but the difference was smaller than in the case of Robo-Kitchen High-Tech-Green. The dynamic group evaluated Robo-Kitchen High-Tech-Green as the most favourite one. The evaluation of current situation was more or less the same in traditional and dynamic groups although it got lower values by the green group.

The economic analysis was based on interviews and questionnaire and proved to be helpful. It was a weak point of the interviews that limited numbers of experts were involved. The Hungarian team had a special problem of answering the questionnaire. Due to the short time period (10 years) of rebuilding of the capitalist market economy some questions and expressions were unknown by some experts. For correct understanding they had needed special guidance. The summaries of the answers were useful input for the second workshop.

4.1.2 Practical aspects and recommendations

- The project was well organised from the work plan through research process till the finalisation of the work. The leadership of the working processes was very resolute apart from the fact that helped the creative and innovative initiatives. The meetings were important and useful stages of the common thinking and working. The atmosphere of the co-operation between the individual members and different teams was friendly and helpful.
- Sometimes the changes in the members of the research team raised some difficulties. It is a normal situation and it can be tolerated because the duration of the project was long enough.
- The other experience of the project that it should have been concentrated more on the continuous publication of the new results. It was possible although the strict time management and the other non-project related duties of the researchers it was not intensive.
- It is important to recommend the results of the project by two ways. For the future researchers to apply of the methodology and for policy makers to take the possible consequences of the DOS's into consideration. The ways of the spreading of results are clarified in the work plan and in the agreement of the project researchers.

- The results of the SusHouse project might be useful for the East European countries which are candidates and for EU member states to find the way towards a more sustainable household

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Appendix

Table 1 Relevant „Function" Stakeholders in Hungary

Stakeholders on different level of SCE function	From beginning of the Sushouse project Current	Fist workshop	Second workshop
(Food) Service sector	Burger King, McDonalds,Pizza Hut, canteen,	Burger King, Mc Donald, Harmonia restaurant, Korzó restaurant	Hotel Szieszta,
Appliances producers	Lehel Zanussi-Electrolux-Jászberény_fridge Electermax-cookers Salgótarján-cookers Siemens-microwave-Budapest Köfém-Székesfehérvár Eletrohouse-Békéscsaba,	-	-
Retail/wholesale	SPAR, METRO, TESCO, JULIUS MEINL, COOP HANSA, Market	Metro, Tesco, Market, Small shops, Milk product trader	Internet ABC, Milk product trader
Supply chain actors	Pick Rt. Szeged, Ringa Gyor, Hungerit Szentes, Cooling house Székesfehérvár, Campden&Chorleywood Hungary, Mirelit Coolingindustrial RT Knorr-CPC Hungary-Röszke, Szegedi Canning company, Unilever, Danon, Bábolna-Kecskemét, Nestlé Szerencs,	Unilever, Bábolna-Kecskemét, Szegedi Canning company Szeged, Békéscsaba, Nyíregyháza SaGa, Dairy, Meat,	Unilever, Dairy, Nestlé Szerencs, Canning company Nyíregyháza
Primarily producers(agriculture, cotton, mining)	Floratom, Hód-Mezogazda RT, Bábolna KITE, Farmers	Hód-Mezogazda RT, Bábolna KITE, Farmers	Hód-Mezogazda RT, Farmers
Others	Tetrapack, Folia Cargo Zsombó	Tetrapack, Dunapack,	-
Environmental groups Consumer groups Other	Green Hearth friendly program, Bioculture, Friends of gardens	- Bioculture, Friends of gardens	-
Ministries & national research councils Local/regional governments Others	Central Food research Institute, Meat-industrial research Institute, Department of Environmental, Energetically Office, Consumer protection Agriculture economical Research Institute, Agriculture, Industrial, Local government Szeged, Zsombó, Majors,	Ministry of Environmental protection, Central Food research Institute, Meat-industrial research Institute.	Central Food research Institute,
Research institutes & universities	Biological Research Inst.titute of HungaRIAN Academy of Sciences, OETI, Agriculture University Debrecen, Research		Bay Zoltan Biotechnological R. Ins. Academical Biological Research Inst.titute, OETI,

	Institute University of Sopron, Faculty of Economics University of Veszprém, Cereal Reseach Institute		Nutricomp, Medical University, Agriculture University, Economical Faculty of Univ. Sopron, Univ. of Veszprém, Ceral reseach Institute

Table 2 Results of Brainstorming

Budapest	Sopron	Nyíregyháza
1. basically the structure of the family will not change in the future	1. basically the structure of the family will not change in the future	1. Basically the structure of the family will not change in the future
2. generations will live together	2. a person is needed to employ for the housekeeping (SCE function)	2. Generations will live together
3. the dominant type will be the detached house	3. houses can be adjusted to the different demands	3. the dominant type will be the detached house type
4. houses can be adjusted to the different demands	4. modification of the operation of city centres	4. houses can be adjusted to the different demands
5. modification of the operation of city centres	5. small settlements will be more developed	5. small settlements will be more developed
6. small settlements will be more developed	6. the youths would live more individually (single-like)	6. the youths would live more individually (single-like)
7. the youths would live more individually (single-like)	7. polarisation of the households will remain	7. polarisation of the households will remain
8. mobile flats	8. pets will become family members	8. pets will become family members
9. polarisation of the households will remain	9. multifunctional households	9. multifunctional households
10. multifunctional households	10. the main problem is going to be with waste (reduce, recycling, reuse)	10. the main problem is going to be with waste (reduce, recycling, reuse)
11. the main problem is going to be with waste (reduce, recycling, reuse)	11. long-life household machines	11. bio-decomposition
12. long-life household machines	12. bio-decomposition	12. high pressure cooking
13. water recycling for energy gaining	13. high pressure cooking	13. intelligent cooking pots
14. bio-decomposition	14. intelligent cooking pots	14. adaptation of NASA technology
15. alternative energy sources	15. alternative energy sources	15. eatable packaging materials
16. steam energy utilisation deriving from the burning of waste	16. adaptation of NASA technology	16. recycled "plates and glasses"
17. the utilisation of semi-conductors	17. bio-gas, bio-compost usage in a community like living style	17. waste disposal in the space
18. bio-gas, bio-compost usage in a community like living style	18. collection and utilisation of precipitation for irrigation	18. linkage of more alternative energy supplying unit
19. collection and utilisation of precipitation for irrigation	19. waste disposals as "gold mines" in the future	19. cleaning without water (magic spray)
20. water purification without chlorine	20. eatable packaging materials	20. utilisation of vacuum energy
21. linkage of more alternative energy supplying unit	21. waste disposal in the space	21. longer life time for consumables
22. cleaning without water (magic spray)	22. linkage of more alternative energy supplying unit	22. development of a mutual financial and mental interest
23. utilisation of vacuum energy	23. cleaning without water (magic spray)	23. education, basic education (development of nutrition science)
24. longer life time for consumables	24. utilisation of vacuum energy	24. Internet usage
25. development of a mutual financial and mental interest	25. longer life time for consumables	25. conservation of traditional tastes in TASTE BANK
26. education, basic education (development of nutrition science)	26. development of a mutual financial and mental interest	26. Food Museums
27. Internet usage	27. education, basic education (development of nutrition science)	27. Hobby food production
28. Information centres	28. Internet usage	28. Independent and objective auditing body
29. Independent and objective auditing body	29. conservation of traditional tastes in TASTE BANK	29. Political control
30. Political control	30. Food Museums	30. X % of the commercial time should be spent on anti-commercial
31. X % of the commercial time should be spent on anti-commercial	31. Hobby food production	31. Linkage of commercial and education
32. Linkage of commercial and education	32. Information centres	32. More storable food
33. Eco-labelling	33. Independent and objective auditing body	33. Postal waste collection
34. State control	34. Political control	34. Ducks without feather and biting pigs thanks to genetic engineering
35. More storable food	35. X % of the commercial time should be spent on anti-commercial	35. Development of water-, natural gas- and electric meters
36. The concentration of production due to the decrease of transportation costs	36. Linkage of commercial and education	36. The concentration of production due to the decrease of transportation costs
37. Strengthening of communication with the consumer	37. Eco-labelling	37. Strengthening of communication with the consumer
38. The ration of special products will increase	38. State control	38. The ration of special products will increase
39. The importance of comfort will be determinant	39. More storable food	39. The importance of comfort will be determinant
40. Devolution of globalisation in the food sector, fresh food will be in focus	40. The concentration of production due to the decrease of transportation costs	40. Devolution of globalisation in the food sector, fresh food will be in focus
	41. Strengthening of communication with the consumer	41. Functional food/ sex-food
	42. The ration of special products will increase	42. Room bicycles - utilisation of this kind of energy for kitchen activity
	43. The importance of comfort will be determinant	43. Poor people consume tablets, rich people consume delicate
	44. Devolution of globalisation in the food sector, fresh food will be in focus	44. Crisis
	45. Functional food/ sex-food	45. General social welfare
	46. Life on the Mars	46. Market overproduction
	47. Internet ordering	47. Strengthening of family values
	48. Comfort and unhealthy lifestyle	

	49. Population growth stops	
	50. Polarised world (poor/rich)	
	51. Future equal with fear	
	52. Shorter working time, more family programme	
	53. Fully automatic kitchen	
	54. Migration to the Universe	