



Action Plan STRING

Hungary Northern Great Plain Region Debrecen



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~ Part I. ~ General information ~

Project: **Strategies for Regional Innovative Food Clusters (STRING)**

Partner organisation: **Municipality of Debrecen**

Other partner organisations involved (if relevant): **University of Debrecen, EDC Debrecen Nonprofit Kft.**

Country, region: **Hungary, Northern Great Plain Region**

Contact person: **HARSÁNYI, Zsolt**

Self-defined performance indicator: **Involving 3 companies (Number of projects submitted and supported with inputs from STRING to TOP 6.1 and 6.8 measures of the ITP of Debrecen: 3)**

~ Part II. ~ Policy context ~

II.1. Policy Instruments

Territorial and Settlement Development Operational Programme (TOP) and
Integrated Territorial Program of Debrecen (ITP)

The *Territorial and Settlement Development Operational Programme (TOP)* aims to support regional, decentralised economic development and an increase in employment based on local resources. The programme allocates more than € 1bn to integrated sustainable urban development actions in the framework of a dedicated priority.

TOP is focusing on the following priorities:

- creating local conditions to boost economic growth and increase employment
- enterprise friendly and population preserving urban development
- switch to low-carbon economy especially on urban areas
- development of local public services and strengthening of social cooperation
- development of local human resource, strengthening of employment and local cooperation
- sustainable urban development in cities with county rights
- community led local development

TOP allocates a budget frame to regional actors such as counties and cities with county rights and provides them with a planning framework to prepare their *Integrated Territorial Programmes (ITP)*. Priority 6 “Sustainable urban development” within TOP is dedicated to cities acting as regional centres, such as Debrecen, which has a budget of € 144m.

Debrecen ITP is tailored to regional characteristics and structured into 7 ERDF and 2 ESF measures, including a preliminary list of projects for each measure. ERDF Measure No. 1 represents the highest share (30%) and provides space for initiatives related to innovation, incubation and cluster development for sectors prioritized in county level RIS3. Under the topic

of innovation, The Debrecen Innovation Centre project is the sole project initiative. It aims to improve innovation capacities in the region with a focus on food industry. As such, it is a real flagship serving not only the city but also the whole region. Furthermore, two additional ESF projects also contribute to the operation of innovative chains and the Innovation centre. The budget allocation structure has not reflected the high ambitions of the city to become a real R+D+I centre in priority fields such as food production. Also breakthrough solutions to ensure efficient use of funding are needed.

The Municipality as the ITP owner and the University of Debrecen as the largest regional innovation hub have a shared interest in increasing the amount and the efficiency of financing provided by the ITP on projects targeting the improvement of innovation capacities especially in the food industry, being a RIS priority. The partners aim at improving the usage of ERDF funding of TOP Priority 6, Measure 6.1 (Development of economic infrastructure to foster employment) via the ITP of Debrecen in the following ways:

- Setting up an innovation centre is a flagship project proposed by the ITP: There is a lack of information and experience on the operation of innovation labs, innovation chains and triple helix cooperation in food industry. By influencing the future concept as well as by shaping the content and the management of the Open Innovation Centre (over €7.5m) the efficiency of the project implementation will be considerably improved. Based on interregional transfer of experience adaptation of best practices can be achieved. Combining local knowledge, represented by University of Debrecen, with the adaptable solutions learnt from STRING will allow partners to achieve a marked improvement in the efficiency of the policy instrument implementation.
- Developing and getting support for more projects in the field of innovation capacity building: STRING assists the partners to acquire knowledge that leads to new project ideas to be submitted for support.

II.2. Which indicators did you dedicate?

Number of projects submitted and supported with inputs from STRING to TOP 6.1 and 6.8 measures of the ITP of Debrecen: 3

Food industry has the largest tradition in Debrecen: an historical past going back to medieval times, as this city had and has large fields with one of the best quality soils in Hungary. Therefore, agriculture and food processing played a key role in the economy and considered as one of the 3 strategic industries of Debrecen. Currently, Agri-food industry is the second largest employer in the city (having 5000+ employee) and has the third largest turnover (cca. €650m). Around 200 companies working in this sector, which is almost 2.5% of the total number of firms.

The indicator we proposed is reachable, till now, we haven't faced any serious unexpected factor or change that could block our efforts to successfully finish our project. From the actions, detailed below, the agri-food sector, its companies and stakeholders will gain on different fields. Developing the infrastructure of the companies contributes to increasing their productivity and efficiency of their processes within the organization (marketing, promotion, enterprise management, quality management, knowledge management). As a result of the higher productivity, value added in the industry also increases, which is the main source of the income

rise. By doing it, the whole region would develop, since agri-food industry is one of the largest employers in Eastern Hungary and the spill-over effect of this development would be observed in other industries as well. Not only the employees and agri-food entrepreneurs would benefit from this development, but also government and municipalities since local budgets lean on taxes levied on value added by businesses.

The project is aiming to promote side effects as well, such as workplaces with more liveable and proper working conditions meeting the modern, developed economies' requirements. It improves the region's employment which have wide-range social benefits. Actions aiming the development of the companies' operation environment establish a more company-friendly environment, therefore, the number of newly established companies will be increased in the industry and the survival rate of the companies can also be improved. To sum up, the development of such an entrepreneurship-friendly environment can be expected which boost up the agri-food sector. The competitiveness of companies will improve which will decrease the lag from more developed economies.

~ Part III. ~ Details of the actions envisaged ~

III.1. Summarize the basic situation at the beginning of the project.

Basic situation at the beginning of the project

At regional level, there are 6303 enterprises in agriculture. In the Northern Great Plain, food production turnover is € 2.67bn, produced by 10,000 food industry workers, which is 1.7% of total regional employment. Northern Great Plain Region produces more than one fifth of the value added by Hungarian agriculture. The contribution of the region was proportioned to the national GDP: less than 1%.

In Hungary the share of food industry of the gross added value is around 2.2%. Its employment weight was 4.3% based on the number of employed in the national economy, and it represented 4.0% from the investments, furthermore, it contributed to the production of processing industry by 13%, and by 6.3% to the export. The Northern Great Plain Region contributes to the Hungarian food industrial gross added value by 19%, which is €0.78bn in the agriculture and €0.23bn in the food industry.

Based on the main activity, three-fourth of the regional food industrial companies deal with the production of drinks, bakery and pasta products, which altogether share 14% in the food industrial production value. The number of companies dealing with producing drinks, bakery and pasta products compared to other food industrial players is especially high in all counties in the Northern Great Plain region.

Within the sectorial structure of food industrial companies, the presence of meat processing ones is also significant. The role of fruit and vegetable processing is extremely high compared to the structural characteristics of the other regions.

A strength of Northern Great Plain region is that it has one of the most outstanding research-development institute networks, its higher education system is quite advanced, the production facilities are favourable in most of its area, and it has developed food-processing capacities. According to the Global Innovation Index, Hungary went down on the rank, although the financing rate of R&D (in % of GDP) has been continuously increasing. This means that more and more money is spent on development, but with less efficiency.

We are building up the innovation process in the system of open innovation. The players are participating in the new innovation system, in which the university plays the central role. It transfers professional know-how to the open laboratory that will try to manage ideas from agri-food businesses. These innovation ideas will further flow to the test plant where the product can either be launched into the market or get into the cluster which also produces goods. Market orientation appears on every level which manages the process from the idea generation to the market launch. This is called the category of living lab where we try to manage the consumer's innovation-acceptance process. In this innovative environment agri-food firms are opened to participate in our project, as previous discussions show.

The most significant education institute is the University of Debrecen in the region. Its Faculty of Agricultural and Food Sciences and Environmental Management has been a leading institution of the Hungarian agricultural and food industrial education and research for many

decades. Besides, the Faculty of Economics and Business Administration has also several research fields of agricultural and food industrial focus.

In close cooperation with the university, the Pharmapolis Innovative Food Cluster executes the programs concerning the food and health industry. The cluster holds together the development ideas of many bigger companies and several small and medium enterprises and brings them closer to scientific achievements and experiences of University of Debrecen. Using this special opportunity for development we produce such food products, what contribute to health maintenance and good way of feeling by eating them. The Pharmapolis Cluster organises and coordinates the research and development activity of the 77 partners in the creation of new functional food products. Members are the determining food enterprises and research institutes in Hungary.

In order to reach our goals, we have listed the resources we have. The stakeholders unanimously agreed on, that the most important resource is the commitment of every participant, which act as the ignition key for the engine for change. We must emphasise that by having this commitment we could and can find enough financial sources to launch the project.

Learning needs

In the Engine for Change document we identified the following Learning needs:

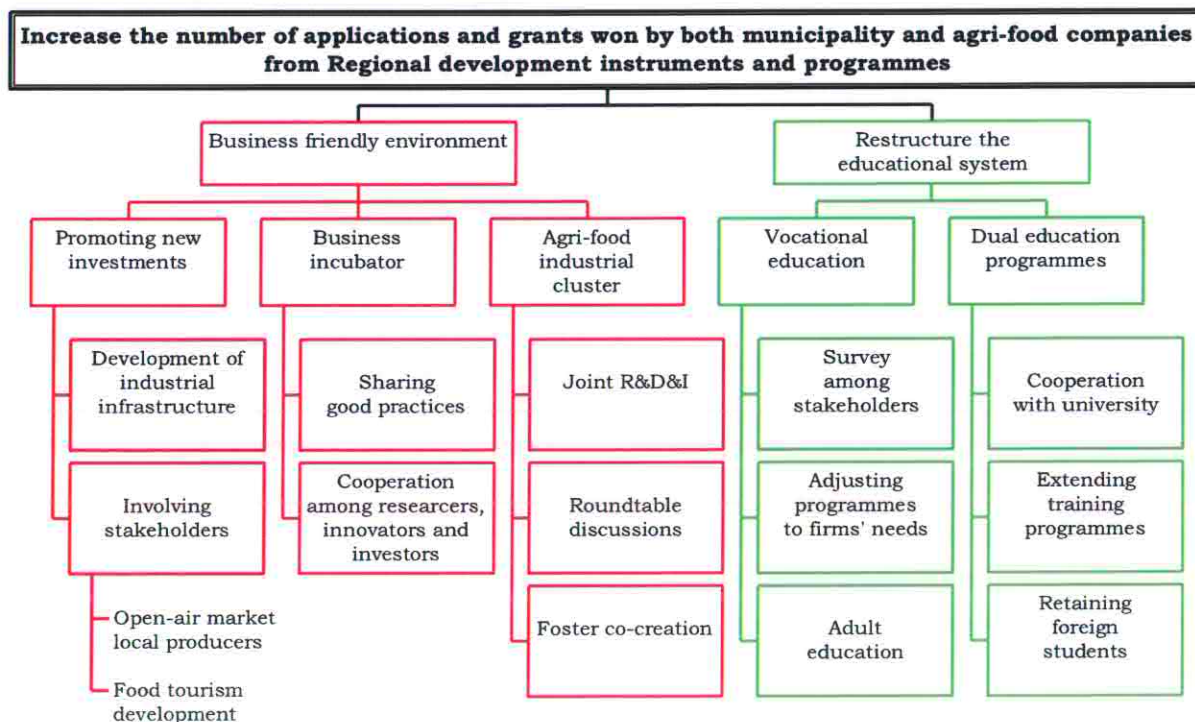
<i>Learning need</i>	<i>Why it is not sufficiently addressed? Is it due to:</i>	<i>Should it be addressed by</i>
Improve role of agriculture and food innovation in regional development by harmonizing policy instruments	<input type="checkbox"/> choices of policy management? <input checked="" type="checkbox"/> lack of resources? <input type="checkbox"/> lack of competences? <input type="checkbox"/> other (specify)	<input type="checkbox"/> supporting directly specific projects? <input type="checkbox"/> supporting specific infrastructures (specify)? <input checked="" type="checkbox"/> improving the policy design? <input type="checkbox"/> improving the policy <input checked="" type="checkbox"/> governance?
Promote added value by linking innovation and production to real consumer needs by improving the commercialization of R+D outputs and stimulate a demand driven instead of supply driven production	<input type="checkbox"/> choices of policy management? <input type="checkbox"/> lack of resources? <input checked="" type="checkbox"/> lack of competences? <input type="checkbox"/> other (specify)	<input type="checkbox"/> supporting directly specific projects? <input type="checkbox"/> supporting specific infrastructures (specify)? <input type="checkbox"/> improving the policy design? <input type="checkbox"/> improving the policy <input checked="" type="checkbox"/> governance?
Integration of SMEs in clusters and intercluster cooperation between the participating food regions	<input type="checkbox"/> choices of policy management? <input checked="" type="checkbox"/> lack of resources? <input type="checkbox"/> lack of competences? <input type="checkbox"/> other (specify)	<input checked="" type="checkbox"/> supporting directly specific projects? <input type="checkbox"/> supporting specific infrastructures (specify)? <input type="checkbox"/> improving the policy design? <input type="checkbox"/> improving the policy <input checked="" type="checkbox"/> governance?

As it turned out during the discussion phase of the project, local stakeholders are willing to focus on the Learning Need nr.3 (Integration of SMEs in clusters and intercluster cooperation between the participating food regions). The first LN is so elusive and is full of politics that even a significant effort could not guarantee the intended effect on policy instruments. The second LN is also a key question to our project, because it can directly fine-tune local business environment to the needs of the agri-food companies and indirectly increase the number of local businesses. For example, the case of Alföldi Tej LTD (one of the largest companies of the Hungarian dairy industry) showed that large changes in the macroeconomic policy could not be achieved, but with the investment subsidies, provided by Individual Government Decisions, we can improve the position of agri-food industry in the regional development and harmonize the customer needs and innovative production technologies.

III.2. Reaching the objectives

We composed a figure that represents our objectives within this project. This is based on the experiences we gained by the composition of the Engine for Change, and the problems that are emerged during our meetings and roundtable discussions. In our application we defined the performance indicator: to achieve that 3 companies and their projects join STRING project. In the beginning of this project we imagined two goals: to reach a better business environment and creating efficient training programmes for agri-food businesses.

After several brainstorming meetings and lots of appointments we have reached the below detailed objective-tree.



1. Figure: Objective tree

The objective of the project

In order to achieve our indicator, the investment of 3 newly established companies in Debrecen, we must make a business-friendly environment. The experiences of the last 2 years in food industry and mechanical engineering sector were taken account of defining our objectives, so we know that a single industrial park is not enough to promote larger companies' investment in Debrecen. Beyond infrastructural elements there is a crucial role for the development of soft factors (education, trainings, marketing, cultural issues, etc.) to keep Debrecen and its region on the map of international level site selection permanently. The successful investment locations are building on both hard (developed infrastructure) and soft factors. Policies defined by TOP 6.1. and 6.8. are providing good basis and opportunities for food industry.

In the last 2 years the stakeholder meeting feedbacks of the SMEs helped us to take notice of both positive and negative effects of large companies' investments, especially the negative ones on SMEs. That is why we have made some proposals to solve them during working out the actions listed below. As the feedbacks on the stakeholder meetings and foreign best practices show, it is essential to involve local short supply chain producers, farmers or family-run businesses as well.

The main objective is to *Increase the number of applications and grants won by both municipality and agri-food companies from Regional development instruments and programmes*. This ultimate goal helps the Northern Great Plain Region to develop both agriculture and food industry, thus increasing the productivity and efficiency of agri-food companies gives better conditions to local population. This main goal is built upon two subobjectives: we must create a *Business-friendly environment* and we must *Restructure the educational system* to meet the requirements of agri-food companies.

Reaching the *Business-friendly environment* for agri-food companies has 3 focus areas: *Investment promotion*, *Business incubator* and *Cluster for agri-food industry*. Not only the investments made by new entrants to the regional agri-food sector is meant under investment promotion, but also reinvestments carried out by incumbent firms. In order to increase willingness to invest we must *Develop industrial infrastructure* (basically providing high quality industrial parks or industrial zones) and *Involve stakeholders to the promotion* (so they have a direct effect on getting the business environment closer to their needs). To this latter we have two projects that aim to involve the regional stakeholders to these processes: operating open-air market for local producers and developing food tourism. *Business incubator* has a major role in *Sharing good practices* from both Hungary and abroad, and acts as a catalyst to accelerate *Cooperation among researchers, innovators and investors*. With providing these activities new firms and agri-food start-ups have the opportunity to have a smooth start and survive the critical first two years. Cooperation for existing companies also an important element of the business-friendly environment, so *Agri-food industrial cluster* has to support *Joint research and development and innovation projects*, organise *Roundtable discussions* regularly and *Foster co-creation* among the member of the cluster and other regional agri-food companies.

The other subobjective is to *Restructure the educational system (to promote cooperation with university to adapt educational programs to the demands of the companies)* to meet the

requirements of agri-food companies. Two levels of education must be distinguished here: *Vocational education* and *Dual education programmes* based on the regional universities. First, we must know what the requirements of the regional agri-food companies are, so we must conduct a *Survey among stakeholders* regularly that helps us in identifying the relevant interventions. Once we have this information, we must *Adjust the programmes to the firms' requirements* so they can rely on the regional education to find well qualified workforce. An unexploited resource is the *Adult education* that has to be elaborated in the near future. In the higher education a strong *Cooperation with the university* must be build, mainly in the form of dual education programmes that help students to learn the theory at the university and the practice at the companies. *Training programmes must be extended* to different sectors and on different levels, so agri-food companies will be able to select among fresh graduates with a wide spectrum of knowledge and skills. University of Debrecen has a constantly growing number of international students, recently 5500+ foreigners attending some programme. These students can enforce a multicultural working environment at local companies, thus considered as a key issue in increasing production efficiency of agri-food firms. That is why, we must *Retain foreign students*, so local economy would gain from their knowledge.

Partners and participants of the project

In the region the most significant participants are the Municipality of Debrecen City, the University of Debrecen on the academic side and the Pharmapolis Innovative Food Industrial Cluster from the business side. These 3 considered as the major stakeholders of STRING project. The agri-food higher education-research institute as a part of the University of Debrecen with its prestigious history which is the biggest higher education institute in the Northern Great Plain Region. Due to the many disciplines at the University, the agricultural and food industrial sector can closely cooperate with the scientific research network which covers the fields of clinical examinations, pharmaceuticals and dietetics. This established multi-disciplinary approach gives the basis for agri-food industrial and life-scientific cooperation. On this basis, clusters were formed with national scope (previously they were regional only). Pharmapolis Innovative Food Cluster operates connected to this sector, having 80 member companies, and it is an accredited innovation cluster. It is the most significant platform of research institute vs. company cooperation in this sector, which is continuously increasing the number of its members and activities. The representatives of the public sector form the regional and local conditions. An outstanding example is Debrecen City which aims to support innovation as a highlighted aim, which is a central element in the Főnix development plan of the city. Major field of the infrastructural and human resource development is within the food sector. The main reason for this is that Debrecen city had a significant food sector in the past which decreased in the 90s tremendously.

Further stakeholders are: Department of Public Health at the Government Office of Hajdú-Bihar County, the Hungarian Chamber of Agriculture and Debrecen Vocational Training Centre. The Government Office within its public health function performs tasks as defined in specific legislation: in the field of public health (food and nutritional health, environmental and settlement health, health compliance of cosmetic products, chemical safety, child and young health, occupational health), in order to fulfil related tasks it may operate chemical, radiological or aerobiological test laboratories. The Government Office participates in elaborating public health programmes aiming at health promotion of the population and directs, organises and

coordinates the implementation of these programmes. The Hungarian Chamber of Agriculture (HCA) covers the whole domestic food chain, the agricultural production activity and the field of rural development through its members. As a flexible and professionally qualified public body, the HCA has been working since its foundation to give a new impetus to the Hungarian agri-food economy. The Vocational Training Center of Debrecen offers a diverse system of vocational education and training programmes. In addition to vocational grammar school, vocational secondary school and trade school programmes, as well as the partial vocational qualifying programmes of the Vocational Training Bridge Programme, it also engages in adult education and adult training, as well as provides students with dormitory placement.

Assets of reaching the objectives, good practices

Hungary: As a partner representing the Northern Great Plain Region, we made a showcase of four good practices with an approached from various aspects. First, an organization coordinating the activities of companies, Pharmapolis Innovative Food Cluster was introduced. Secondly, the diversification of the Derecske Orchard, an agri-food company was presented. Thirdly, a tool for stimulating the business environment of Debrecen, roundtable discussions were described. Lastly, IGEN Debrecen (Innovative Generation Training Program), designed to assist start-up enterprises was presented.

Spain: Few technological environments supporting the operation of entrepreneurs were presented in the Castilla y León region: bio-business incubators, entrepreneurship and innovation network (ICE the public body in charge of R&D programmes, VITARTIS cluster, CARTIF technological centre), as well as an agricultural technology centre. Several specific Spanish agricultural businesses were presented, among them the most successful pork meat processing plant owned by the BEHER company, where we could look into entire supply chain of the Iberian pork meat products. This site visit helped us with one of our action as establishing an incubator lab, so these good practices were perfect examples how to build up the business model and how can we implement those. On the other hand, in Hungary and in our region lots of farmer have pig farming and we saw a good practice about how to make the system better and more effective.

Denmark: Denmark primarily relies on the Triple Helix model, considering research and development, information sharing as major tools for improving efficiency. In the Central Denmark Region, we could see the special production and processing features of the eastern and western parts of the country, as well as the organization (Engage in Food) established for bridging gaps between the two areas. While companies are built around big cities in the east, the west part is a truly rural area. Future Food Innovation, the organization established to assist SMEs was presented, similarly to the Innovation Camp designed to enhance cooperation between companies and educational institutions. A proof of the success of the visit is that as a result of the relation formed between Pharmapolis Innovative Food Cluster and Danish Food Cluster, they submitted an application in the category “New industrial value chains for innovative, healthy, precision and sustainable foods”. We can also use these good practices at another action we want to implement, building a better cooperation between the education system and the agri-food companies.

Netherlands: We could observe several innovative good practices in the North Brabant province. We were introduced to the innovative ideas – among others, their LED lighting

solution – at the development lab established at the headquarters of the company, and we were also presented the above-mentioned technologies in practice, when operated in the biggest herb growing greenhouse. Van Den Borne Ardappelen – the largest potato supplier of McDonalds in Europe – showed its technology for efficient farming, including the remote sensors placed in the soil, crop development based on big data utilization, as well as purchasing equipment and machines based on the results of long-term data analysis. The representatives of Eindhoven also presented how to convert brownfield industrial facilities in a way to make them suitable for accommodating restaurants that meet today's needs and use the products of local growers. Among innovation-stimulating institutions, we could visit Brainport, which helps the implementation of ideas by providing infrastructure, financing, development and test lab. The experiences of this site visit were showed to Hungarian relevant agri-food actors, companies and they started to use these technologies, such as LED lighting and precision farming. Besides agriculture and food industry the good practice the new solutions of the brownfield investment can help in other sectors of the region.

Stakeholder meetings

There was big interest in the agri-food companies attending at the stakeholder meetings. Stakeholders came from the whole North-Great Plain Region and represented both small and medium sized companies. During the meetings all the companies had chance to tell their opinions, requests and discuss them. Several needs were collected what now we have involved in the actions, for example building a better cooperation between the university and other training and education system members and the agri-food companies. After showing the good practises what we had seen abroad they got inspired and they started to look after the implementation possibilities of those systems.

Influence on stakeholders or business environment

During the STRING project Debrecen made relationships with the most important companies in the Northern Great Plain Region via the stakeholder meetings. This action resulted monthly meetings organised by EDC Debrecen and the University of Debrecen. The discussed topics are transferred to the Municipality and to the Mayor. Debrecen plays a significant role in the region thus the problems raised in the stakeholder meetings can be solved effectively directed by the City. The stakeholders cover all the layer of the agri-food sector, such as canning, milling, corn processing, livestock breeding (pork), food producers, beverage industry and important actors in Debrecen such as Pharmapolis Innovative Food Cluster, and two faculties from the University of Debrecen (Faculty of Economics and Business; Faculty of Agricultural and Food Sciences and Environmental Management). Agri-food companies are interested in technical and technological development, industry 4.0, employer branding, organisational development (as knowledge management, agile management, project management), lean management. They wanted to know good practices from others, so the STRING project knowledge exchange phase served us good examples and we presented these at the stakeholder meetings and also made a brochure where we showed these GPs in 32 pages. We have evolved all the actions to boost their business environment in order to have better options for the companies to operate and develop.

Indicative list of stakeholders:

- Municipality of Debrecen
- EDC Debrecen Nonprofit Ltd
- Pharmapolis Innovative Food Cluster
- Faculty of Economics and Business at University of Debrecen
- Faculty of Agricultural and Food Sciences and Environmental Management at University of Debrecen
- Debrecen Vocational Training Centre
- Department of Public Health at the Government Office of Hajdú-Bihar County
- Hungarian Chamber of Agriculture
- IGEN Debrecen
- Agri-food companies (Globus, Bold Agro, Civita, Hajdú Gabona, Free From, Marnevall, AVE ásványvíz, Csipkerózsa, POPZ, Alföldi Tej, etc.)

III.3. Action

~ Action1 ~

Name of the action: **Creating business-friendly environment**

1. Background

Realising that a single infrastructural investment like establishing an industrial park is not enough to achieve our indicator, we became aware of the necessity of the opinions and attitude of the executives of local businesses. The standpoints of both incumbents and new entrants in the question of the successful combination of the factors of business environment give us more insight into the decision-making of new investments.

The main challenge of creating a business-friendly environment is to unravel the needs of the local businesses and to make an objective status report of the current business environment. Measuring qualitative variables are extremely difficult because it does not have a standard scale, could not be directly compared with other – mainly international – examples and must be precisely defined to make it easier to formulate clear statements and proposed plans for interventions.

We haven't got exact data about how local agri-food managers assess the business environment our region provides, what their motivations are by their investments, what incentives work most efficiently to settle their new production facilities in the region, and generally, what are the main problems they face with in our region both in economic and legislative term. It clearly turned out on the stakeholder meetings, that businessmen would like to cooperate with municipalities in forming the business environment, so they are eager to tell their opinions about these questions, knowing that with their detailed answers we can step towards the desired direction. Among the feedbacks we collected on stakeholder meetings, the most frequently mentioned desires are: reducing bureaucracy, flexibility of tax-paying processes, simplifying licence requirements, etc.

Debrecen has some experiences in conducting surveys about the city's business environment, which can serve as the basis of the regional surveys and business development. Based on this questionnaire, a business environment index was formed, which consist of 14 questions, and its value represents the proportion of positive opinions about the business environment. The increasing index shows stronger trust for the regional economy, better environment, easier way of doing business and acts as the main indicator of good economic interventions.

We have seen in Denmark that a new company only that time takes place in a city if the political and economic background and the transparency are predictable. It is very important that the decision makers have information about the possibilities of the city, such as field and supplier availability. It was also interesting that how can the university gives support to the new companies. We learned that collecting and managing the data can help not only for the companies but the local economic environment.

In Valladolid, Spain, we saw a good practice about the implementation of the cooperation relying on the knowledge of the university and the willingness of the municipality. These two actors built an industrial park together based on the needs of the entrepreneurs.

2. Action

A detailed, professionally carried out representative survey stands in the heart of this action. In order to minimize the statistical error, we targeted the minimum of 200 respondents. In addition to the annual telephone survey, EDC Debrecen has an active dialogue with businesses to collect opinions and suggestions more widely. It highlights the key areas where prompt interventions are needed and also provides the reference basis for all measurement in the future. In longer term it gives an objective feedback for the regional decisionmakers about the effectiveness of the changes they carried out based on the regular surveys.

Another key issue is to evaluate the results well, in order to come up with the real problems of the agri-food sector of Northern Great Plain region. It must be discussed on stakeholder meetings, thus everyone is able to contribute to clarify the main problems and to have the feedback directly.

The next issue is to compile the proper mixture of economic, legislative and social means to solve the emerging problems. It addresses the issue of scope of authority among the regional organizations, such as municipalities, regional development agencies, local offices of the state government, educational institutions (vocational schools, universities), financial institutions, etc., but by sustaining the existing momentum it does not seem to be an insoluble problem. Agri-food businesses must be involved to the whole process, to increase their commitment to adapt to the changes.

The last step is to check the results of the next surveys, whether it has the right outcome, makes the expected changes and stakeholders are satisfied with them or not. It must be tested that are there any regional differences among cities, industries or companies in terms of being affected by the changes, or the effects on the economy. This feedback must be built into the upcoming interventions, so the whole business environment will organically develop and keep the mood of the stakeholders up.

The main point of this action is that realizing the needs of the companies coming out from the survey the concerned actors and authorities would deal with them. The process of this action starts with gathering roundtable discussions (specialised in agri-food sector, industry 4.0 and R&D), workshops (one about the supplier chain, one about financial possibilities, one about robotization) among the persons concerned (agri-food companies, authorities, etc.) and write proposals to the decision makers of the responsible organisation. These proposals would contain the inspiration of the action, the costs, the responsibilities and the timeframe. In another action wider group should be involved by big conferences. During these events the promotion of the new possibilities could be transferred. These tools support the City to create investor-friendly environment and make quicker and easier implemented decisions. All together these subactions help to reach the TOP 6.1. indicator (three company establish factories in Debrecen).

3. Timeframe + cost

The timeframe of this action is at least 5 years, because business environment can be changed only in long term and the above-detailed monitoring process can provide robust results only in the long run. The focus is on the survey that must be carried out continuously, that supports the dedicated interventions to the regional economy.

The first step is to find a professional market analyst company, which has enough experience in the field of competitiveness analysis, quantitative and qualitative questionnaires and has a database about regional agri-food businesses. After it has been selected, the concrete questions must be agreed on, but it must be elaborated well, because the majority of the questions should not be changed in the future. It is an essential issue for the comparability and ability for showing trends from the long run dataset.

The milestones are:

- aligned questionnaire	Deadline: December 1, 2019.
- Workshop 1, results are presented for the stakeholders	May 1, 2020
- intervention	October 1, 2020
- Workshop 2, results are presented for the stakeholders	May 1, 2021
- Workshop 3, results are presented for the stakeholders	May 1, 2022
- Workshop 4, results are presented for the stakeholders	May 1, 2023
- Workshop 5, results are presented for the stakeholders	May 1, 2024

After each survey the roundtable discussion and workshops should be organised within 2 months followed by the written proposals in 1 month. The implementation should be done within 6-12 months depends on the features of the different actions. These should be ended by organising a big (press) conference.

Costs (all the costs would covered by EDC Debrecen):

- Survey: Based on our previous experiences, a preparation, conducting the survey and presenting the results costs cca. €15,000 /year	
- Roundtable discussions	€ 1,500 / event
- Workshops	€ 700 / event
- Conferences	€ 5,000 / event

4. Responsibilities

- Dr. Papp László, mayor of Debrecen
- Harsányi Zsolt, head of Business Development, EDC Debrecen

5. Risk factors

- non-representative survey
- non honest answers, feedback
- not enough contact information
- chief officers can't be reached via telephone
- misinterpreting the result
- incomplete mixture of policies

6. Summary

The main challenge of creating a business-friendly environment is to unravel the needs of the local businesses and to make an objective status report of the current business environment. We haven't got exact data about how local agri-food managers assess the business environment our region provides, what their motivations are by their investments, what incentives work most efficiently to settle their new production facilities in the region, and generally, what are the main problems they face with in our region both in economic and legislative term. In longer term it gives an objective feedback for the regional decisionmakers about the effectiveness of the changes they carried out based on the regular surveys.

A key question is to compile the proper mixture of economic, legislative and social means to solve the emerging problems. It addresses the issue of scope of authority among the regional organizations, such as municipalities, regional development agencies, local offices of the state government, educational institutions (vocational schools, universities), financial institutions, etc., but by sustaining the existing momentum it does not seem to be an insoluble problem. Agri-food businesses must be involved to the whole process, to increase their commitment to adapt to the changes.

~ Action2 ~

Name of the action: **Establish business incubator**

1. Background

The feedbacks of stakeholder meetings and the above-mentioned survey clearly demonstrated us, that in order to tempt a large investment in the regional food industry it is essential to present what competitive advantages Debrecen and its region can provide to investors. The idea of the incubator lab derives from the good practices from Spain and the Netherlands. In Spain cluster and technological centres were shown which served as good example in order to equip the Incubator Lab, as well as in Eindhoven with its FoodTechBrainport. Our idea is to establish a place, where the potential of scientific research and development, the local innovative businesses and other actors of the economy can cooperate and implement successful innovative projects or launching new products to market.

With the new trends of having healthy and locally produced functional food there is a constantly growing willingness to settle startups in food industry. The innovative startup ecosystem in the Northern Great Plain Region is concentrated in Debrecen since it has the largest academic, scientific and technological background with an active NGO network. The University of Debrecen has two faculties that provide the basis for agri-food startups: Faculty of Agricultural and Food Sciences and Environmental Management has been a leading institution of the Hungarian agricultural and food industrial education and research for many decades, and the Faculty of Economics and Business has also several research fields of agricultural and food industrial focus. Within the framework of the UD there is a training program, which uses the learning-by-doing method, called Team Academy. It develops the entrepreneurial mindset by starting students' their own companies, creating products/services, working with clients and doing their own businesses. Another key organization is the IGEN DEBRECEN (Innovative GENERation Training program for supporting the new startups and small business creation), which is a practice-oriented, innovator and startup training. While providing the theoretical background, they focus only on useful knowledge in entrepreneurship. The participants can master the entrepreneurial habit, working in a team, where the goal is to implement an idea together, helped by experienced mentors and trainers.

These organizations act as a simplified incubator that helps the early steps of newly formed businesses. They have not specialised themselves to agri-food industry, however, there is a strong need for a dedicated organization for agri-food startups and SMEs. An agri-food incubator could bring together researchers, professionals from both agriculture and food processing, teachers, innovators, SMEs and potential investors, provide high-quality assistance to innovators or other crucial services. Having a sample production facility, incubator could give the opportunity to test the production phase of an idea and produce in small scale or create a proper packaging to the final product.

Based the knowledge of Spain, we experienced that establishing an incubator lab will contribute to make a competitiveness against other cities regarding the knowledge which is gathered in the labs. This means that the large companies would settle down in Debrecen.

2. Action

An incubator needs a good financial background, a proper site with all the necessary infrastructure and facilities and an organization with professionals of agri-food industry. The proposal of the incubator project has been approved and EDC Debrecen has started to discuss with the stakeholders of the STRING project about the required equipment and facilities in the incubator. The conception of the facilities and the programs in the building should be ready at the end of this year in order to plan the building properly.

So first, the financial background must be provided, which is the hardest question. Stakeholders expressed their willingness to participate in the operation of a future incubator (with financial support also), but first they want to see how it works. We cannot rely on private resources to launch the incubator, thus external sources are required, basically from EU grants. Municipality of Debrecen has applied for the support of Territorial and Settlement Development Operational Programme to found an incubator in Debrecen.

The operation will be based on the collaboration of the Municipality, the University and private companies from the whole Northern Great Plain Region. They must agree on their business model, whether it should be profit-oriented or non-profit, the organizational and business rules, the management, etc. which should be decided by the time of the building's 50% construction status. Once it has its management, they can select the location of the incubator and decide the technical details of the sample factory.

3. Timeframe + cost

The milestones are:

	Deadline:
- preparation phase (business plan, architectural plan, etc.)	31.12.2019
- public procurement for contractor	31.07.2020
- construction (50%)	31.12.2020
- construction (75%)	31.03.2021
- construction (100%)	31.05.2021
- first occupation permission	15.06.2021

Costs:

The cost of construction is financed by TOP (Territorial and Settlement Development Operational Programme).

Total cost of the project: HUF 1.4 bn (€4.4m)

4. Responsibilities

- Dr. Papp László, mayor of Debrecen
- Harsányi Zsolt, head of Business Development, EDC Debrecen

5. Risk factors

- unsatisfactory utilization (not enough applicants)
- knowledge sharing having deficiencies
- other intentions emerging (change the orientation of the incubator and/or its facilities)
- cooperation among stakeholders is hindered

6. Summary

With the new trends of having healthy and locally produced functional food there is a constantly growing willingness to settle startups in food industry. The innovative startup ecosystem in the Northern Great Plain Region is concentrated in Debrecen since it has the largest academic, scientific and technological background with an active NGO network. For instance IGEN Debrecen (Innovative GENERation Training program for supporting the new startups and small business creation), which is a practice-oriented, innovator and startup training. While providing the theoretical background, they focus only on useful knowledge in entrepreneurship. The participants can master the entrepreneurial habit, working in a team, where the goal is to implement an idea together, helped by experienced mentors and trainers.

There is a strong need for a dedicated organization for agri-food startups and SMEs. An agri-food incubator could bring together researchers, professionals from both agriculture and food processing, teachers, innovators, SMEs and potential investors, provide high-quality assistance to innovators or other crucial services. Having a sample production facility, incubator could give the opportunity to test the production phase of an idea and produce in small scale or create a proper packaging to the final product.

An incubator needs a good financial background, a proper site with all the necessary infrastructure and facilities and an organization with professionals of agri-food industry. So first the financial background must be provided, which is the hardest question. Stakeholders expressed their willingness to participate in the operation of a future incubator (with financial support also), but first they want to see how it works. We can't rely on private resources to launch the incubator, thus external sources are required, basically from EU grants.

~ Action3 ~

Name of the action: **Restructuring agri-food education (to promote cooperation with university to adapt educational programs to the demands of the companies)**

1. Background

In our stakeholder meetings it turned out that the present cooperation of the municipality, the university and the representatives of agri-food industry is not really focused on the education, so there is an interesting mixture of labour shortage and fresh graduates' unemployment in this sector. On the one hand, thousands of youth finish school or graduate at the university, hundreds of them do not find their account in the regional labour market. Usually they do not find other solution and they have to move to the capital city or Western-Hungary, but the most talented ones do not stop at the border and they move to Western Europe. On the other hand, hundreds of vacancies exist in agriculture and food industry and HR managers are complaining of labour shortage, however they spent lot of money to recruitment. One reason is that the needs of the agri-food industry is not represented in the educational system in the Northern Great Plain Region. Creating an effective education system with practical skilled students coming out from the institutions could form the region to be more attractive and helpful to the agri-food companies settling down in the region which helps us to improve our policy instrument regarding the economic development and foster employment.

During the site visit in Denmark we have seen the operation of the Triple Helix model where teams of international students come together and compete to find the best solutions to food industry challenges. The country primarily relies on the Triple Helix model, considering research and development, information sharing as major tools for improving efficiency. Future Food Innovation, the organization established to assist SMEs was presented, similarly to the Innovation Camp designed to enhance cooperation between companies and educational institutions. On roundtable discussions we started to apply the Triple Helix model is to the issue of educational restructuring, which boosts up the changes in the programme structure on different educational level. Municipality and Vocational Training Centre are responsible for the secondary schools and their vocational programmes, so they can cooperate with the key players in the agri-food industry. From the university's side the Chancellor and the deans of the relevant faculties are playing crucial roles in this cooperation and they are eager to introduce new dual educational programmes, that makes the university more attractive to students. And at last but not least, firms' representatives can express their needs concerning the practical skills and theoretical knowledge required to hire new workforce. This multilateral communication brings up the deficiencies of both sides, educational institutions get to know the practical side, firms can have a broader insight to the research conducted at the university and they can set the framework of the cooperation, how to harmonize the researches and the practical education. This Triple Helix approach helps to give instant feedback of both sides.

2. Action

Based on the survey of TOP 6.8. the following modifications of educational structure are needed:

Launching new dual educational programmes

The idea derives from the good practices showed in Denmark where the companies cooperate with the university creating a system in order to help the students become entrepreneur.

University share a commitment to delivering courses and programmes that meet the needs of agri-food industry and the regional economy more generally. This should be achieved by linking the theoretical education to the practical knowledge students can learn at the real production process at real firms. We must reach at least a regional solution to the restructuring of course offerings and content. It is resulted in more performance-based assessment and work-ready criteria, such as graduate attributes, which seek to capture generic skills and abilities that can be applied in the regional workplaces.

Required actions of this subsequent activity:

- Organising events to build closer relationship among the University and the companies
- Make cooperation agreements between the University and the concerned companies
- Continued contact between the partner organisations

Apprenticeship system in the vocational education for food industry

The basics come from Denmark where the Danish cluster attend in the training of the schools where they give the requirements and practice knowledge to the students.

Agri-food industry requires the possession of a broad range of skills and problem-solving attitude from the applicants to job opportunities. These skills can be acquired only through experience, while the knowledge comes from learning in a real or stimulated environment. The highest level of learning is provided by a master who can show every details of the different types of food processing. Company-based training of apprentices is complemented by compulsory attendance of a vocational school. This training acquaints the benefactors with the theoretical and practical principles of food processing operations and problem solving. At the lower end of the spectrum are blue-collar workers, but this system can be applied for higher level of positions, even for adult education.

Required actions of this subsequent activity:

- Collection the exact needs of the agri-food companies about the required skills and deliver the information to the teachers and schools
- Restructuring the learning materials taking into consideration the information received

Harmonizing topics for thesis work and companies needs

The Danish University has good relationship with the research institutions which we have seen during the site visit. They have a cooperation about the desired research areas which help both parties to develop in those areas.

At the university there is a high pressure on students to choose a thesis topic that is actual, relevant for the programme and can be worked out alone. They face with the problem that they could not get enough data about the different companies or technologies because companies are afraid of the risks that accompanied with sharing their sensitive data with students and the

university. If the firms and the university harmonize the topics that companies should know more about (e.g. an analysis of their intra-firm processes or a selected functional area) and acceptable by the university, this whole problem will be solved and both sides will benefit from it.

Required actions of this subsequent activity:

- Organizing research brainstorming events with the participation of the professors from the University and the competent associates from the companies in particular to the verification of thesis topics
- Sharing up-to-date information about the possibilities and research areas of the companies and also at the University

3. Timeframe + cost

The timeframe of these actions is 5-10 years, because the first results can be observed after the first students finish their schools, but the major outcome is expected only in the long-run.

The milestones are:

- Thesis topic revision
- Framework for apprenticeship cooperation
- Dual education programmes

Deadline:

December 1, 2019.

May 1, 2020

continuous

Costs:

This action does not need external financial resources, all the institutions can finance the changes from their own budget (University of Debrecen, Vocational Training Center of Debrecen). Appr. costs:

- Organizing events € 5,000 / event
- Staff costs of the person working on the relationship among the University and the companies € 1,000 / month / person
- Restructuring the learning materials € 10,000 / study

4. Responsibilities

- Dr. Papp László, mayor of Debrecen
- Dr. Bács Zoltán, chancellor of University of Debrecen
- Tirpák Zsolt, chancellor of Vocational Training Center of Debrecen
- Harsányi Zsolt, head of Business Development, EDC Debrecen

5. Risk factors

- availability of up-to-date learning materials and knowledge
- large inertia of accreditation system for higher education
- not enough applicants to the programmes

6. Summary

In the Northern Great Plain Region there is an interesting mixture of labour shortage and fresh graduates' unemployment in this sector. On the one hand, thousands of youth finish school or graduate at the university, hundreds of them do not find their account in the regional labour market. Usually they do not find other solution and they have to move to the capital city or Western-Hungary, sometimes Western Europe. On the other hand, hundreds of vacancies exist in agriculture and food industry and HR managers are complaining of labour shortage, however they spent lot of money to recruitment. One reason is that the needs of the agri-food industry is not represented in the educational system in the Northern Great Plain Region.

On roundtable discussions we started to apply the Triple Helix model to the issue of educational restructuring, which boosts up the changes in the programme structure on different educational level. Municipality and Vocational Training Centre are responsible for the secondary schools and their vocational programmes, so they can cooperate with the key players in the agri-food industry. From the university's side the Chancellor and the deans of the relevant faculties are playing crucial roles in this cooperation and they are eager to introduce new dual educational programmes, that makes the university more attractive to students.

The main actions can be: (i) launching new dual educational programmes, (ii) apprenticeship system in the vocational education for food industry, and (iii) harmonizing topics for thesis work and companies needs.

~ Action4 ~

Name of the action: **Open-air market for local producers**

1. Background

As we trying to avoid the negative effects of large investments and to find the best educational structure it emerged, that there is a constantly growing demand for a better future for young agri-food entrepreneurs. Most of them are students, and they must see the opportunities of appearing with and selling their products on the market. A new channel of distribution should be created which provides development and well-proposed turnover for young market actors on one side and existing businesses on the other side. Furthermore, it could help new companies to present new products and innovation in the market.

The idea derives from the site visit in the Netherlands. The representatives of Eindhoven also presented how to convert brownfield industrial facilities in a way to make them suitable for accommodating restaurants that meet today's needs and use the products of local growers. We were thinking that this could also work as a market. The building can protect the sellers and their products from the damages of the weather, but the open air can bring the customers closer to the nature.

Conventional food supply chains may cause several sustainability problems including food security and ethical issues or environmental damages due to long-distance transport and logistics. Emergence of alternative and short food supply chains that may be able to eliminate or diminish negative impacts of the conventional food Short food supply chains can be identified by two main characteristics: (i) food production, processing, trade and consumption occur within the region; (ii) the number of intermediaries (retailers) is minimised; and (iii) this form helps the actors in the supply chain to be more sustainable.

In the Northern Great Plain Region producers using short supply chain have limited access to markets where they can sell their products directly to the final consumer. Linking to the policy instrument (TOP 6.8), this action could improve the employment among the beginner entrepreneurs in order to have easier access to the market so the entrepreneurial mindset could spread and this place also helps for those who are already on the market and they would like to enter a new product. Traditional markets and market halls (where the presence of retailers is predominating, though a smaller area is usually dedicated to producers, too) are maintained by local municipality, there is no restriction about geographical distances. Every development, which aims at improving the conditions for short supply chain producers, give an additional advantage to them compared to simple retailers.

As the Municipality of Debrecen is committed to increase the number of local producers and regional products on the markets, more open-air markets will be planned to be operated.

2. Action

Operating a new roofed market for local producers.

The conditions of trading are improved by new tables, indoor opportunity to load and unload products, access to fresh water and toilettes, security system and lights in the evening. The action is to promote this supply chain which gives new possibilities to the beginner entrepreneurs and to the already operated farmers to sell their products.

Marketing activities, new channels (like short food supply chains) can be launched, such as:

- enabling product traceability for the final consumers and feedback on the products through innovative procedures (eg. mobile application, QR code application, open day organization for farmers)
- introduction of a new sales incentive method: short food supply chain
- introduction of a trademark system: it is important for producers to avoid and prevent their products from being mixed up with others, and to draw consumers' attention to producers, their products and their origin in order to avoid these misunderstandings. According to the current ideas, we would like to promote the products of short food supply chain producers, with the right quality and freshness as well as authenticity, with a slogan.

3. Timeframe + cost

The milestones are:

	Deadline:
- creating short food supply chain	30.06.2020
- introduction of trademark system	31.12.2020
- creating product traceability (Pharmapolis Innovative Food Cluster)	31.05.2021

Costs (appr.):

- creating short food supply chain	€ 46,500	(financed by the Municipality)
- introduction of trademark system	€ 10,000	(financed by the Municipality)
- creating product traceability	€ 14,000	(financed by the Cluster)

4. Responsibilities

- Dr. Papp László, mayor of Debrecen
- Jurácsik Zoltán, CEO, Pharmapolis Innovative Food Cluster

5. Risk factors

- not enough local producer
- high exposure to seasonality
- underutilized because of not enough consumer
- change in the trustee (from municipality to government)

6. Summary

In the Northern Great Plain Region producers using short supply chain have limited access to markets where they can sell their products directly to the final consumer. Traditional markets and market halls (where the presence of retailers is predominating, though a smaller area is usually dedicated to producers, too) are maintained by local municipality, there is no restriction about geographical distances. Every development, which aims at improving the conditions for short supply chain producers, give an additional advantage to them compared to simple retailers.

As the Municipality of Debrecen is committed to increase the number of local producers and regional products on the markets, more open-air markets will be operated with marketing activities and new short food supply chain channels, such as enabling product traceability for the final consumers, introduction of a new sales incentive method and introduction of a trademark system.