Final Report

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APPENDIX

1.Preamble

BASAN (Baltic Sea agro-industrial network) is a member of the “Innovation in Europe” networks supported by the Enterprise Directorate General of the European Commission as part of the Innovation and SME programme. BASAN has ten participants representing the countries (apart from Russia) around the Baltic Sea. Four of these ten participants are regional research organisations. The others are regional innovation centres. The secretariat is placed at the Bioraf Denmark Foundation situated on Bornholm, a small island in the middle of the Baltic Sea.

The BASAN network was established in December 2001 and finished its activities in November 2003.

The overall goal of BASAN is

- To suggest "best practise" for agro-industrial innovation relevant to the conditions prevailing in the rural areas surrounding the Baltic Sea.

Operational objectives:

- To identify/develop ways and operational means to transfer/convert European agro(bio)industrial research into practical application in small scale production units within the the Baltic Sea Region.

- To identify success factors in the individual Baltic Sea areas and to assess the significance of these factors for a successful agro-industrial innovation process.

- To identify (mainly) non-technical barriers in the areas.

Activities

The focus has been on identifying ways to integrate the tools and skills needed to set up small scale production units in the Baltic Sea Region based on locally produced agricultural produce.

The work has been based mainly on information sharing among the involved institutions and regional authorities and entrepreneurs.

In order to ensure a fact orientation, *two virtual production units* have been designed. They were used as case studies in the involved regions in connection with the identification of local barriers/constraints and opportunities. The case studies were supported by a questionnaire survey.

A “model” information and "scout" function (innovation/technology observatory) have been established with the aim of providing the regional authorities and local entrepreneurs with

information about new business opportunities especially suited for their regional conditions.

A website has been created (www.baltic-network.de) that is partly accessible to the general public and partly accessible to members only (intranet).

BASAN has organised one kick-off meeting, 6 regional meetings, 2 steering group meetings and a final conference.

2. Executive Summary

The countries around the Baltic Sea share a long history with trade, culture and strategic interests, and the Baltic Sea Region constitutes a coherent cultural region. Only for a short period, lasting three-fourths of of a century, was the region split up into two spheres, and many links were broken. The region now has the opportunity to re-establish the historical trade relations.

At the BASAN final conference it was concluded that the Baltic Sea Region has a considerable growth potential, and even that the area might become a leader in agro-industrial and rural development. Individually the regions may be too small, but together they could form a strong link between old and new Europe.

Although the importance of agriculture and agro-industries to the national economies has been reduced during the last decades, the agricultural sector will remain a key sector, and sustainable and stable food and non-food production is still of considerable political interest. Also a dynamic development of the rural areas is of importance for the stability and economic growth of the whole region.

A strategy towards a more dynamic future development of the rural areas in the Baltic Sea region has been formulated.

The strategy is based on discussions between network members and steering group members, together with input from local stakeholders and information gathered from literature.

The strategy includes measures for attracting potential investors to the region and measures exploring/exploiting the growth potential of the individual regions.

In operational terms the strategy should include both joint, region-wide activities and activities in the individual regions.

Joint activities

- Establish a virtual "Baltic Sea Agro-industrial Campus (chapter 7.1.1) including:
  - A technology observatory
  - An agro-industrial network
  - A training centre for entrepreneurs
  - A business and market study unit.

- Establish the "Baltic Sea Bio-fuel Region" (chapter 7.1.2.) including:
  - A network of bio-energy pilot plants situated in the Baltic Sea Region
  - A network involving regional authorities, advisory institutions and research organisations
  - Co-operation between existing (national) and new bio-industrial clusters.

Activities at a regional level

- Create a vision for the region
- Establish an "entrepreneur package" for foreign investors/entrepreneurs
- Create an "incentive package" for local entrepreneurs
- Encourage the establishment of regional producer groups
- Set up "enterprise zones"
- Stimulate the creation of clusters and networks.

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3. The Set of Challenges

The Baltic Sea Region covers 2.3 million square kilometres and has a population of some 103 million. 50 % of the land is afforested and 20 % is arable land. The climate varies from an Arctic climate in the north to a temperate climate in the south.

The area includes 9 countries, 4 of whichare currently members of the European Union, and 4 of which will join within a few months.

In addition to vast forests, the area has an abundance of abandoned land and permanent pasture that has the potential for use in the production of biomass and to some extent of agricultural crops (food and non-food alike).

The yield of crops is low in some areas compared other parts of Europe, mainly due to the use of extensive farming methods. Better farm management, introduction of higher yielding seeds, improved used of fertilisers and pesticides could increase the output from these areas considerably.

A large proportion of the locally produced crops is exported from the regions unprocessed. The added value is thus generated elsewhere.

The number of new companies created in the areas has (with a few exceptions) been modest, and the entrepreneurial spirit is generally low.

Many of the Baltic Sea areas are far from big cities and markets, research centres and universities. The income of those regions is below the national average, and the age distribution is imbalanced with a relatively high proportion of elderly people. The unemployment rate is high, and young people leave the areas to find jobs elsewhere.

Some areas rely heavily on tourism, and there is a risk that such areas will develop a "monostructure" where most of the workforce relies on only one trade. Such regions will naturally become very vulnerable to international economic fluctuations.

The Baltic Sea areas thus represent a number of challenges that have to be met, if the (remote) communities shall not only survive but also survive as viable and attractive areas to live in also for future generations.

However, the Baltic Sea areas also have many assets that may attract new business activities:

- *Many areas have an abundance of land at low cost*
- *Some have access to cheap labour and energy*
- *A few have access to universities and/or research centres*
- *The cost of living is low compared to the national average*
- *The surroundings are often very beautiful with good hunting and fishing possibilities*
- *The remoteness of some areas – e.g. the Baltic Sea islands - makes them attractive for some high added-value productions such as molecular farming*
- *The occurrence of plant and animal diseases and pathogens in the northern Baltic Sea areas is low due to the climatic conditions.*

4. Strategic Recommendations

A major challenge is to identify potential business opportunities and to attract investors to these regions.

In an effort to attract new business activities, it might be advisable to focus on a few technological areas with particularly good potential under the conditions prevailing in the Baltic Sea Region.

They include:

- *High volume productions like bio-energy (solid and liquid)*
- *Low volume high profit per-unit productions like functional foods and food ingredients and speciality non-food products.*
- *Biorefining – combined production of high volume products and high profit products*
- *High-tech farming – molecular farming, precision farming, etc.*

Each of these production groups represents a considerable potential under the conditions prevailing in the Baltic Sea areas, as is argued in this report.

4.1.Joint activities

4.1.1.Virtual Baltic Sea agro-industrial campus

A first step in a strategy to attract investors to the Baltic Sea areas would be to make their advantages known to the surrounding world. The potential investors must be convinced that the regions have important advantages compared to other regions. Such advantages might be (in addition to the advantages mentioned above) lower input and transport costs, access to raw materials in acceptable amounts and quality, access to specialised labour or research facilities, etc. Also fiscal incentives, the local business climate, etc., could play important roles.

The strategy should include a promotional scheme for the entire Baltic Sea Region managed by a centralised secretariat that should be established as part of a ***"virtual Baltic Sea agro-industrial campus". (7.1.1. page x)***

The campus should address the obstacles revealed in the BASAN survey:

- *Low entrepreneurial spirit*
- *Limited language skills*
- *Limited awareness of new technologies*
- *Limited access to R&D institutions*
- *Little experience in innovation activities and know-how transfer.*
- *Little experience in business management and market evaluation.*

The campus should also actively participate in the creation of clusters especially suited for the Baltic Sea Region. More specifically it should:

- *Encourage the development of (e.g. geographically dispersed) clusters of small scale local agriculture-oriented value-added production processes and services based on the introduction of new speciality crops (11.5.page x)*
  - *Food and feed crops (11.4.page x)*
  - *Energy crops (11.2.page x)*
  - *Medicinal plants, spices, plants for cosmetics, dyes, etc.(11.5.page x)*

- *Encourage the establishment of agro(bio)-industrial companies with a positive impact on an entire region.(agro-industrial locomotives- biorefineries.10.2.1.).*

4.1.2.Baltic Sea Bioenergy Network

According to the EU Commission, the EU must in future rely much more on renewable energy resources such as biomass than is the case today (11.2.page x). The world's oil reserves, and especially the European reserves in the North Sea and Baltic Sea, are finite, while photosynthesis is not.

The Baltic Sea Region with its vast amounts of forests and unused or extensively used agricultural land would be an obvious candidate for becoming the "Bio-fuel Region of Europe".
The biomass production potential is enormous and, due to low-cost land and, in some areas, cheap labour, the production costs are moderate compared to other parts of Europe.

Biomass fuel clusters have already been created in Baltic Sea regions (see the Appendix: Minutes of the Regional Meeting, Umeå).
Nevertheless, It is crucial for success that co-operation between the various clusters - production clusters, advisory clusters and research clusters - is established.

This can be achieved in the Baltic Sea Region by co-operation between existing local/regional/national clusters already formed. In the pellet sector the already started co-operation between local authorities, the pellet industry and researchorganisations in Sweden (in the SLUP project) can be widened to include actors in all Baltic Sea countries.

The existing pilot plants in the Baltic Sea Region should be available to all actors in the region. Examples of such plants are:

- *A biodiesel plant in Poland*
- *Bioethanol plants in Ornskoldsvik in Sweden, Mecklenburg-Vorpommern, Germany and Funen, Denmark*
- *A solid bio-fuel plant, BCT, in Umeå, Sweden*

Networking
Networks involving regional authorities, companies, advisory institutions and research organisations must be established in the Baltic Sea Region. Local networks in the region, such as the "Bio-fuel region" (a network in northern Sweden) can be enlarged to cover the whole Baltic Sea Region.

4.2. Regional activities

The strategy should also include activities performed at a ***regional level:***
Such activities might be to:

- *Establish a vision for future regional development*
- *Develop an entrepreneurial package to attract foreign entrepreneurs/investors (agro-industry orientation).*
- *Develop an incentive package for local entrepreneurs (agri-culture orientation).*
- *Organise regional producer groups*
- *Stimulate the creation of clusters and networks.*

Finally, the ***national authorities*** *may consider the introduction of fiscal incentives for the remote regions such as:*

- *Tax incentives*
  - *Tax incentives on technology transfer (including tax credits on patent acquisitions)*
  - *Tax incentives on patent application and protection*

- *Tax credit schemes to support the training of personnel and immigration of specialists*
- *Tax exemption on specific products of particular interest to the Baltic Sea Region, such as bio-fuels, biodegradable packaging materials, etc.*

- *Financial incentives*
  - *Easier access to venture capital for agro(bio)-industrial activities*
- *Define enterprise zones in the least favoured regions.*

5. The Baltic Sea Region

Most of the population is concentrated in the south and in the coastal areas. The land use of the area is unique, with 50% afforested and 20% arable land. Approximately 30% of the population of the Baltic Sea Region live in rural areas.

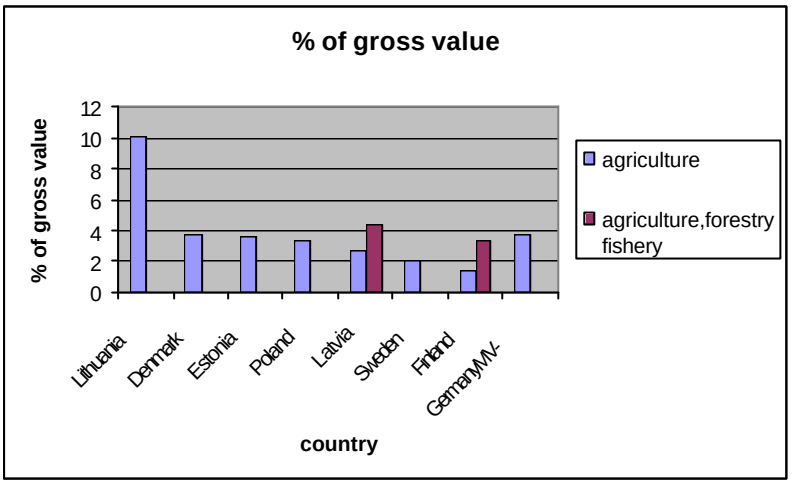
The area includes nine countries, four of whichare current members of the European Union, andfour of which will join within a few months. There are considerable differences between current EU members and the other countries, which emphasises the fact that the region is not yet a homogenous entity.

5.1. Agriculture and agro-industries in the Baltic Sea Region

Although the importance of agriculture in the national economies of the Baltic Sea countries has been reduced during the last decades, agriculture is still considered to be a

key sector, and the production of sustainable and stable foods and non-foods is still of considerable importance.

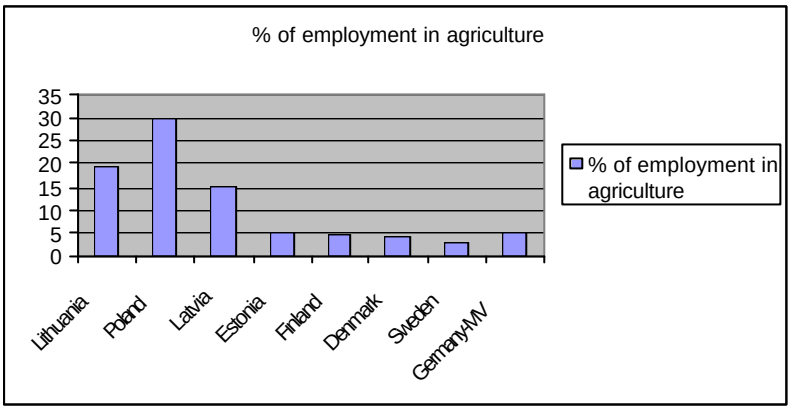
As shown in figure 1, the percentage of gross value added by agriculture varies from 1.4 % in Finland to 10 % in Lithuania. Forest plays an important role in Finland, Sweden, Estonia and Latvia in particular, and many farms are a combination of agricultural and forestry. There are 23 million ha of forests in Finland, 2 million ha in Estonia and 2.9 million ha in Latvia.



Source: Economic Rural Development – project description, 3rd revision, April 9, 2002. IIASA and BASAN members.2003

Figure 1. Value of agricultural production as a percentage of gross value

Also, the number of persons employed in agriculture varies considerably among the Baltic Sea countries, from 29 % in Poland to 3.3 % in Sweden. Accordingly, a decline in job opportunities in rural areas will have a more devastating impact in some countries than in others. However, in spite of these differences, all the Baltic Sea countries sharea stagnation of rural areas with a loss of jobs and declining populations



Source: Economic Rural Development – project description, 3rd revision, April 9, 2002. IIASA and BASAN members.2003

Figure 2: Percentage of workforce employed in agriculture.

Today, farmers and existing agro-businesses in rural areas around the Baltic Sea are mainly producing bulk products for commodity markets, where price often is determined by political decisions and not always related to the actual costs of production. The farmers' influence on their own situation is therefore rather limited. This situation has prevailed for many years and is not leading to any dynamic development of the rural communities.

There are however many differences in characteristics and trends between the present EU countries and the accession countries in the Baltic Sea Region. These differences cover geographical and climatic conditions as well as social, environmental and economic aspects. For example the relationship between agricultural land and total area varies from 7 % to 62 %, and the relationship between agricultural population and the total population varies between 3 and 30 % in the individual countries.

Also, the farming structure and average farm size differ considerably from country to country.

The above figures clearly demonstrate the need for new activities in the rural areas around the Baltic Sea, especially activities that can create new jobs and improve income in the rural areas.

In the following, a number of tables and graphs illustrating the considerable differences in production patterns, yield, etc., are shown. The differences indicate the large potential for production improvements and increases in some of the Baltic Sea countries. However, any substantial increase in production of primary products like cereals and rapeseed (the most common crops in the area), which are already produced in surplus amounts in Europe, does not make sense, unless new markets can be found. Fortunately, there are alternatives to the traditional crops, as mentioned in chapter 11 in this document. Also, promising alternative applications for cereals and rapeseed are available.

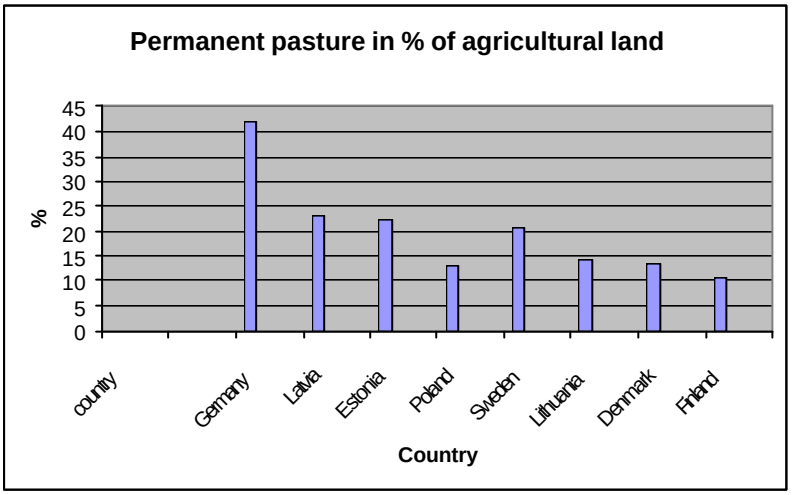
5.2. Primary production, yields of the most common crops and milk in the Baltic States

5.2.1. Permanent pasture

As shown in figure 3, the ratio of permanent pasture to arable land varies considerably. In Germany, for example, more than 40 % of agricultural land is meadowland and pasture, whereas in Finland only 1.2 % is pasture (approximately 10 % consists of meadowland and fallow). The vast pasture areas constitute a large potential for future production of products like biomass for bio-energy production.

There is a considerable amount of abandoned land especially in the Baltic States:

537,000 ha in Latvia
360,000 ha in Lithuania
341,000 ha in Estonia



Source: FAO statistics and BASAN members 2003

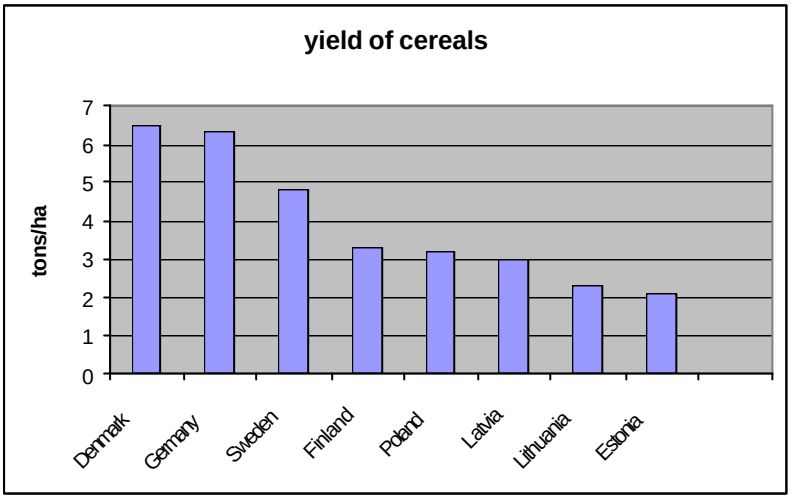
Figure 3. Permanent pasture as a percentage of total agricultural land

In the present EU countries, the crop yield per ha is currently still higher than in the accession countries, as shown in the following figures. However, the yield per ha is increasing in those countries. This indicates a large potential for production increase in the accession countries.

5.2.2. Cereals

Cereals are the most widespread crop in the Baltic Sea countries, as in Europe on the whole. Cereals are thus grown even in the northern part of Sweden and Finland.

Figure 4 shows the average cereal yields. They vary from 6.5 tons/ha in Denmark to 2 tons/ha in Estonia.

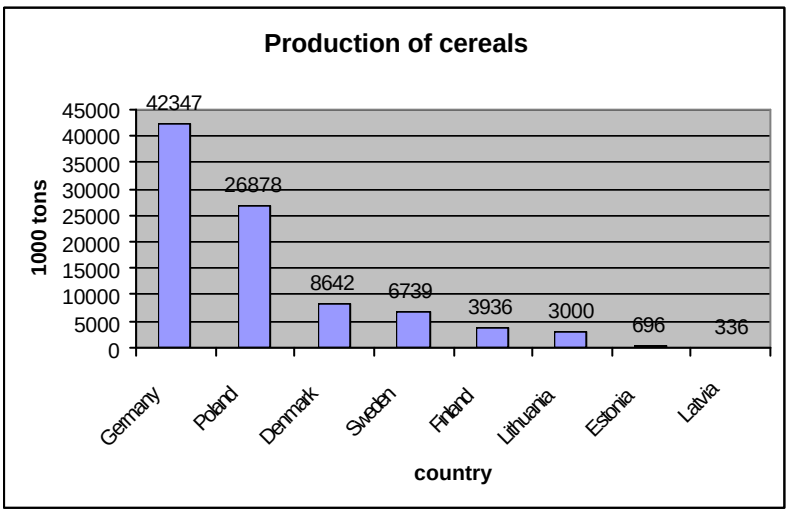


Source: FAO statistics and BASAN members 2003.

Figure 4: Yield of cereals in tons/ha 1998.

There are thus considerable variations in crop yield not only from country to country, but also within the individual countries presumably due to a number of factors such as crop variety, soil quality, and the application of fertilisers and pesticides. The relatively extensive production on rather large areas of land gives an indication of a very large potential for production increase in the Baltic Sea Region.

Figure 5 shows the production figures for food and feed cereals from the individual countries.



Source: FAO statistics, BASAN members 2003 and AGENDA 21

Figure 5: Production of cereals in the Baltic Sea countries

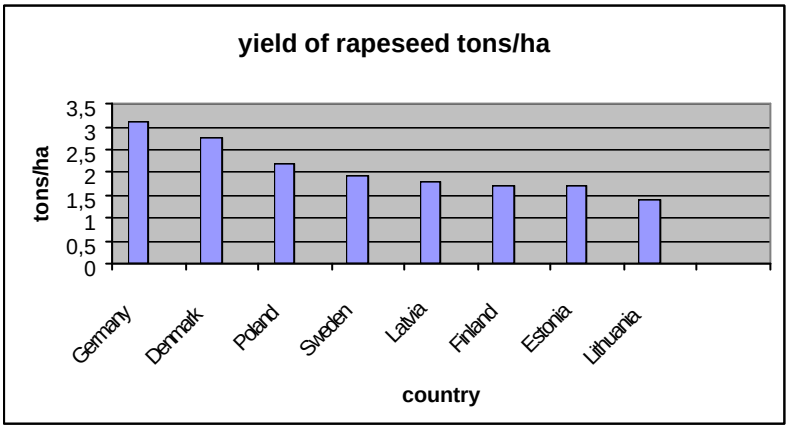
The cereals are mainly used for food production, and the two biggest countries, Germany and Poland, are by far the largest producers. The total production of cereals amounts to more than 85 million tons.

The major part is used for food. The production of feed grain is more modest, yet the amount is still considerable compared to other parts of Europe. The total production of cereals for feed and industry is approximately 32 million tons. Both Poland and Germany have wheat starch factories, and in Finland, starch is produced from barley, which is rather extraordinary.

5.2.3.Vegetable oils

Rapeseed is the second most important crop in the Baltic Sea Region. Especially Poland and Germany are important rapeseed producers. Together they produce 3.7 million tons of rapeseed, which is almost 30 % of the total world production. However, rapeseed production has been reduced during recent years, especially in the EU countries, due to a change in the CAP.

Yield

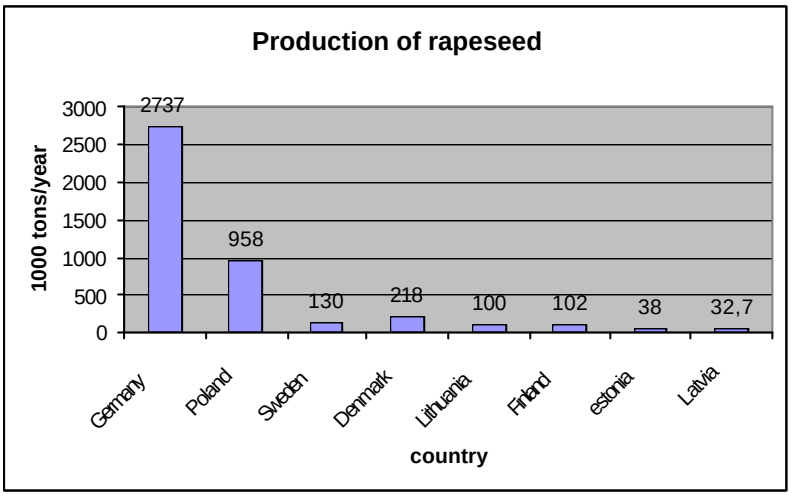


Source: FAO statistics, AGENDA 21 and BASAN members 2003

Figure 6: Yield of rapeseed in the Baltic Sea countries

Limited amounts of linseed are grown, especially in Germany and Poland.

Figure 7 shows the production of rapeseed. It is obvious that Germany is the largest producer by far. In Mecklenburg-Vorpommern alone the production is 850,000 tons/year (Gienap,2003).



Source: FAO statistics, AGENDA 21 and BASAN members

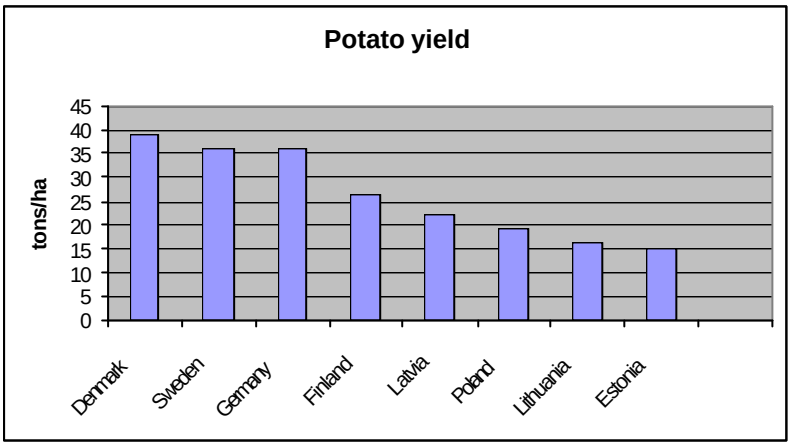
Figure 7: Production of rapeseed

Most of the rapeseed oil is used for food, although up to 40 % is used for non-food applications such as motor fuels, lubricants, varnishes and paints, solvents, printing inks, etc.

5.2.4.Potatoes

Potatoes are an important crop in the Baltic States, Poland and Denmark. Poland is not only the largest producer in the region, but also second in Europe and third in the world. Again there are differences in crop yield per ha. Potatoes are used as food or for industrial purposes. Potato starch is produced in all Baltic Sea countries. Also the starch production is regulated by an EU quota system, leaving little room for expansion.

Figures 8 and 9 show yield and production. Again, crop yields vary greatly from country to country.



Source: FAO statistics 1997, AGENDA 21 and BASAN member
Figure 8: Potato yield

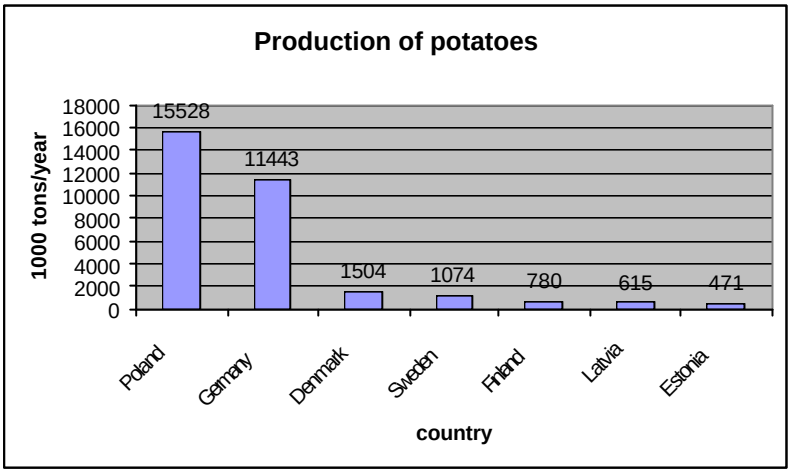


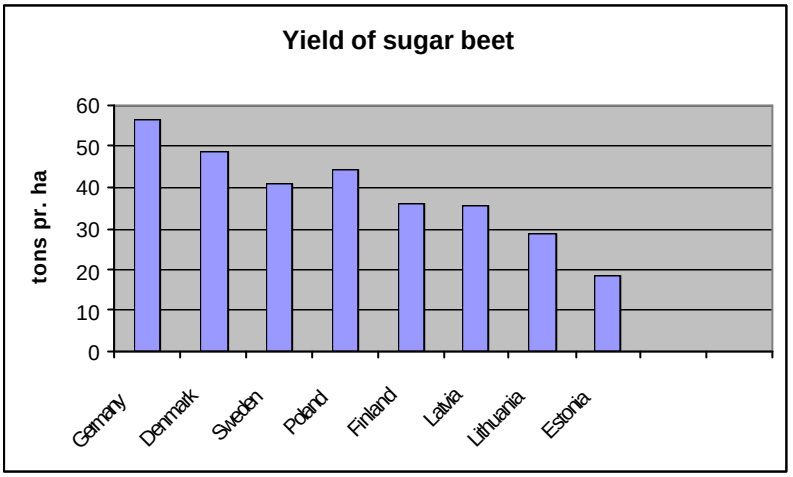
Figure 8: Potato yi
Source: FAO statistics,AGENDA 21 and BASAN members 2003
Figure 9: Production of potatoes

5.2.5. Sugar beets

Most of the sugar production is used for human consumption, and quotas regulate the amount of production in the four EU countries.

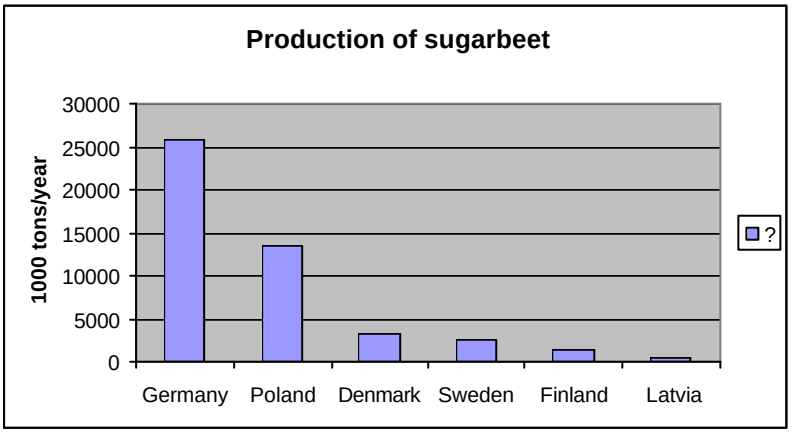
The potential non-food markets are large, provided the price is right.
Sugar (sucrose) is an excellent feedstock for fermentation, which is of special interest to the Baltic Sea Region with its high concentration of fermentation industries, including pharmaceutical companies.

Figure 10 shows the average yield of sugar beets in the individual countries. Like the other main crops, yields vary greatly from country to country.



Source: BASAN members
Figure 10: Yield of sugar beets

Sugar beets are the most efficient carbohydrate crop measured in tons per ha. The main carbohydrate competitor, i.e., starch from either cereals or potatoes, has the advantage, however, that the long-chain polymeric nature of starch imparts properties that are not matched by sucrose, which leads to substantially greater use of starch in the pharmaceutical and chemical industries.
Figur: sugar beets i stedet for sugar beet



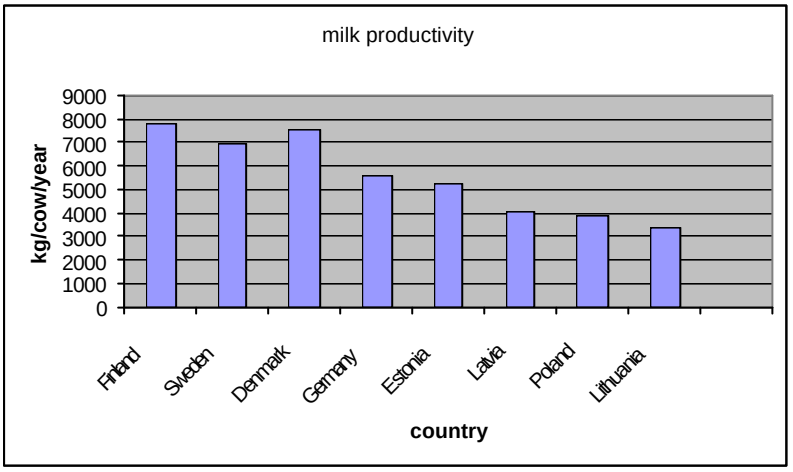
Source:BASAN members

Figure 11: Yearly production of sugar beets

Germany and Poland are the largest producers by far. The figures for the other Baltic countries have not been found.

5.2.6. Milk production

Germany and Poland are also the largest milk producers. The milk production has been relatively constant during recent years in the EU countries, mainly due to the milk quota system, while production has declined in the Baltic countries.



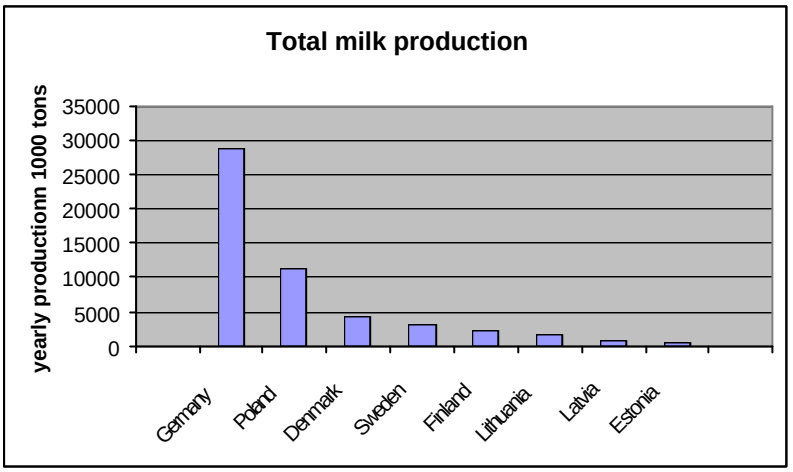
Source: BASAN members 2003 and FAO statistics.

Annike:Note: Finland 6900 kg milk per year

Figure 12: Milk productivity – kg milk per cow per year

Productivity varies considerably, as shown in figure 12, from 3000 l/cow in Lithuania to more than 6000 l/cow in the Nordic countries. Thus, there is a considerable potential for expanding milk production in some of the Baltic Sea countries. On the other hand, the EU milk quota system will effectively prevent any large scale expansion of the milk production.

Figure 13 shows the total milk production,



Source: FAO statistics and BASAN members 2003

Figure 13: Total milk production

5.3. Introduction to the areas of the Baltic Sea Region represented in BASAN

An extensive description of each of the nine countries represented in the BASAN network is given in the individual national reports.

In the following, brief summaries of these reports are given.

5.3.1. Denmark

Denmark is an important food producer with a large export of processed food to the whole world, but Denmark is no longer as dependent on agriculture and agro-industries as it was only 50 years ago, and Danish farmers do not have the same political influence as in the past. However, Danish agricultural and food research is still considerable with an agricultural university of international standard and large research centres.

Denmark has 2.7 million ha of farmland. The structural changes have been considerable in recent years. In 1995, there were 29,000 full-time farmers. Today, this figure is 21,000, and it is predicted that the number of full-time farmers will further decline to approximately 13,000 by the year 2015. The average farm size is 48.5 ha, while the average size of a "full-time farm" is much bigger. It has increased from 87 ha in 2001, to approximately 100 ha in 2003, and it is predicted that the size will increase to 161 ha by 2015. (Source: Danish Research Institute of Food Economics, 2003).

The main crops in Denmark are cereals, rapeseed and sugar beets, which account for more than 80 % of total plant production (excl. grasses). The cereal grain production accounts for 79 % of the total production. However, the value added through processing is limited to a few product groups such as dairy products, meat, poultry and pork, the price of which is determined by the world market.

This specialisation and a high export level make Danish agriculture vulnerable to factors beyond Denmark's control. On the other hand, the specialisation on a few product groups has made Danish farmers efficient and competitive.

Denmark has four potato starch factories andfour vegetable oil mills.

5.3.2. Germany

Mecklenburg-Vorpommern
Mecklenburg-Vorpommern is part of the Baltic Sea Region.
Agriculture is important to Mecklenburg-Vorpommern. It constitutes 3.8 % of the GDP, and the food exports constitute almost 40 % of the total exports from the area.

Mecklenburg-Vorpommern has approximately 1 million ha of agricultural land, 4.5 % of which is used for non-food production, mainly oilseed for biodiesel production. The province is the largest rapeseed producer in Germany with a production (2001) of 850,000 tons. However, there is no central oil mill in the region, but a number of small farm-scale units and one large, decentralised plant with a crushing capacity of 5 tons of seed per day.

Only 20% of the farmers in Mecklenburg-Vorpommern own their own land. The majority, i.e. 80 %, live on leased land. The average farm size is rather large – 320 ha.

The farmers in Mecklenburg-Vorpommern seem to have little interest in investing in non-core activities, and they also seem very reluctant to get involved in contract farming.

A considerable amount of land is found in so-called environmentally sensitive areas. For example, 200,000 ha of wetlands are only used for grazing. These areas are heavily subsidised.

5.2.3. Latvia

The agricultural sector is traditionally the backbone of Latvia. However, agriculture's share of the total GDP is declining. It 1995 it was 8.9 % of GDP, while in 2001 it declined to only 2.7 %, and the trend towards further reduction continues. The average size of agricultural farms (101,000) is approximately 24 ha, while an average household plot (151,000) is 8 ha. The income level in agriculture is low – 75 % of country average. Most of the agricultural production is fragmented and the farm size is too small for efficient production.

Latvia has one main advantage: its geographic location. Latvia is close to large markets. The infrastructure is good, and there is easy access to railroads, airports and ports.

However, the Latvian food producers have many unsolved problems, most of which are historically based, and there are many barriers to potential new companies.

The domestic market is not yet sufficiently well-organised and regulated. Furthermore, the domestic food industry competes with cheap - subsidised – food from western countries.

The crisis in the Russian market for fish and meat in 1998 resulted in problems for many Latvian producers, whose main market was Russia.

The Latvian agro-food industry is gradually developing, as is the whole country. Latvian farmers have successfully applied for EU SAPARD programme funds, which has improved the general situation of the agro-food sector. The positive results – almost completely utilised SAPARD funds for 2000-2003 – have proved the goodwill and high working capability of the representatives of the Latvian agro-food sector. The SAPARD case is a good example for the opportunities of the coming Structural Funds, and it is clear that the Latvian agro-food sector is ready for the upcoming competition on the European market.

However, there are currently many problems that have to be overcome.

Some Latvian food companies have old-fashioned machinery, and there is a widespread realisation that modernisation is badly needed. However, it is not easy for most companies to find the necessary investment capital. Some improvements are expected such as increased government support. Currently there are only a few national funds, yet in autumn 2003, the Latvian Venture Capital association was founded.

As Latvia has been oriented towards East European countries for more than a generation where Russian is the dominant language, the limited international language skills (such as English and German) are an obstacle to international co-operation for the middle and older generation of businessmen, especially those who come from rural areas. However, this fact depends on the management of the companies. The big food enterprises, located in Riga and its surroundings, have all the necessary skills, qualifications and experience for international co-operation.

There are many entrepreneurs among Latvia's farmers, and they are willing to take high risks. Some have started alternative businesses such as ostrich production, onion growing, strawberry farming, etc.

Latvia has a few privately owned agro-industries, e.g., a potato starch factory and three sugar factories.

5.2.4. Estonia

Like Latvia, Estonia is ideally located for establishingof transportation links and distribution chains for goods and services to companies in Europe and the Eastern part of the world. Also, it has a well-developed infrastructure.

One-third of the population live in rural areas. The importance of agriculture, measured as a percentage of the gross domestic product, is declining, however, and today it is as low as 3.4 % of GDP. In 2001, there were 61,000 private farms in Estonia with an average size of 21 ha.
The domestic market for agricultural products is relatively small, and the largest foreign market, Russia, is very unstable. The market situation may change drastically when Estonia joins the EU. However, this will require certain quality standards that might not be met by all Estonian food companies.

Investment funds for value added productions do exist; these funds have not yet considered investments in high added-value agro-industries, however. One problem is that the low cost of land makes it difficult for agro-industrial entrepreneurs to give enough security for loans.

The production of rapeseed has increased in recent years, and a new oilseed processing plant has been erected. It has a capacity of 60,000 tons per year (of seed).

Traditionally Estonia is a flax producing country growing flax on more than 40,000 ha in the early 20th century. Today, this area has dropped to 80 ha. One of the largest flax factories in Europe (Parnu Linen Factory) is situated in Estonia. It produces linen yarn and fabric mainly from imported flax fibres. A new flax factory is under construction.

5.2.5. Poland

Poland has over 38 million inhabitants, 38% of whom live in rural areas and 29% work in the agricultural sector. There are 1.96 million individual farms in Poland with an average size of 8.3 ha. The total farmland acreage is 16.9 million ha, but only 11.5% of this amount have soils classified as very good and good, 54.4 % have medium class soils and as much as 34.1% are classified poor or very poor.

Poland is the only country in which the private sector survived during the communist era. At that time, 80% of the farmland was in private hands. According to the Agricultural Census 2002, the private sector now constitutes 93.1% of the farmland. The problem is still the structure of Polish agriculture. 26.5% of our farms have with an average acreage of 1-2 ha, 32.2 % of farms 2-5 ha, 21.9% are in the group of 5-10 ha, 9.3% in the group of 10-15 ha and only 10.1% are larger than 15 ha.

Most small farms use traditional methods of production, with a low level of fertiliser and pesticide application rates. About 60% of farms produce for self-sufficiency only, and sell nothing on the market. But there are also large number of highly productive farms which use modern methods of production, are well-equipped and capable of able surviving the competition with current EU agriculture.

Polish agriculture is an important producer of several products of plant, orchard and animal origin. In products areas such as raspberries, currants, onions, cabbages, cauliflower, strawberries and apples, Poland is a leader among European countries. Because of its predominance of light soils, Polish agriculture is one of the biggest producers of potato and rye in the world.

The dairy sector is also quite strong, and includes a large share of big European companies. During the last decade important progress has been made in milk quality and milk yield per cow at specialised farms, yet statistics for the entire country are not so optimistic because of large amount of small farms with only 1 or 2 cows.

To stimulate changes and modernisation in agriculture, there are several programmes of preferential crediting for our farmers, as well as financial programmes of the EU. The problem is lack of free equity in farms, which causes difficulties to fully accommodate these possibilities.

The most urgent priorities are to invest in local industries that process agricultural goods, to stimulate local initiatives, to improve the level of education of farmers and their families and to create new jobs for people getting out of farming and agricultural production.

5.2.6. Sweden

Sweden covers a large area of land. With only 10 million inhabitants, a considerable number of whom are concentrated in large urban areas like Stockholm and the Øresund region, there are many thinly populated regions. Some of the regions have natural resources like minerals and timber, and in these regions large industries have been established on the basis of the local raw materials. However the majority of remote regions have to base their income on agriculture and forestry, and Sweden has for some years experienced an exodus of people from remote regions to the growth centres.

These regions constitute a huge challenge. For many years, therefore, Sweden has put great emphasis on developing all the Swedish regions, and a number of growth centres throughout Sweden have been established. Many of the growth centres are centred around universities and, in recent years, science parks. This seems to have been a successful endeavour, as the regions with universities and science parks, even in remote parts, seem to flourish and are able to attract new companies in technological growth areas such as IT and biotechnology. But the development of the agro-industrial sector is much more modest.

Normally, private shareholders in Sweden do not invest in agro-industrial projects, if the raw material supply is dependent on subventions. It is too risky to rely on politically determined raw-material prices. The subvention may be changed at any time.

The Swedish agro-industry and agro-industrial knowledge and financing capacity have been very much centralised in the Stockholm region, which may create problems for more remote farmer groups and agro-industries.

5.2.7. Finland

Like Sweden, Finland has a long coastline, and most of the rural regions in Finland are situated near the Baltic Sea and Bothnia Bay

Finland is a model country in European research policy benchmarking. International studies rank it as the top country in the world for technological co-operation between companies and universities, and in the development and application of technology. The volume of R&D has doubled every ten years. R&D spending now constitutes 3.5 of the GDP.

Most of the money is spent on industrial research, mainly biotechnology and information technology. However, the public funding of food and agro-industrial research is also considerable. More than 20 % of the public funding is spent on applied research. Also a few of the large food companies spend a considerable amount of money in functional food research, and Finland is a leading country in the world in terms of functional foods.

Finnish farmers are generally well educated, have good international contacts, many speak English and they have access to the Internet. But they are seldom aware of the new possibilities constantly arising from new research and development.

Large companies dominate Finland, and they are often sceptical of projects and new production processes that were not developed by their own R&D unit.

Many SMEs, however, are very open to new ideas, but they may not always have the right expertise to develop these ideas. As a result, agro-industrial companies with both an entrepreneurial spirit and the expertise to explore new ideas are rare.

The incubators and science parks around the universities are very useful in transferring know-how from science to practise.

76,000 farms were registered in 2002, half of which have more than 20 ha of land. (average 30 ha/farm)The most common crops are cereals and grass (83 % of cultivated land). Oilseeds are produced on approximately 66,200 ha, and about 103,000 tons of seeds are processed for food oils.

Barley and potatoes are used for the production of starch. In 2002, about 264,000 tons of potatoes were processed into starch. Most of the starch is used in the paper industry.

The interest for alternative crops is increasing. Especially the production of caraway has been successful, and caraway is now grown on 7,000 ha. Caraway is used as a spice, and most is exported. Some Finnish farmers have created co-operatives and set up small production plants for the production of commodities from berries, herbs, vegetables, etc.

In general, Finland is a forested country and many Finnish farmers rely on forest production.

5.2.8. Lithuania

Lithuania has a favourable geographic location. Two transport corridors of European importance run through Lithuania. North-south railways and roads connecting Scandinavia with Central Europe, and east-west routes linking the huge Eastern markets with the rest of Europe.

Agriculture is important. The agricultural sector accounts for 10 % of the GDP and the number of jobs in the agricultural sector constitutes 21 % of total employment (1998). The rural population constitutes 32 % of the total population. Until a few years ago, depopulation of rural areas was common, as in the other Baltic Sea areas. This tendency has now changed, however, so that the population of rural areas is actually increasing.

Lithuania has a considerable amount of abandoned land (360,000 ha) that might be used for afforestation.

Three different types of farms currently characterise Lithuania's farming structure:

- Agricultural companies
- Family farms
- Household plots

Agricultural companies are large-scale corporate-like enterprises founded as a result of the transformation of state and collective farms. In addition to primary production they are involved in agro-processing and trading activities. By 1998, there were almost 1500 agricultural companies with an average of 340 ha.

There are approximately 200,000 family farms with an average size of about 7 ha.

The household plots have an average size of 2.2 ha. They are often operated by shareholders of agricultural companies or by rural inhabitants with additional income sources (e.g. job in a factory).
All in all there are 327,000 household plots, and they account for a significant share of the income generated in rural areas.

The general productivity of Lithuanian agriculture is low compared to neighbouring countries, the quality is often unsatisfactory, and the production is rather fragmented. Modernisation of farming equipment is badly needed.

Also the Lithuanian food industry needs to be modernised, the quality must be improved in order to be able to meet the quality standards of the EU Commission.

Food production is dominated by the dairy and meat sectors. Currently, Lithuania is a net importer of meat.

The grain production area constitutes about 46 % of the total arable land. There are 47 grain processing companies. Rapeseed is grown on 84,000 ha.. There are two oil processing plants with a total capacity of 30,000 tonnes of oil per year.

Flax is an old domestic crop in Lithuania. Production can not satisfy demand. There are 9 flax processing enterprises with a total capacity of 50,000 tons.

Lithuania produces potato starch in limited amounts. The starch processing capacity is 10,000 tons/year, but the actual production is only 2,400 tons of dried starch/year.

The interest in producing speciality crops is growing. Caraway is produced on 4,800 ha (2002), while valerian, camomile and calendula occupy 25-350 ha. They are used in the pharmaceutical and cosmetic industries.

5.2.9 .The Baltic Sea Islands

The Baltic Sea islands share many common problems such as remote location and thus far from larger markets, high transport costs for people and goods, depopulation, lack of commercial activities, limited public service, etc. Each of these factors is in itself a barrier to new commercial activities, and when combined they present a serious obstacle.

5.2.9.1.Lolland/Falster and Bornholm, Denmark

Geographically three Danish islands are part of the Baltic Sea Region. Lolland and Falster are connected to each other via a tunnel, and also connected to Sealand by bridges, while Bornholm is situated in the middle of the Baltic Sea, with ferry connections to the Danish mainland, Sweden, Germany and Poland.

Bornholm has 870 farmers who farm 34,000 ha. The average farm size is 45 ha. The number of farmers is declining (appr. 3 % a year). 95 % of the agricultural products are sold unprocessed from the region.

Lolland-Falster has some of the most fertile agricultural land in Denmark, and the farmers are generally well off.

The importance of access to knowledge for regional development is discussed elsewhere in this report. Both Danish regions have local agro-industrial research centres – Green Centre on Lolland/Falster and Bioraf Denmark Foundation, but no universities or university level education programmes.

Green Centre has had success in the creation of local micro-clusters of farmers and small processing industries (cherry and honey production, etc.). The establishment of new jobs has been modest, however.

A number of innovation tools and incentives for entrepreneurs are available on Bornholm and Lolland/Falster. Thus, the Danish state and local authorities have established a good public environment for a dynamic business climate, although so far with little success with regard to the establishment of new companies and new jobs. The unemployment rate of both regions is higher than the national average.

A number of SMEs producing high quality food are situated on Bornholm, such as a cheese factory renowned for the quality of its blue cheese and other companies exporting all over the world.

5.2.9.2.Gotland, Sweden

Gotland is the largest island in the Baltic Sea. The number of inhabitants is 58,000 .The structure of the commercial activities vary from the rest of Sweden. Above all, the number of employees in the forestry and agricultural sectors is more than twice that of the rest of Sweden. Between 80 and 90 % of the agricultural and forestry production is exported, most of it in a non-processed form.

Until recently a large sugar mill was situated on Gotland. This mill closed a few years ago and created considerable problems for the then 650 sugar beet growers.

The industry is dominated by a number of small food enterprises and one large high-tech (electronics) factory (L.M.Ericsson, Visby). The factory was placed on the island as a result of regional policy considerations.

Gotland has never been through an industrialisation process as other parts of Sweden, and, apart from a few large industries established with considerable public financial support, the industries are very small. 68 % of the private employees on Gotland are employed in companies with less than 19 workers. The average figure for Sweden as a whole is 43 %. All in all, the majority of the workforce, almost 40 %, are employed in the public sector. A few governmental institutions (e.g. Svensk Tipstjeneste) have been placed on Gotland as part of a political strategy to place part of the governmental institutions in the Swedish regions.

In 1987, a university (Högskolan på Gotland) was established. To begin with, the students were recruited mainly from the island itself. Today, however, they come from all over Sweden. The university is small with 1200 students, yet it is independent and has proved that it can compete on equal terms with other Swedish universities. There are four lines of study: the humanities, IT/economy, engineering and ecology. The university is of significant importance for Gotland. It is the largest single working place on the island, and the university teachers have become an integrated part of the society, attracting more academics to the island. In the long run, it could become a catalyst for dynamic regional development. In its marketing activities Högskolan uses its remote position as an asset. It stresses the advantages of a small, intimate student environment and the many recreational facilities on Gotland (Tage Petersen, 2000).

5.2.9.3. Öland, Sweden

Öland is the second largest Swedish island. It has 21,000 inhabitants, and the main activities are agriculture, fisheries and tourism, as on the other islands.

Like the other islands, Öland is burdened with a lack of industrial activity and depopulation. The island has one advantage over the other islands, however. It is connected to the Swedish mainland via a bridge to Kalmar, which reduces transport costs.

5.2.9.4. The Åland Islands, Finland

The Åland Islands consist of 6,100 islands, and the number of inhabitants is 25,000. The Åland Islands are part of Finland, but they have an autonomous status, e.g., with their own

government and parliament. Also the Åland Islands has their own representative on the Nordic Council.

The main activities are in the transport sector and public services. Income from agriculture, fisheries and forestry accounts for approximately 4 % of the gross domestic product. One of the major productions is onions that cover almost 25 % of the total market in Finland. Other agricultural and horticultural products are potatoes, sugar beets, apples and cucumbers.

As for the other islands, one of the barriers to new productions are the high transportation costs that often prevent new activities. The islands put great emphasis on activities to help establishing companies that can process the raw materials produced on the islands to retain the added value and to create workplaces that are crucial to economic growth.

The islands have one outstanding success story, namely A/B Chips that is the biggest industry on the islands with an annual turnover of EUR 130 million. It produces potato products – mainly potato chips, and A/B Chips now has subsidiaries in the other Nordic countries, and the products are exported all over Europe. The success is mainly due to one very enthusiastic person: an entrepreneur who could see the potential of having a potato factory on the island.

5.2.9.5. Rügen, Germany

Rügen's area of 973 km^2 makes it the largest island in Germany. It is connected to the mainland via a dam, causeway and bridge. The island's problems are similar to those of the other Baltic Sea islands. The population has thus declined from 85,000 in 1990 to 75,000 in 2001. The unemployment rate is high: 19 % in 2000.

The main commercial activities are tourism, agriculture and fisheries. Tourism is of increasing importance, which raises some concern. Today, 40 % of all jobs are in the tourist industry, which might lead to an unwanted "monostructure".

There are 236 farms on Rugen with a total agricultural area of 60,000 ha. The soil is fertile, and the main crops are sugar beets, oat, rye and potatoes. Private farmers own half of the land, while the other half is owned by the state and leased by farmers. Most of the agricultural products are "exported" and processed elsewhere. The average farm size is large – almost 300 ha, which facilitates the introduction of new farm technologies like large harvest machines, early warning systems, precision farming, etc.

The authorities on Rügen have recently, together with the local population, established a regional development concept (or strategy) with a time perspective of 10 years. (Regionales Entwicklungskonzept, Rugen). The work has resulted in many suggestions on specific activities to help solve the many economic, socio-economic and environmental problems.

5.2.9.6. Saaremaa, Estonia

Saarema is a relatively large island with an area of 2,922 km^2. However the population is only 40,000, and the average age is lower than in Estonia on the whole. Saaremaa has an airport and good ferry connections to the mainland.

About 40 % of the area is covered with forests, and agriculture plays an important role to the overall economy. 75 % of agricultural land is still state owned.

Tourism plays an important role, as on the other Baltic Sea islands.

6. Significant Factors for Rural Dynamism in the Baltic Sea Region

Although the rural areas of the Baltic Sea Region have much in common, they differ greatly in terms of economic and social development, which is partly due to the fact that the development of a given region is determined by a multitude of parameters (factors). Some of these are natural and static, some are regulated by the EU Commission and some are regulated by the national government.

In reality, local authorities only have influence on few of the determining factors, and *the key to success for a given region is to make optimal use of the positive non-changeable (by the local authorities) factors and to eliminate or reduce the effect of the negative factors through the introduction of region-specific incentives.*

Significant Parameters

Natural factors

- Climate
- Geographic location
- Soil fertility
- Natural water resources
- Landscape

Institutional framework

- Common Agricultural Policy and Environmental Policy
- Infrastructure
- Incentives
- - Fiscal incentives
- - Financial incentives
- - Innovation incentives

Variable factors (parameters)

- R&D and technological development
- Farm structures
- Consumer preferences – market structure
- Change in relative prices
- Availability and cost of capital
- Availability and cost of labour
- Entrepreneurship

Intangible factors

- Business climate
- Quality of life
- Access to medical care
- School system
- Cost of living

6.1. Natural factors

6.1.1. Climate

The Baltic Sea Region covers a vast area, and some of the areas are very remote. The climate varies considerably; from an Arctic climate in the north to a temperate climate in the south. As an illustration, the growth period (number of days with an average temperature above +5º C) varies in Sweden alone from 160 days in the coastal areas of Övre Norrland to 230 days in the Scania province in the south of Sweden. The climate puts natural limitations on the variety of crops that can be grown.
(Energiskog, Statens Energiverk, 1985.9)

The circumpolar areas hold about 50 % of the land in Sweden and Finland, but only approximately 15 % of the population and a very limited area of agricultural land. The climate in these areas is severe and the weather unpredictable, making farming difficult.

On the other hand, agriculture in the Northern part of the Baltic Sea/Bothnia Bay has a few advantages such as good light conditions and an extremely long daylight hours during the summer months. Furthermore, plant diseases and pests are rare, and thus the need for pesticides is modest.

Farmers in Vesterbotten in Sweden and Osterbotten in Finland have taken advantage of the fact that the occurrence of plant diseases is low to produce pathogen-free seed potatoes, and farmers in Osterbotten in Finland have found that the cool climate is exceptionally well suited for fur production (chapter 9).

The slow growth might favour the formation of secondary plant metabolites indicating that this climate might be suited for production of speciality crops containing biological active materials (e.g. molecular farming, chapter 11.5.1.). It is well known that the aromatic

quality of fruits and berries from these areas, for example, is superior to those from warmer climates.

In other parts of the Baltic Sea Region, the weather is more ideal for agricultural production, and most of the common crops in Europe can be grown in these regions (see chapter 5.2.).

6.1.2. Geographic location

Many of the regions in the Baltic Sea area are far from big cities and markets, which is often one of the major barriers to economic performance in a given region (see page xx). Thus there seems to be a fairly straightforward relation between economic performance and accessibility to transport infrastructure – motorways, railways and airports.

However the new information and communication technologies can make a decisive contribution towards reducing the relative disadvantage arising from the physical distance from the important markets and more populated areas (examples: the Baltic States, Bornholm).

Both Sweden and Finland have shown that the establishment of research centres and universities in remote regions can have a considerably positive effect on the economic development of these regions (Gotland, chapter 5.2.9.2, Umeå and Oulu, chapter 9).

6.2. Institutional framework

6.2.1.EU framework

Half of the countries represented in BASAN are members of the European Union, and the other half will most likely join the EU within a short period of time. It is therefore relevant to analyse the potential impact of the EU policies on the rural development in the Baltic Sea Region.

Common Agricultural Policy

The Agricultural Council is currently in the process of revising the Common Agricultural Policy. New priority will be given to rural policy (the second pillar of the CAP) meaning that higher priority will be given to the demands of citizens and society for market orientation with specific focus on food safety and quality.

The orientation of the agricultural production towards higher quality standards as demanded by consumers that are more and more concerned with animal welfare, environmental standards, etc., will force farmers and rural based industries in the Baltic Sea Region to adapt their activities. This may include new products of increased value added (page xx), more efficient techniques and also diversification of activities. This adaptation may lead to a further specialisation of rural economies. In certain "marginal areas" of the Baltic Sea Region, this might entail a risk of abandoning economic activities if no action is taken.

The actual non-food set-aside system allowing for growing non-food crops on the set-aside land is an important incentive for non-food companies and could become a decisive element in the future establishment of new productions based on energy crops and other non-food crops in the Baltic Sea Region. As mentioned, a considerable amount of

abandoned land is available. However, the set-aside scheme may be revised. A 10 % rate of long-term environmental set-aside in which e.g. energy crops cannot be grown has been proposed. This would be a serious drawback to the prospects of new activities.

Innovation activities
With its initiative "Innovation in a Knowledge Driven Economy" the Commission laid down the framework for a series of actions and put forward recommendations to Member States. These initiatives are general and no distinction is made between the individual sectors of industry. These general conditions for innovation are naturally also of significance to the agricultural and food sectors.

EU Structural Funds
It is expected that major changes of the Structural Funds will take effect after 2006. The impact on the rural areas in the Baltic Sea Region will be important to the regional development.

The European Social Fund (one of the three structural funds) supports and complements the efforts of member states to combat unemployment, develop labour markets and human resources. The Fund offers educational opportunities for the unemployed.

These funds are of great significance to regional development. They are, however, complementary and require the co-operation of governmental and regional authorities.

R&D policy
On a research level, the new 6th Framework Programme on Research, Technological Development and Demonstration 2000-2006 will give higher priority to cross-sectoral issues such as food safety research. Importance is also given to networking and the formation of a European research area.

EU directives
The Council regulative 2309/ on Deliberate release to environment of genetically modified organisms could have great influence on the future of molecular farming.

The revision of the Packaging Directive (94/62/EU) laid down new, more ambitious targets for recovery and recycling to be met by 2006. This will clearly have an impact on the use of biodegradable materials (made from agricultural raw materials, etc.).

The Landfill Directive (1999/31/EU) will have an indirect impact on the use of renewables.

Impact of global environmental agreements.
The EU is part to the United Nations Framework Convention on Climate Change and it ratified the Kyoto Protocol on 31 May 2002. The EU committed itself to reduce the emission of greenhouse gases by 8 % from 2008 to 2012, relative to that of 1990.

One major contribution to the achievement of this goal would be to increase the use of both solid and liquid bio-fuels as substitutes for fossil fuels. In the Baltic Sea Region an enormous reserve of land that might be used to produce large amounts of biomass for energy production. (see chapter 11.2) is available.

The EU is also a contracting party to the United Nations Convention on Biological Diversity (CBD) and in 1998 the EU adopted a biodiversity strategy with a specific action plan on agriculture with the objective of halting biodiversity decline by 2010.

Among other measures, this strategy involves a shift towards the production of unconventional crops (food and non-food), which also is one of the recommendations set up for the establishment of new activities in the Baltic Sea areas (chapter 11).

6.2.2. Infrastructure

When investors are considering suitable sites for establishment of new productions, they will naturally take the infrastructure in a given region into consideration. Access to railroads, motorways, and airports is important, but also access to cheap energy (electricity and heat) and process water may play an important role. (see page x).

6.2.3. Innovation incentives - best practice

The experience from our work in the BASAN network has revealed that although incentives may share similar aims and target similar activities, a comparison of separate measures introduced in line with regional priorities has turned out to be an extremely difficult task.

The identification of **one** "best practice" scheme that applies to the entire Baltic Sea Region seems hard to achieve. The differences among the Baltic Sea areas are simply too large. An incentive that works well in one region may prove impossible or difficult to implement in another. It is possible, however, to identify some incentives that are applicable in all areas, especially financial incentives.
Tax incentives may be used to stimulate increased expenditure across a wide range of innovation activities – allowing companies to decide their priorities, whilst financial incentives are more likely to be concentrated on specific, government-stipulated priorities.

<u>Tax incentives</u>

It is common practice in most Baltic countries to allow a tax deduction on R&D expenditure. However, R&D is only one link in the innovation chain, and tax incentive schemes for establishing of new activities would presumably be much more effective if all links in the innovation chain were included.

Especially for less favoured regions with no local access to know-how (no local research centres or universities), a tax incentive on *technology transfer (including tax credits on acquisition of patents)* and the acquisition of new technology (e.g. information technology) could be a very valuable incentive.

Equally important for those regions may be tax incentives on co-operation between companies and universities and research centres. Expenditures that arise in projects due to collaboration with research centres outside the region should be partially or totally deductible, including grants to university students.

Providing tax incentives for *patent applications and protection* may seem relatively insignificant compared to the total development cost for a given new process or product. On the other hand it is important that small companies have incentives to protect their ideas.

One main barrier to technological development in many areas seems to be the lack of skilled personnel. Therefore *training* key personnel can be vital to the survival of new companies. Tax credit schemes that support both the training of personnel and allow for income tax deductions for foreign specialists with research experience are therefore important. Such schemes already exist in Sweden and Denmark, for instance.

A tax incentive tool used in some countries (such as the Illinois Institute for Rural Affairs (USA) is the designation of specific areas *as enterprise or empowerment zones*. Such zones can specifically encourage investment and create jobs in less favoured areas. The most frequently offered incentives in enterprise zones are income tax credits, property tax rebates and sales tax rebates. In the enterprise zones, the community should also play a role in helping to improve the social and community services within the area.

Establishment of enterprise zones in the Baltic Sea Region may be the incentive needed for growth also in the most remote and less favoured regions.

A tax exemption or – reduction on bio-fuels could be very important instrument in boosting the activities of remote Baltic Sea areas. Most of these regions produce considerable quantities of biomass (lignocellulosic) and they have the capacity to increase the production of cereals and oilseed crops.

Such raw materials may be used for the production of liquid bio-fuels such as bioethanol and biodiesel. With the current fossil fuel prices and a tax reduction on bio-fuels, these could become highly competitive, and the potential market is enormous. Bio-fuel production units could thus become the “locomotives” of dynamic development in rural areas that are lagging behind.

Likewise, a tax reduction for biodegradable packaging materials that are usually made from biological raw materials, could be a decisive incentive for the establishment of productions in rural areas with easy access to good-quality raw materials.

<u>Financial incentives</u>
Financial incentives concerning new business activities are available in most countries in the form of grants, subsidies, low interest loans, etc.

Financial innovation incentives may be more popular than tax incentives by governments and regional authorities, as they are easier to control – in term of expenditure – and may be focused on sectors the authorities consider to be priority sectors.

It seems, however, that the authorities and venture companies in the Baltic Sea region do not prioritise agriculture and food and agro-industrial innovation projects. It seems much easier to obtain funds for the biotech and the information technology sectors (and, in some regions, tourism), as in all Baltic countries these sectors are perceived as high growth areas.

Denmark may be used as an example: the Danish public venture capital fund – Business Development Finance – recently (June 2003) published a forecast for the necessary venture capital investment in Denmark up to 2008. It predicted that wheras investments in new activities concerning biotechnology and healthcare, for example, could constitute approximately DKK 4 billion (EUR 600 million), investments in biotech/food might amount to only DK 0.5 billion (EUR 70 million). According to the report, IT investments will constitute DKK 3 billion.

Only one venture company in Denmark invests in the food industry and agro-industries, namely DANISCO Venture.

The modest interest in investing in agro-industries is not only a Danish problem. The discussions at the regional meetings have indicated that a general lack of access to finance is a major constraint for the establishment of agro-industrial SMEs (food and non-food alike). Especially seed capital and start-up capital are needed.

Direct equity investment, as used in the USA with great success (chapter 13), would also be very valuable.

Furthermore, indirect financial support, such as loans and equity guarantees, have proved to be useful instruments. Again, however, it seems difficult to obtain such support in the agro-industrial area (chapter 12.4).

6.3. Variable factors

6.3.1. R&D and technological development

Technological developments are running full speed ahead around the world, also in the agricultural and agro-industrial industries, and it is becoming increasingly important to be up to date with the latest developments.

How do the Baltic Sea entrepreneurs, farmers and agro-industries get access to the world's flow of new agricultural technology?

Know-how transfer via private companies

Often, discussion about technical change in agriculture and agro-industries focuses on public research and extension services. However, a number of studies have shown that private input companies (both local companies and equipment suppliers) can also be important channels for the introduction of technology in the agricultural sector (chapter 9).

Research centres and universities
The major supply of knowledge on new technologies will come from local research centres and universities, and numerous studies have shown that access to knowledge centres is of considerable importance to regional dynamics (chapter 9.5). The knowledge centres not only create new knowledge, they also have the capacity to absorb new knowledge from other parts of the world and in co-operation with local entrepreneurs make use of this knowledge to create new business opportunities.

Networking
Unfortunately many of the remote regions of the Baltic Sea Region are situated far from knowledge centres, and a lack of access to new knowledge is one of the major obstacles to dynamic development.

Networks – also involving investors, professional intermediates and others – are needed to establish the complex connections by which knowledge is efficiently transferred from the rest of the world to the Baltic Sea Region and from research to industry**.**

It might thus be feasible to establish a Baltic Sea Scout Unit and a Baltic Sea Virtual R& D Centre (chapter 7.1.1), possibly with a joint secretariat.

The scout unit idea has already been tested with some success within the BASAN network, as we succeeded in establishing a business connection with organisations in other parts of Europe and in the Baltic Sea Region (chapter 8).

6.3.2. Farm structure
The prevailing farm structure in a given region has an impact on the potential for new activities. Farms in the Baltic Sea Region vary considerably both in size and in the level of technological development. The Baltic Sea Region includes highly mechanised farms and farms with no access to modern equipment. And some farms, such as in Germany and Poland, are very large, while other farms, such as in the Baltic States and Poland, are extremely small (see country reports and chapter 5). Thus, farm size varies from up to 1000 ha to less than 2 ha (country reports) in the Baltic Sea regions.

Therefore, it is obviously impossible to establish a single, common innovation policy for all rural areas. We have come to the conclusion that it is necessary to distinguish between at least two dimensions in future rural innovation and development activities (chapter 10):

- Agri-production: a rational and sustainable agri-production and agro-industrial production that is viable with a minimum of subvention.

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- Agri-culture: a multifaceted, highly diversified, small-scale production of unique regional products.

The two dimensions are different in nature and have different incentive requirements and innovation demands.

6.3.3.Market structures: consumer preferences

For many years, many of the Baltic Sea Region's farmers have been relying on local markets, and their survival has been dependent on these markets. However, the ongoing globalisation of the food supply system may affect these markets considerably with increasing competition from imported food products (see country reports).

While the more prosperous agricultural areas are likely to respond positively to increasing market orientation and international competition, peripheral rural areas (like many of the Baltic Sea areas) continue to face problems like unfavourable farm structures, low income, an ageing population, depopulation and relative isolation from major centres of economic activity, unless proper action is taken. *High levels of subsidy and traditional rural development programmes will presumably not be enough to change the stagnation or even negative development (see chapter 9.8). New actions to counteract the problems in the individual regions must be taken.*

It is our suggestion that such actions should follow two directions:

- Encourage the development of geographically dispersed clusters of local, small-scale, "agri-*culture"*–oriented, value-added productions and services based on local traditions (chapter 10.1). Centralised know-how accumulation and international marketing of the products
- Encourage the establishment of large "agri-*production"*–oriented, "agro-industrial locomotives" with a positive impact on the entire region (chapter 10.2).

Agri-culture-oriented quality products and services.
Local value-added production is normally associated with local input, local labour and local distributors. The size of the local market determines the production size, which may be a serious constraint to dynamic development. Therefore the small-scale producers could benefit from the development of close synergy with each other; groups of producers would then be better able to develop their own networks, thus helping to bypass expensive intermediaries and retain more of the economic benefit in the local community. The networks might set up a centralised marketing function, and, particularly important, establish their own quality control unit or establish co-operation with an established and renowned quality control institute. The quality control aspect is becoming increasingly important considering the many food quality problems that Europe has been faced with in recent years. The EU Commission is constantly issuing new food quality regulations and standards, and it is becoming increasingly difficult and costly for small SMEs to remain up to date and to respond to the new standards.

Agri-production
The local "locomotives" will obviously have to compete on an international market. In chapter 9.2, suggestions for potential "locomotive" productions particularly suited for the Baltic Sea Region are given, while chapter 11 gives an overview of the great potential for large scale food and non-food productions.

Consumer preferences
In future, there will be three main, general types of consumer (chapter 10.3):

- Natural-oriented consumers – the agri-culture scenario
- Health-oriented consumers – the agro-industry scenario

- "Tight-spending" consumers – the agro-industry scenario

6.3.4. Change in relative prices

The globalisation of the food supply system and the still larger and more dominating international retail chains will make competition very tough especially on standard food products.

However, also in the future, there will be room for higher priced speciality foods. Some consumers regard factors such as naturalness and freshness or health-promoting properties to be so important that they are willing to pay a premium price for such products.

Non-food bio-based products will often have to compete with- sometimes cheaper - petro-derived products. However this sector also has a customer segment that is willing to pay a premium price for environmentally-friendly products (chapter 10.3).

6.3.5. Availability and cost of capital

The questionnaires and discussions with local stakeholders have clearly shown that one of the main bottlenecks in most regions is the lack of venture capital. A wide gulf seems to separate the concerns of local entrepreneurs in the agro-industrial area and those of public funding authorities and bank officials (chapter 12.4).

Banks and investment companies seem to be very reluctant to invest in the start-up of new agro-industrial companies, especially SMEs, as they perceive the area as a low-profit segment with few chances of success.

Public funding schemes for agro-industries also exist, yet regional policy and schemes still appear to be oriented largely towards the concern and needs of already existing (often large scale) companies. The establishment of new agro-based SMEs will therefore require the set-up of local public funding schemes specifically geared to invest in such companies.

6.3.6. Availability and cost of labour

Labour costs vary considerably among the Baltic Sea areas. Some have very cheap labour, which of course is an important incentive for establishing new activities in these areas. On the other hand, low labour costs are often accompanied by a lack of expertise. A shortage of skills (including language skills) constitutes a real barrier. Specifically there is often a shortage of persons with expertise in communication, project management and basic business, yet a lack of more general administrative and technological skills are often a problem as well.

Therefore workforce availability and cost of labour are not only important to new businesses. The availability of labour training facilities is also of great significance. In this context it is very important that the local authorities are aware of changes in labour demands by industrial firms and of specific demands from firms planning to establish new business activities.

6.3.7. Entrepreneurship

A supportive infrastructure and economic incentives to provide the motivation to initiate new ventures are important factors, but certainly not enough to secure the creation of new activities and new jobs. An adequate pool of entrepreneurially-oriented individuals must also be available.

Unfortunately, as the country reports unanimously show, the entrepreneurial spirit is very low in the rural regions in the Baltic Sea Region. **The lack of entrepreneurial spirit is perhaps the most severe barrier in the less dynamic regions.**

There are at least two possible ways to solve this serious problem:

1) Establish regional training centres, e.g. in connection with a "Baltic Sea virtual campus" (chapter 7.1.1.) and

2) Encourage entrepreneurs from other areas to set up activities in the regions.

According to Mueller and Thomas, entrepreneurship might be taught. But some persons are predisposed for entrepreneurship, and their chances for success as entrepreneurs are considerably higher than persons without entrepreneurial values.

It is generally presumed to be relatively easier to find potential entrepreneurs and to set up training programmes in regions with access to universities and research centres than in regions which lack access to higher education centres. There are however exceptions, like the Finnish fur producers and greenhouse producers in Eastern Bothnia (chapter 9) who have built up the necessary expertise through study tours to other parts of Europe.

6.4. Intangible factors

Often the remote regions can offer a number of intangible advantages such as: untouched landscapes, quality of life, low cost of living, low crime rate, etc., that might persuade entrepreneurs to establish new businesses in their region.

The valorisation of these rural amenities and the related employment opportunities have, according to Terluin, no clear effect on the economy of rural areas.

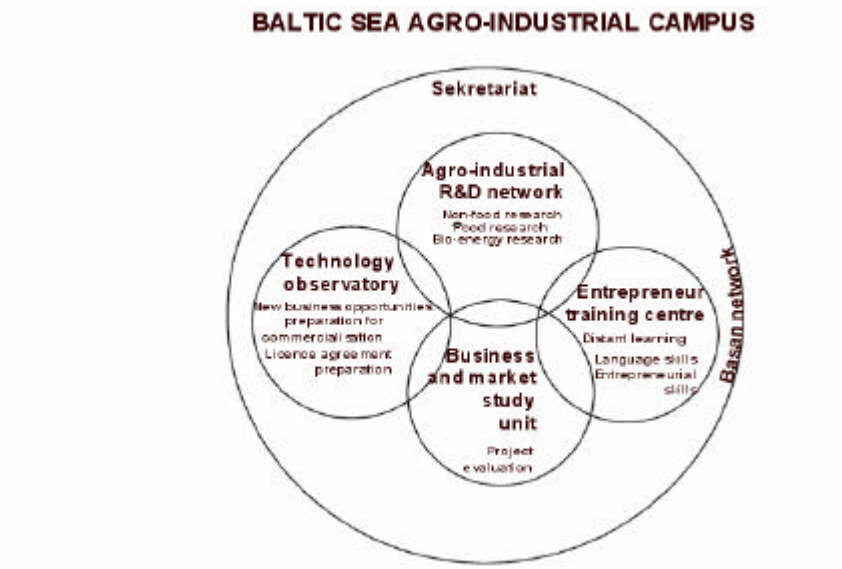
7. Initiatives for Strengthening Dynamic Development in the Baltic Sea Region

The strategy suggested in chapter 6.IV may constitute the basis for the following **actions** that, in our view, will have a positive impact on the development of the rural areas around the Baltic Sea:

7.1. Joint activities

- Establish a "Virtual Baltic Sea Agro-industrial Campus"
- Create a " Baltic Sea Bio-fuel Region"

7.1.1. Baltic Sea Agro-industrial Campus



It would probably be of great benefit to the entrepreneurs in the Baltic Sea areas to have access to **one** entity where they test their ideas (both technologically and commercially) and have their business plans controlled by experts, before they contact investment funds and banks.

It is therefore suggested to establish a "Virtual Agro-industrial Campus" that includes:

- A technology observatory (scout function, chapter 8)
- A "Baltic Sea Agro(bio)-industrial Research Network", a network of existing local research and development institutions (chapter 9.3.1.),
- A training centre for entrepreneurs (language skills, IT, "entrepreneurial mentality", etc.),
- A business and market study unit.

The Baltic Campus will function as a focal point for the establishment of new SMEs in the Baltic Sea areas. Instead of spreading the activities in many different directions, the Campus should have a visible profile and clear priorities and focus on specific directions of development. Potential Baltic Sea focus points might be: bio-energy regions, $C0_2$ neutral regions, agro-food technology nuclei, biorefineries, etc.

By means of the *technology observatory* (chapter 8), the Campus will ensure that all relevant know how compiled over the years and currently generated in the EU and via national research programmes will be available to the Baltic Sea entrepreneurs.

The *R&D Centre Network* will be involved in the necessary know-how transfer and if necessary will adapt the production process or product to the conditions prevailing in the Baltic Sea Region. The pilot plant facilities, available at the institutions that form part of the centre, will be used to optimise the process and to produce samples for market studies.

The centre networks will together with the technology observatory follow the international scientific development closely and constantly look for new business opportunities for the SMEs in the Baltic Sea Region. The network should seek to establish alliances with international institutions involved in development of new products or productions of interest for the Baltic Sea Region.

T*he training centre* will help to ensure that local entrepreneurs have the necessary skills (including language skills) required for the start-up of new innovative companies. The centre could be established as a virtual centre involving a number of institutions that jointly have the necessary teaching facilities and experience in organising courses for entrepreneurs, and, of particular importance, facilities for distant learning as well. The latter is of significance for the, hopefully many, potential entrepreneurs situated in remote areas.

The *business* and *market* study unit will help select the best business opportunities and be involved in generating the necessary funds for the preparatory work and, at a later stage, the start up of the company.

7.1.2. The Baltic Sea Bio-fuel Region

According to the EU Commission, the EU must in future rely much more on renewable energy resources, such as biomass, than is the case today (chapter 11.2). The world's oil reserves, and especially the European reserves in the North Sea and Baltic Sea, are finite, photosynthesis is not.

The Baltic Sea Region with its vast forests and unused or extensively used agricultural land would be an obvious candidate to become the "Bio-fuel Region of Europe".
The biomass production potential is enormous and, due to low-cost land and in some areas low cost labour, the production costs are moderate compared to other parts of Europe.

Biomass fuel clusters have already been created in Baltic Sea areas (appendix: regional meeting, Umeå).
However, it is essential for success that co-operation is established among the various clusters, i.e., production clusters, advisory clusters and research clusters.

This can be achieved in the Baltic Sea area by currently existing co-operation among existing local/regional/national clusters. In the pellet sector, the already started co-operation between local authorities, the pellet industry and research organisations in Sweden (in the SLUP project) can be widened to include actors in all the countries of the Baltic Sea Region.

The existing pilot plants in the Baltic Sea Region should be available to all actors in the region. Examples of such plants are:

- A biodiesel plant in Poland
- A bioethanol plant in Ornskoldsvik in Sweden
- A solid bio-fuel plant - BCT- in Umeå, Sweden

Networking
Networks involving regional authorities, companies, advisory institutions and research organisations must be established in the Baltic Sea Region. Local networks in the region such as the "Bio-fuel Region" (a network in northern Sweden) can be enlarged to cover the whole Baltic Sea Region.

7.2. Activities at regional level.

In chapter IV it was suggested that a regional strategy might include the following activities:

- Create a vision for the future development of the region
- Develop an entrepreneur package to attract foreign entrepreneurs/investors (agro-industry orientation).
- Develop an incentive package for local entrepreneurs (agri-culture orientation).
- Organise regional producer groups
- Establish "Enterprise zones"

In the following, the "operational" content of each of these activities is discussed.

7.2.1.Vision

It is vital that the regional population and local authorities have confidence in their own abilities to perform and make use of the available resources, be they tangible or human. It is not so much the tangible resources themselves that matter to economic performance, but the way in which the region is able to exploit them (chapter 9.8.).

In this respect it is important for the local authorities to have a vision (and in a next step a strategy) for the future development of the region and for the local population to agree on this vision. (Examples: the regional development concept for Rügen (chapter 5.2.9.5) and "The Agricultural Community Action Process" from Illinois, USA (chapter 13.5).

This vision/strategy will determine, which of the above-mentioned activities would be most appropriate. For example: If the vision is that the region should mainly focus on sustainability, landscape preservation, tourism, etc., then perhaps it would not be a good idea to create an enterprise zone or to try to attract foreign "agro-industrial locomotives".

7.2.2. Entrepreneur package

In the effort to attract new companies (e.g. agro-industrial locomotives) or entrepreneurs to a given region, an efficient instrument would be to offer individual "entrepreneur packages" or "relocation packages", including land at low cost, worker retraining, tax incentives, infrastructure improvement, low interest loans, etc.

However, public incentives are not the main deciding factor when a company considers whether to establish new production facilities. Factors such as business climate, transportation, infrastructure, utilities, cost of labour, proximity to suppliers and customers, access to research and higher education facilities, quality of life, etc., also play a decisive role. Therefore such information should also be included in the package.

An entrepreneur package might offer:

1. General practical information on issues such as
   - Cost of labour
   - Access to skilled and unskilled labour
   - Cost of capital and access to venture capital
   - Access to public funding (EU, governmental, regional)
   - Cost of living (housing, food, medical care, etc.)

2. Customised incentives concerning:
   - Loans, credits and subsidies for job creation
   - Tax abatements and tax credits for start up companies
   - Land at reduced cost
   - Access to customised workforce training

   The amenities offered by a specific rural area, such as landscapes of outstanding scenic beauty, settlements with a rich architectural heritage, national parks, etc., should also be mentioned in the entrepreneur package.

7.2.3. Incentive package for local entrepreneurs

Support to local enterprises and business initiatives in rural areas might be given as:

- Incentives to investors (e.g. fiscal incentives)
- Guaranties and securities for loans
- Promotion of the countryside as an attractive place to invest in
- Financial support and economic advice for business start ups (management, accountancy)
- Loans, credits and subsidies for job creating business projects
- Support for “self employment” in the form of small loans and micro-loans.

7.2.4. Workforce training: access to research and higher education

Not only are workforce availability and the cost of labour important to new businesses, but the availability of facilities for workforce training is also of great significance.

7.2.5.Regional producer groups (micro-clusters; chapter 9.1)

A regional producer group is aimed at offering local farmers a regional market for their produce as well as a regional identity and a source of individual stories of human interest to tell the consumer- one from each of the producers.

The aim is to meet modern consumers’ expectations concerning quality and traceability (chapter 10.3). The marketing should be as transparent as possible, and the demand for traceability should be met by labelling each package of meat, honey, jam, etc., with a label identifying the producer and describing the farm.

The products may be sold not only through retailers, but also via a mail order service as well as from an Internet shop.

The producer group should be affiliated with a regional research centre, and the group members should be offered training courses, cheap inputs of fertilisers, feed, etc., access to new technology, and so on. The regional research centre could be part of the " Baltic Sea Campus" described below.

(Examples: Green Centre, chapter 9.1, Graig Farm Organics, chapter 10.1, The Orkney Marketing Scheme, chapter 10.1, and Prophyta, Zostera Dämm, chapter 10.1.)

8.Technology Observatory/Scout Function

8.1.Projects financed by EU research programmes

Over the last ten to fifteen years, the EU Commission has spent billions of euros on research and development projects in the agro-industrial area, including food and non-food projects alike.

The Commission has come up with a number of useful initiatives to disseminate the results of these projects. Individual project catalogues have been issued, reports on individual problems and press releases have been published and project impact studies have been carried out. Also, specific concerted actions on the dissemination of results, such as BIOMAT, IENICA and FLAIR FLOW, are very useful to those who seek information in new research findings and business opportunities in the agro-food/non food area.

In spite of all these efforts, it is a fact that the actual commercial exploitation of the results is still limited . One obvious reason could be that the commercial world – industrialists, entrepreneurs, investors, etc. – do not seek their information from the above sources. Another reason might be that the information from the above activities is directed more to scientists than to industrialists and the business community.

As is shown elsewhere in this report, a number of the EU-financed projects, and naturally also the national projects, might be of great interest to the rural areas around the Baltic Sea. It is therefore suggested to establish a permanent scout function that can seek out the best business opportunities (for the Baltic Sea areas) and prepare them for commercialisation.

8.2. Survey of EU research projects

All projects related to agriculture and to food and non-food production in the EU Research and Development programmes from 1988 till now have been scrutinised, and the project co-ordinators of those of potential relevance to the Baltic Sea Region were contacted.

The projects were part of the following Framework Programmes:

- Second FP, 1988- 1992 :ÉCLAIR and FLAIR
- Third FP..., 1991- 1994: AAIR
- Fourth FP..,1994- 1998: FAIR
- Fifth FP…. 1998- 2002: LIFE SCIENCES

A total of 61 projects were selected, and the co-ordinators contacted. Forty of the projects were production and/or product-oriented and thus potential business opportunities. The remaining 21 projects were network projects and studies. A list of the selected projects is found in the appendix.

The survey results are shown in table 1.

Table 1: Survey Results

Project type	Number of projects contacted	Number of answers	%	Number of projects interested in co-operation	%	
Product/process oriented	40	19	47	8	20	
Networks and studies	21	12	60	12	60	

As is seen, only some 50 % of the product/process oriented project partners who responded were interested in co-operation (know-how transfer, joint venture, etc.). The reasons for the lack of interest in co-operation from the remaining projects were mainly that:

1. Exploitation rights had been given to one of the (industrial partners) who had no interest in sharing its knowledge
2. The outcome of the projects had not led to the expected results
3. The process was not yet ready for industrial exploitation.

A few simply responded that they were not interested in co-operation with organisations in the Baltic Sea Region.

The rate of response is low (47 %) for the technology-oriented projects (a reminder was sent to those who did not respond within a few months).

The response rate was better for the networks and studies, and the interest in co-operation was high. These projects, however, do not include elements of productions and business opportunities. Most of the project leaders were most generous in sending reports and articles, and the material thus collected has been very useful to our work.

A short description of the production/process oriented projects with a positive attitude towards co-operation was sent to all BASAN members, who forwarded them to potential stakeholders in the respective regions.

Business contacts
We have no certain knowledge of the total number of contacts that have been created due to the BASAN scouting activities. We are, however, aware of the following activities in which we have actively participated:

- BASAN has initiated contacts between a British and a Polish company concerning the establishment of a production unit for biopesticides in Poland.(based on a FAIR project)

- Another Polish firm has decided to carry out a feasibility study concerning the establishment of a biorefinery in Poland, and they have established a co-operation with the Bioraf Denmark Foundation. The work is based on findings from an ÉCLAIR project, among others.

- A Lithuanian company has, after evaluating the business plans, expressed interest in the two virtual factory concepts; and discussions with Danish, Swedish and German partners on how to proceed are currently in process.

- Another company from Lithuania has asked for additional information about one of the virtual factory projects, namely the Lupin protein factory. The virtual factories are based on knowledge generated in Life Science projects.

- BASAN has helped in establishing contact between a Swedish innovation company and a Polish rye and oat mill.

- Furthermore the BASAN scout function has initiated a contact between a Swedish SME, situated in the IDEON science park in Lund, and a German flour mill, and negotiations on establishment of a joint company in Mecklenburg-Vorpommern have taken place.

Other business contacts
BASAN has been contacted by a number of organisations (universities, research centres and industries), which were interested in co-operation with organisations in the Baltic Sea Region. All these contacts have been passed on to the local stakeholders via BASAN members, and a few contacts have already been established.

A Hungarian university has asked for contacts with Baltic Sea companies interested in water purification. The Hungarian university has developed a new flocculent, based on starch, for the purification of drinking water, and the university would like to co-operate with a Baltic Sea company for a joint exploitation of their invention.

A Latvian technical research centre has asked for co-operation on the growing of galega for commercial purposes. Galega grows well also on poor soils and can be used for fodder, soil improvement and energy.

Another Latvian research institute offers know-how on the production of ethanol from deciduous wood and agricultural waste.

A research centre in Romania offers a patented process for the manufacturing of a "natural" medicine against mastitis - a common bovine disease in the Baltic Sea Region.

8.3. Scout function: working procedure

The results of the BASAN scout activities give a clear indication of the needs for such an activity.

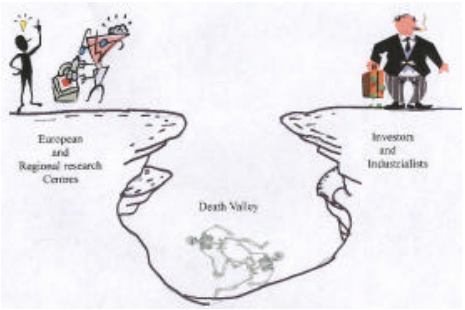


Fig 14. Death Valley syndrome

The impression so far is that it is not difficult to identify commercially interesting projects. It is much more difficult to interest potential local businessmen and investors in exploring the commercial opportunities, and to establish contacts between the researchers and the investors. When an entrepreneur seeks funding of a project at the pilot stage, he typically has not yet formed a company. When he seeks money for a scale-up of the process and marketing tests, the investors (industries, banks, etc.) will ask him about the market for the technology and the products, and they will want to see a realistic business plan. The entrepreneur is unable to tell where the customers will be, because the pilot stage of the technology must be successfully tested, before the public realises that the technology can work on industrial scale, and a reliable business plan will not be made before a scale-up has taken place. This is the "Death Valley Syndrome". The "Death Valley" must be bridged, if technology development is to be fully realised.

The experience with the two virtual factories (chapter 12) and the responses to the questionnaires (chapter 12.4) thus indicate that it is not enough to describe a given project in technical terms. It seems to be even more important that it is described in such a way that the commercial potential is clearly seen.

The following three step procedure is suggested.

Three action steps
Phase 1. Selection
Phase 2: Preparation for commercialisation
Phase 3: Business plan

Phase 1. Selection
A description of the new business opportunity is distributed to the involved innovation centres for consideration. If interest is expressed from stakeholders in one or more of the regions, the project manager is contacted, and the project is transferred to phase 2.

Phase 2. Preparation for commercialisation
The technological level of the new concept is evaluated. Has the process been finally developed, or are additional laboratory and/pilot plan experiments still needed?

A preliminary feasibility study, including market estimates and production costs, is carried out. And the technology potential is stipulated.

The intellectual property rights are discussed with the project manager. A (European) patent application is filed, if this has not already been done.

A development service contract between the project manager, one or more regional research centre(s) with the appropriate pilot plant facilities and expertise, and the local stakeholder(s) is prepared. The contract details the work to be done leading to start-up. It covers items such as due diligence, test marketing, engineering and financing. The work performed during the due diligence phase helps to define the risks and the solutions to problems.

Finally, a comprehensive commercialisation report is prepared. The report should include:
- A review of the technical feasibility of the technology
- An assessment of the level of competition in the intended market
- An objective estimate of the market need for the technology
- A review of industrial trends that affect the commercial viability of the technology

Phase 3. Business plan

The business plan is set up in accordance with the recommendations given by the Commission (LIFT, Preparing a technology Business Plan, 2000)
- Executive summary
- The market
- The product
- The business and its trading position
- Marketing strategy
- Manufacturing
- Forecast of sales, cash flow and break even

- Management and control of the business
- The required financing package

9. Regional Development: Why Do Some Areas Outperform Others?

The BASAN activities have, as already mentioned, confirmed that there are considerable differences in the development of the regions around the Baltic Sea. Many regions have a very high unemployment rate that seems to have become permanent. And often the situation is worsened by the fact that the number of people living on social pensions has increased. There are, however, also examples of dynamic regions with strong growth (Gnosjö and Umeå Sweden, Oulu in Finland, Wismar in Germany). These examples even represent regions that theoretically have severe "handicaps" compared to other regions. Gnosjö is far from big cities and universities, and Umeå and Oulu are situated in the far north of Bothnia Bay. However, in all three cases their strong position has been built up during several years.

Gnosjö is a paradox in Sweden, mentally and geographically far from research centres and universities, and with poor communication possibilities and infrastructure. The level of formal education is the lowest in Sweden. The development and expansion potential is low.

In spite of these conditions, the Gnosjö region has outperformed any other region including large cities and regions with universities. Gnosjö has 85,000 inhabitants and several thousand SMEs clustered around metalworking, plastic production and furniture factories.

The reasons for the successful development may be that the region has a flexible workforce and a good ability to adapt to changing market conditions. Furthermore, there is a strong local network and the willingness to co-operate is outstanding. The companies participate actively in the local social and political life (NUTEK, B 2002:2).

Rolf Olsson, Swedish University of Agriculture, Henrik Ingo, Osterbottens Svenska lantbrukssallskap, and Sven Lingegår, Lansstyrelsen i Vesterbottens Lan, have made the following comparison of two regions, Vesterbotten (Sweden) and Ostrobotnia (Osterbotten,Finland), that have the same climatic and soil conditions. Also, culture and language (Swedish) are similar, but the development of the regions has been very different. (The complete report is found in the appendix.) While Osterbotten can be characterised as a dynamic region with a number of successful agro-industrial SMEs, the development of Vesterbotten is slow or even stagnating.

Their conclusion is that preconditions for dynamic regional development are:

- Access to well functioning extension services and research organisations
- A public environment that encourages entrepreneurship
- The existence of efficient production clusters

- The existence of networks for sharing experience and know-how.

Differences in the development of Osterbotten and Vesterbotten

- The farmland has been reduced since the 1950s in both regions, but the tendency is much more pronounced in Vesterbotten.
- The average land rent is low in Vesterbotten, 10–20 €/ha/year, and high in Osterbotten, 100–500 €/ha/year. This difference in land rent may partly be explained by a higher level of farm subsidies in Osterbotten.
- The extension services for farmers are being reduced in Vesterbotten, while the extension services are expanding in Osterbotten. The extension services in Finland are well integrated and cover the whole chain from water drainage, crop production, farmhouse building and husbandry.
- Production clusters have been established in both regions, yet the clusters are limited to organic farming and husbandry in Vesterbotten, while in Osterbotten clusters exist in all areas of agricultural activity. Clusters in the areas of fur production and greenhouse production have been particularly successful in Osterbotten. The clusters are closely linked to extension services and research centres.
- Agricultural universities are situated in both regions. While in Sweden the public funding of research is focused on *basic* research, public funding of *applied* research is increasing in Finland. As public funded of *applied* research is important to the development of SMEs, the Finnish strategy focusing on applied research might be one of the reasons for the more dynamic development of Osterbotten.
- The former structures of farms in Vesterbotten (and in Sweden), where the farms were situated close together in villages, has changed, and today the farms are spread throughout the agricultural landscape, which has resulted in a reduction of interaction among farmers. In Osterbotten the original "village structure" has been maintained.

The above cases illustrate the complexity of regional development.
In the context of the BASAN objectives, it would thus be of relevance to analyse in greater detail why certain regions radically change their development patterns and others do not, and also to discuss how a positive change can be initiated.

- Can the creation of clusters help regional development? What is needed to establish expansive clusters in a region?
- How important is the access to knowledge (universities, research centres), the presence of dynamic companies and an efficient public innovation strategy?
- How important is the geographic location?
- What are the other important factors?

Internationally, there are many positive examples of change in the development patterns of individual regions. The most famous perhaps is the transition of Silicon Valley from a farming region, specialising in fruit and vegetables, to a world leading IT cluster. The change of Massachusetts from an industrial region dominated by textile industries to a knowledge-based region with IT industries is another example. The State of Massachusetts, USA, puts much emphasis on the creation of clusters as a means of regional development. They stress that in order be become successful a cluster should include not only industry, but also a network of supporting organisations that help to create a climate for successful business competition: universities and research institutions, banks and specialised financial institutions, consulting services, and so on.

In the Baltic Sea Region, the Uppsala Biotech Valley case is a good example of cluster dynamics:
The Uppsala cluster, "Uppsala Biotech Valley", originally centred around the large pharmaceutical company Pharmacia and Uppsala University. In 1993 Pharmacia merged with Upjohn, a US company. The entire management and the R&D department were moved to the US. The cluster survived, however, and it has now become more diversified with many new small research-dependent companies, some of which have been set up by former Pharmacia employees.

The close-down of the old innovation system forced scientists, entrepreneurs and investment funds to establish new relations within the cluster and towards the world market. The local municipality has, together with the university, supported the creation of new companies through the establishment of a local network and infrastructure. And it has been possible to attract international companies in the fields of biotech and IT.

9.1. Innovative clusters as a regional development tool ?

The cluster model derives from the work of Harvard professor Michael E. Porter According to Daniel Hallencreutz and Per Lundequist, a cluster can be defined as "a system of players, who, working together, create added value – a system in which 1+1=3. In other words, it is a system in which different synergy effects create an added value greater than what the two separate entities would create on their own."

Strong regional clusters can be found in the entire industrial scale from low technology to high technology.

There are many examples of successful regional clusters in Europe, some of which are situated in countries in the Baltic Sea Region. Only a few are based on food/agro-industrial activities, however.

Examples of successful Baltic Sea clusters in the Life science area are:

- The biotech cluster in Umeå, Sweden
- The woodworking cluster in Västerbotten, Sweden
- Medicon valley, Øresund Science Region: Sweden/Denmark (4 clusters including a food network)
- The biotech cluster in Oulu, Finland

One of Europe's largest wood clusters is situated in Wismar, Mecklenburg-Vorpommern (see the minutes of the sixth regional meeting). The cluster includes a sawmill, a pulp factory, a chipboard factory, a glue factory and a power station. All the production units have been built between 1995 and 2000, and together they utilise all the individual components of trees, and nothing is wasted. There are in all more than 1000 employees, and the investment costs are more than EUR 500 million.

Two of the few examples of large regional food clusters are the ham producing cluster in the Parma region of Italy, including more than 200 small and large companies, and the "Øresund Food Network". The latter is not really a production cluster, and it may better be characterised as a network of centres of excellence (see chapter 9.3).

In Finland examples of (loosely structured) agro-industrial "mini-clusters" can be found in two regions – South Ostrobothnia and Northern Savo. They have different climatic and

geographic conditions, but share similar socio-economic structures and peripheral locations.

South Ostrobothnia is known for its large number of rural SMEs and independently minded entrepreneurs. Over the years, more or less informal production clusters have been formed in order to adapt to changing market situations.

Within this rather small region, there are 30 furniture manufacturers, 24 carpet producers and 5 cheese producers. The production clusters seem to have been driven in part by local social relations of inspiration. Typically, when production innovations were made and markets found by someone, this inspired others to try something similar or even to copy their efforts directly.

The furniture industries have a formed a producer network in order to reach export markets, and they co-operate on innovation, quality management and export promotion. The regional industry has some reputation for good craftsmanship.

The carpet manufacturer sector also has a strong sub-regional concentration, but is smaller in terms of production capacity and enterprise size. It has developed mainly in the form of seasonal and additional income for farmers, and marketing structures are not very sophisticated. Carpets are to some extent sold direct to consumers at fairs and markets and through wholesalers.

The cheese cluster consists of 5 professional producers who have 70 –80 % of the market share, plus 40-50 family-owned SMEs. Finland's three largest retailers absorb about 95 % of the production, and thus determine the marketing opportunities for most of the local producers. Co-operation between the cheese producers is not as strong as is the case in the two other clusters (Ilbery,B et al: 2001).

The Savo region is particularly well known for the high quality of berry products. The region is home to the largest spatial concentration of berry production in Finland, and the annual strawberry festival has strengthened the public perception of the links between the region and berry products. A large processor buys approximately one-third of all berries produced in the region. The rest are marketed through wholesalers, retailers and directly on the farm. The producers have created a internal network of co-operation among themselves and the processors (Ilbery,B. et al).

Examples of "micro-clusters" can be found on the Danish island of Falster (proceedings from the Final Conference). For example, 25 owners of cherry plantations have created a "production cluster" that deliver cherries to a local juice producer. There are also micro-clusters of:

- Sheep farmers,
- Producers of medicinal plants and spices,
- Bees and honey farmers, etc.

These clusters are mainly info-clusters, where the farmers share experiences on practical matters such as growing and harvesting conditions, diseases, etc. They are closely linked to a regional development centre (Green Centre), which keeps them informed on the latest developments concerning technology and research, new business opportunities, etc.

In general, clusters are geographically concentrated; yet there are examples of successful geographically dispersed clusters. In those cases regional micro-clusters are linked together in national or international clusters (such as the automobile testing cluster in Sweden).

An example of a dispersed agro-industrial cluster is the lavender cluster in the Valbonne region in France. This cluster totally dominates the European lavender oil market, and it includes primary producers and processing companies alike. Another example is the marketing cluster of German hemp producers.

The advantages of being part of a cluster are not only the common access to knowledge and the possibility of experience sharing. They may also include joint marketing efforts and joint research activities. The Medicon Valley board is thus marketing the "Medicon Valley" concept in the Øresund region internationally, and the the "Medicon Valley" brand has now become a competitive edge in itself.

9.2. Potential agro-industrial clusters in the Baltic Sea Region

As mentioned, there are very few examples of food/agro-industral clusters in Europe and the Baltic Sea Region. Besides, agro-food clusters seem to be less "formal" and structured than the biotech clusters, for instance.

There are, however, some obvious candidate sectors where formal "biotech type" cluster creations might be beneficial to the Baltic Sea Region. Potential clusters are:

- Green energy
  - Solid fuels
  - Liquid fuels
- Functional foods
- Regional specialities

All three clusters might be geographically dispersed clusters, and they may be based on regional micro-clusters as mentioned above.

The green energy cluster might be divided into two clusters, as the knowledge, skills and equipment for production of solid fuels are very different from what is required for liquid fuel production.

As mentioned in chapter 11.2 the fuel-production prospects are considerable, and there are also large potential markets in the local area and in neighbouring countries. Solid fuels (e.g. pellets) are often produced in small units, the production may be labour and energy intensive, and poor logistics increase the production costs (chapter 11.2.1).

A solid-fuel cluster could focus on logistics, sharing knowledge and skills on wood waste utilisation, growing and harvesting of energy crops , and joint marketing and distribution.

Liquid fuels, bio-diesel, may also be produced in small units (chapter 11.3), even at a farm level, and the product will most often be sold locally. However, large bio-diesel plants already exist in the Baltic Sea Region, and new are on the drawing board (chapter 11.2.1.). For economic reasons, bio-ethanol plants must be rather large. A bio-ethanol plant might function as a locomotive around which a local (geographically concentrated) cluster can evolve.

A functional food cluster should be linked to university departments or research centres dealing not only with food technology, but also clinical testing and food analysis.

A regional speciality cluster could concentrate its joint activities on marketing, branding and product distribution.

9.3. Research clusters: networks of excellence in the Baltic Sea Region

One of the modalities of the EU's Sixth Framework programme for Research and Development (2002 –2006) is the establishment of networks (clusters) of excellence.

A network of excellence should be designed to strengthen excellence on a particular research topic by networking the critical mass of resources and expertise needed to provide European leadership. This expertise will be networked around a joint programme of activity aimed primarily at creating a durable integration of the research capacities of the network partners.

In the Øresund Region, close to the Baltic Sea Region, a food network of excellence called the "Øresund Food Network" has recently been created.

The "Øresund Food network" was founded by Øresund University (a virtual university including universities from Sweden and Denmark). The objective of the network is to make the Øresund Region one of the most dynamic regions in the field of agriculture and food. The network co-operates with several large Swedish and Danish food and packaging industries and includes Danish and Swedish universities and food research centres (totalling 300 senior researchers). Thus, the entire centre is one of the largest in the world. Furthermore, the knowledge within the network on biotechnology is strong and can be utilised in co-operation with the traditional food disciplines. The cluster is affiliated through the "Øresund Science Region" to the "Øresund Environment" (environmental cluster), "Øresund IT Academy" and "Medicon Valley Academy". The "Øresund Science Region" is funded by the Danish Ministry of Science, The Foundation of Technology Transfer in Lund and Interreg IIIA.

The Swedish Agricultural University has created a research cluster together with local agro-industrial companies in northern Sweden. The cluster consists of SLU, 2 dairies, one meat company and one supplier of fertilisers, feed, pesticides, etc.

Also in northern Sweden, a co-operation (KLAC) between Sweden and Finland with the objective of setting up production clusters, advisory clusters and research clusters in the regions has recently been established. Currently research areas are being formulated, a plant for upgrading of hemp fibres is under consideration, and a scale-up of the current production of reed canary grass from 500 ha to 4,000 ha is being organised.

The NOVA_BOVA virtual university ("a university without boundaries") is an example of university networking in the Baltic Sea Region. NOVA-BOVA includes agricultural universities in the Nordic countries and the Baltic States.

9.3.1. Baltic Sea Agro-industrial Research Network?

The principle of networking research institutions may be used for the Baltic food and bio-industrial research centres as well.

There are only a few such centres in the Baltic Sea Region. Alone they are relatively weak in a scientific context, and they have limited international influence (below the critical mass of resources). But together they could form a strong scientific and tec hnical basis for support to the regions (above the critical mass of resources).

The pool of new ideas created in these institutions is valuable and should be fully explored. It is modest, however, compared to the vast amount of knowledge generated via the EU research projects.

It is vital for the development of new, successful bio-industrial productions in the regions to be able to draw on this knowledge and the many discoveries and ideas developed through EU and national programmes.

Here, too, the local bio-industrial institutes have an important role to play. Jointly, they have the capability of transferring internationally generated know-how into practical applications in the Baltic Sea Region.

Innovation processes, including research and development, are frequently inspired by international impulses and should have an international market orientation (e.g.,EU research programmes). It is on a local level, however, that the research and development results are transformed into commercial productions, often by individual entrepreneurs (examples: Bioraf and Camolina, appendix).

Like most EU projects in which institutions and companies in a number of countries work together, global R&D projects require constant competition between national units and hidden agendas, where participants from one organisation are more interested in the benefits for their own organisation than in contributing to the overall research goal. Real quantum leaps are often created in small, tightly-knit groups with dynamic leadership that are closely linked to local partnerships.

9.4.How is a cluster created?

According to Hallencreutz and Lundequist, there are two types of strategies for supporting potential cluster formations:

First and foremost, potential cluster formations have to be identified and supported in a region's existing business community. This sort of undertaking can, for example, involve supporting networks for raising levels of expertise and specialised skills or investments in infrastructure aimed at strengthening the local employment market.(see chapter 7)

Secondly, regions have to attract the type of companies that are needed to create the regional cluster formations. Building attractive environments that attract new companies, venture capital and specialised skills is an important dimension of this strategy (see chapter 7).

9.5. Regional impact of research. University–industry co-operation

9.5.1. The importance of regional universities

"In spite of the continuing globalisation and internationalisation of science, the research evidence available indicates that there is a close national and local association between research and its exploitation. It seems that the transfer of knowledge, technology and know how works best when the geographical distance between the producers and end users of research is shorter. Studies have shown that scientific papers published in international journals often have only limited regional technical and economic impact, whereas the transfer of tacit knowledge that requires geographical proximity and personal contacts, researcher transfer and research collaboration tends to have much greater significance. In spite of the trends of internationalisation the regional impact of universities is not decreasing. In fact that impact may even increase and assume more diverse forms" (Kai Husso et al. 2000).

Good examples of the regional impact of universities are provided by the regions of Oulu in Finland and Umeå in Sweden (see chapter 9.1). The regional universities not only offer education, but also new business opportunities and better opportunities for people to remain in the area, after they have graduated. That in turn strengthens the region's local economy and its cultural life.

The above examples of successful regions (Umeå and Oulu) build their success on high-tech sectors such as biotechnology and information technology. These emerging sectors are crucial engines of economy-wide innovation and crucial for the development of these regions. They may also play a role in the development of rural areas in general, as spin-offs from these disciplines could undoubtedly lead to new business opportunities, even in the agro-industrial sector. However, it is hard to imagine that these high tech disciplines will ever become an important part of the solution to problems in rural areas in general.

9.5.2. Regional food industries and bio-based non-food industries

Regional innovation policy, which overly focuses on high technology, risks missing the much larger opportunities for improved competitiveness and new products and processes in the more traditional bio-based industries such as the food industry and the non-food industry. The food industry is a traditional industry, where scientific quantum leaps are seldom. The development is evolutionary, not revolutionary. However, the biotech and information technology revolutions will also have an impact on this sector, and new findings in food safety, diet/health relationships, convenience foods, functional foods, nutriceuticals, etc., have made food science more innovative than ever. And we will presumably see a more dynamic food sector in the future. The novel foods will probably have a much larger scope as locomotives of development in rural areas in general than high tech areas like information technology and biotechnology.

The bio-based, non food industry is more complex and includes traditional industries such as textiles, paper and cosmetics, and new industries such as solid fuel, biodiesel and bioethanol producers, producers of plant extracts for dyes, flavours, pharmaceuticals, etc.. Some of these areas are high tech areas that include both biotechnology and information technology.

9.5.3. Access to knowledge in rural areas

Whether the local innovation policy shall focus on high-tech company development or development of new food and bio-based non-food enterprises, access to knowledge is crucial. Universities and research centres dealing with research on food and bio-based non-food development are scarce in the regions around the Baltic Sea, however.

Unfortunately the population basis in most of the remote regions in the Baltic Sea Region is too small for a regional university to be established. However, as proximity is an important feature, resources should be devoted to attempts to create self-sustaining local and regional innovative clusters. A natural "home" for such clusters would normally be a science park. However, science parks are normally affiliated with universities, and as very few universities exist in the rural areas, science parks are not a solution. Part of a solution might be that the few existing regional food and non-food research centres in the Baltic Sea Region are given a more outstanding role and that these centres create strong networks between themselves and with agricultural and technical universities. Also the interaction with local stakeholders should be improved and formalised.(see page 4).

A few examples of university–industry co-operation and of cross-border university co-operation in the agro-industrial area can be found in the Baltic Sea Region, as mentioned in chapter 9.3 (KLAC and NOVA-BOVA).

9.5.4. Capacity to absorb new knowledge

The supply of new knowledge from universities and research institutions is probably necessary, therefore, but certainly not sufficient for a dynamic development of rural economies. The regions must have the capacity to absorb and make use of this knowledge to create new business opportunities. Networks – also involving investors, professional intermediates and others – are needed to establish the complex connections by which knowledge is efficiently transferred from research to industry.

Innovation is a very complex process involving interactions among many players. As already mentioned, scientific advances have opened wider opportunities for innovation than ever before, also in the agro-industrial area, where new discoveries and the development of new biotechnological tools have increased the opportunities enormously. But, increasingly, the real innovation bottleneck is not the supply of new knowledge, but external factors surrounding the process of technology transfer. Managing information overload, achieving social acceptance of new technologies, environmental concerns, and the basic logistics of introducing change may pose a far greater challenge than the underlying technologies themselves.

9.6. The public environment

Finally there must be a legislative and fiscal environment which places no unnecessary obstacles in the way of entrepreneurial activities.

9.7. The importance of geographic location

The EU collaborative research project DORA, co-ordinated by Professor John Bryden at the Arkleton Centre for Development Research, has looked into the importance of "geographical peripherality". The project studied the performance of nine rural regions in Scotland, Greece, Germany and Sweden. It was found that geographical remoteness or

peripherality, either real or perceived, does matter to economic performance. There is a fairly straightforward relationship between economic performance and accessibility to transport infrastructure – motorways, railways and airports with regular services.

The areas with good institutional performance were able to access public infrastructure financing for such things as roads, railways and airports through both national sources and EU programmes, and thus reduce the impact and perception of peripherality.

An important negative factor is a lack of access to the new information and communication technologies in many remote rural areas. It is precisely in the more peripheral areas that ICT can make a decisive contribution to reducing the relative disadvantage arising from the physical distance from centres of information, culture and political institutions. John Bryden thus found that attention to IT-related education, training and infrastructure as a means of addressing peripherality was often greatest in the most successful peripheral areas. There are clear implications for public policy in this theme.

9.8. Other important factors

The above mentioned DORA study concludes that successful regions seem to be "doing it themselves", meaning that they have confidence in their own abilities to perform and to make use of the resources that are already in place, be they tangible or human in nature. It is not so much the tangible resources themselves that affect economic performance, but the way the local players are able to exploit the available resources and sometimes to ensure a favourable flow of transfers in their direction (see chapter 7-8).

The report lists policy recommendations. It emphasises the need for a general, rural, small-business extension service to supplement the traditional agricultural extension service as a means of coping with the new economic demands (see also chapter 9).

The report argues that there is still a need for public resource transfers, but then again these transfers should be adapted to the small scale and diverse nature of the receiving parties, ensuring that such fiscal transfers reach local entrepreneurs and do not simply end up in the coffers of big firms.

The report cannot point to any case where **centrally inspired** initiatives or **heavy external investment** have led to the enduring success of local economies, even if these may have once seemed to come to the rescue of depressed economies. **Less successful areas** are frequently typified by heavy reliance on external public sector initiatives and investment, and a perception among their leaders that this is where the solution lies.

10. Agri-production versus Agri-culture

Over the past fifty years, political, technological and economic developments have favoured the intensification of European agriculture. The support mechanism provided by the EU's Common Agricultural Policy, the advance of mechanisation and the need to reduce costs have favoured specialisation in a few cash crops in European agriculture. As chapter 5 and the country reports show (appendix), this is certainly also the case for the Baltic Sea areas, where cereals and oil crops and potatoes are totally dominating. In future, with reduced subvention to agriculture, the biggest, most efficient and rationally

mechanised farms will have the best chance of making a profit from these crops, while the smallest farms, of which there are many in the Baltic Sea Region, might see their opportunities in diversification and multifunctional farming. Also, traditional livestock production – dairy farms, pig and chicken production– will in future presumably be concentrated on large, specialised farms.

In the Baltic Sea Region, many successful regional examples of small-scale speciality productions of unique regional foods, medicinal plants, herbs, spices, fruits, berries, wool, handicrafts, etc., can be found. Such productions can be very important to the individual farmers and also add positively to development of the local rural community. On the other hand, small productions of speciality products cannot alone meet all the current and future challenges facing the rural areas around the Baltic Sea. For such productions, the suffix –culture - in the word agri*culture* really means culture in the original sense, implying that we must take care of the regional heritage, the high quality speciality foods, the crafts, the countryside and its recreational qualities.

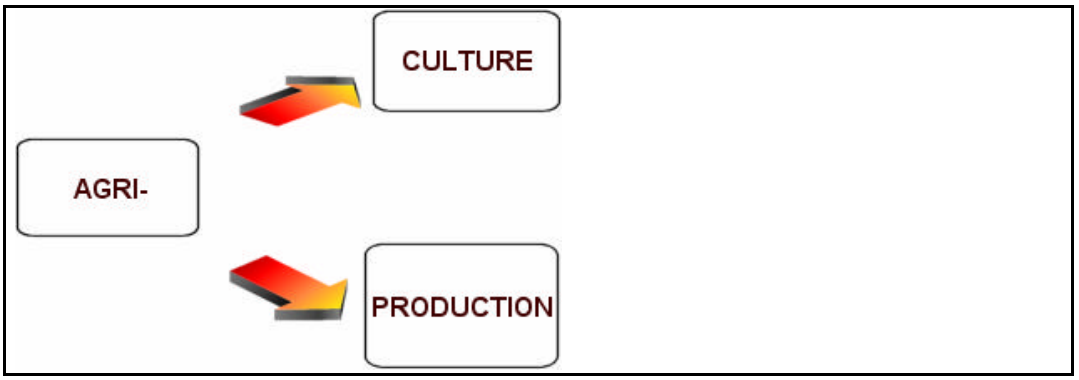
The average farmer, however, will have to produce bulk products (agri-*production)* often with fixed prices and for some commodities also with quota regulations. As EU production subsidies presumably will be more restricted in the future, rationalising and reducing production costs seem to be the obvious means of survival for traditional farmers.

Diversification on farms and new agricultural raw-material based industries may, however, also help to improve the situation. What may be needed in some rural areas is the establishment of large-scale high added-value production units. Preferably, productions that require special raw-material qualities, either unconventional crops (e.g. lupins) or special varieties of traditional crops (e.g. waxy barley). The farmer may receive a premium price for his product, and the entire rural area will also benefit. Apart from the new employment possibilities, there will be positive spin-off effects on local retailers, maintenance firms, transport firms, etc.

Such local “locomotives” should be of a scale that is large enough to compete in an international market as well and efficiently contribute to the development of the entire rural community.

Thus, future rural development has two possible main dimensions:

- Agri-production: A rational and sustainable agri-production and agro-industrial production that is viable with a minimum of subvention.
- Agri–culture : A multifaceted, highly diversified small-scale production of unique regional products.



The two dimensions differ in nature and presumably have different incentive requirements and innovation demands. It might therefore be useful to deal with them separately.

While the small scale productions – agri-culture based industries – often will be established by one or a few individuals, the "locomotives" most often will require a group of entrepreneurs or one or more already established company(ies).

10.1. Agri-culture

Most areas of the Baltic Sea Region have their own traditions and their own unique regional products – food and non-food alike – that are sold on local markets. They are part of the local heritage and part of the regional identity, and measures to preserve these products should be ensured. Examples can be found in the country reports and in the minutes of the regional meetings. Some are particularly successful due to an outstanding product and/or specific advantages such as the proximity of an urban market, good road systems and rail connections, favourable regional development policies, etc. There are, however, also (a few) examples of successful productions in remote places with few regional attributes.

One such example is the biotech company "PROPHYTA" situated in a small village in the northern part of Mecklenburg-Vorpommern. The reason for this rather remote choice is that the founders base their production on know-how generated at a local research centre not far from the company. The founders are former employees of this research centre. PROPHYTA produces biopesticides (BioAct-WG) in a solid state fermentation process, developed by the company, and the product is sold on markets in Europe and the USA.

PROPHYTA offers its facilities and staff to develop and scale-up solid state fermentation processes to customers who want to improve their production or start up new solid state fermentation processes.

Many of the locally sold products will presumably be of interest, also outside the local market. However, small producers usually do not have the skills and financial means to expand their market. *The establishment of a centralised marketing function, serving a cluster of SMEs and including quality control and a labelling system might be the incentive needed for expanding local activities. Thus, the disadvantage of having to sell to small local markets may be turned into an advantage of selling "authentic" and exclusive products to new markets.*

Such trends could favour a development of the remote rural areas around the Baltic Sea, provided the required incentives are present. Authenticity will become a very important issue. An increasing number of consumers wish to know where the products they buy come from, and how they are made. *This demand might be met by the establishment of a network of small production units with centralised marketing and quality control as mentioned above*. The famous "appelation controllee'" system that has been applied to French wine for many years could serve as inspiration to a "*Baltic Sea control and labelling system".*

The Orkney marketing scheme is an example of a successful centralised marketing function. It started as an informal bottom-up network formed by a group of local firms. A network - "Orkney Quality Food and Drink" - was established in 1993 to bring together local companies (today it includes 18 local SMEs) under one umbrella for marketing purposes. In order to provide assistance to this network and other local enterprises, the "Orkney Marketing Scheme" was set up. It is funded by the involved companies and the EU Commission. The scheme includes promotional activities – "Taste of Orkney Promotion" – aimed at trade shows, restaurants and local retailers (John M. Bryden: 2002).

In addition there might be local conditions – climatic, soil, local skills, financial incentives, etc. - that are beneficial to added-value speciality productions that often will find their markets outside the region. New technologies – e.g. generated through EU research programmes – provide new opportunities for flexible specialisation and thus for niche strategies. To take advantage from this, however, it is necessary that the regions themselves are actively involved, react in time and have a clear vision of their stronger points and build possible innovation strategies on these points.

An example of regional involvement in the establishment of a small-scale production based on a project from the EU research programmes is the "Sea-grass Project". A municipality – Amt Klützer Winkel – and an industrial company – Metall und Anlagenbau GmbH, Schwerin - are in the process of jointly establishing a small production unit for the production of insulation boards – "ZOSTERA DÄMM" – in the village of Klütz in Mecklenburg Vorpommern. The boards are made from sea grass harvested on nearby beaches on the Baltic Sea coast.

Another example of a farmer network with a centralised marketing function is the "**Craig Farm Producer Group"** (Bob Kennard, 2002)
Craig Farm Organics started in 1988. Its objective is to process and market organic meat. Since the beginning, the company worked very closely with a group of organic farmers who came to be known as the Craig Farm Producer Group. Today the group has 200 members across Wales and the borders.

The labelled products are sold from the Craig Farm shop, through around 100 retail outlets across the UK and via a national mail order service, as well as from an Internet shop.

The members are offered training courses, cheap inputs, meetings, demonstrations, sharing of technology, *and the ability to sell all products from the farm, provided that the quality is correct.*

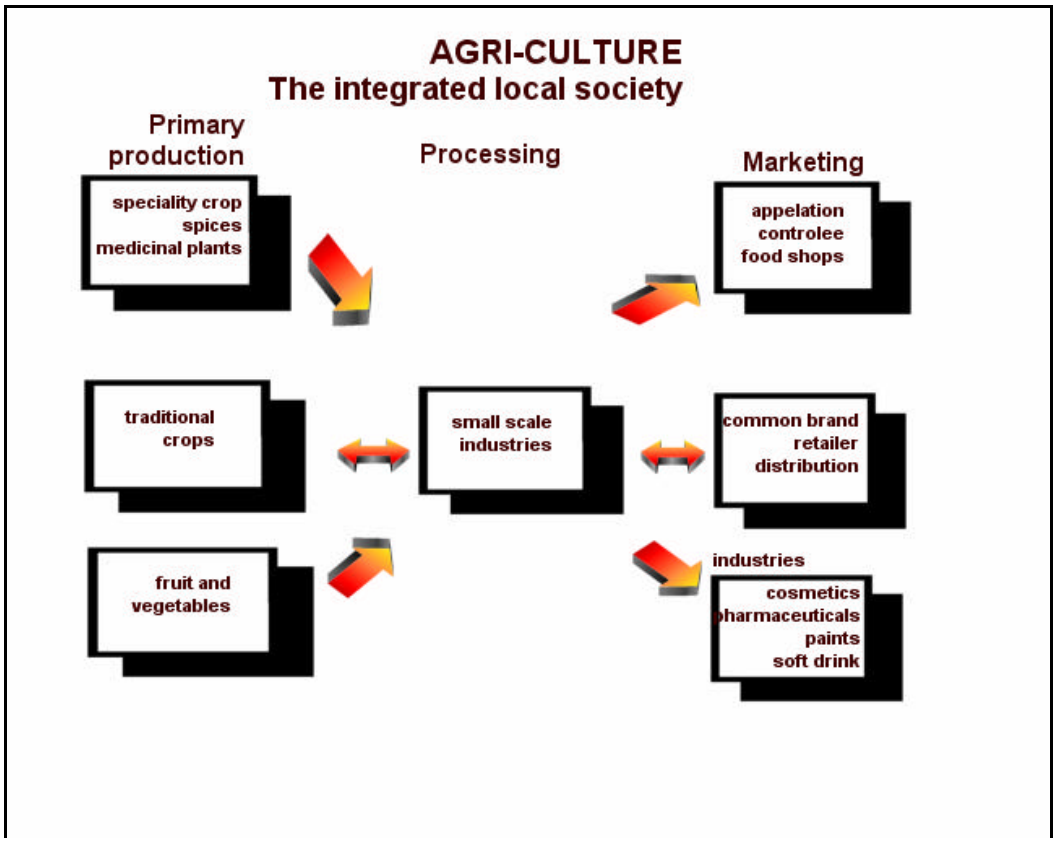
The aim is to be as transparent as possible and to explain how the food is produced. There are open days for customers. Each pack of meat has a label identifying the producer, describing his farm, and offering an Internet address, where more information is available.

It might be advantageous for small companies to have short supply chains. However, this requires good management of custom relations and the establishment of prices at levels that customers are willing to pay. Innovative marketing such as franchise systems and box schemes might be considered.

An example of a company that has introduced novel marketing systems is the home delivery service "GROWING WITH NATURE" situated in North West Lancashire in the North West of England.
It was established in 1992 by a farming family looking for a suitable and economically viable way to sell their organic vegetables directly to the consumer. Initially they sold their products through farmers' markets and supermarkets, but dissatisfaction with the limitations and restrictions of both of these marketing options led them to search for other marketing opportunities for small scale producers. They decided that box schemes reflected the type of marketing strategies (local, fresh, organic) that they wished to establish.

As demand has grown, five other organic farmers have become involved in the scheme. Bags of organic vegetables, supplemented by a small amount of externally-sourced organic fruit, are delivered directly to a fluctuation base of approximately 700 customers with an average of 500 bags delivered per week. 85 % of sales are within a 25 km radius of the production unit, and on average one bag travels 4 km. By comparison, a UK-grown cabbage in a city supermarket has travelled approximately 600 km (Professor Peter Midmore 2002).

In 1995, the "Culinary Heritage Concept" was introduced in South-East Scania, Sweden, and on the island of Bornholm, Denmark. Regional authorities and local businesses felt the need to jointly promote and develop the regional culinary identity in a European context: other regions have successively joined the network. The objective of the concept is to promote and enhance regional foods and regional identities throughout Europe. It was launched to make it easier for consumers, including tourists, to enjoy local and regional foods. A logo has been designed to indicate the restaurants and shops that sell local and regional specialities of high quality (Bjurnemark).

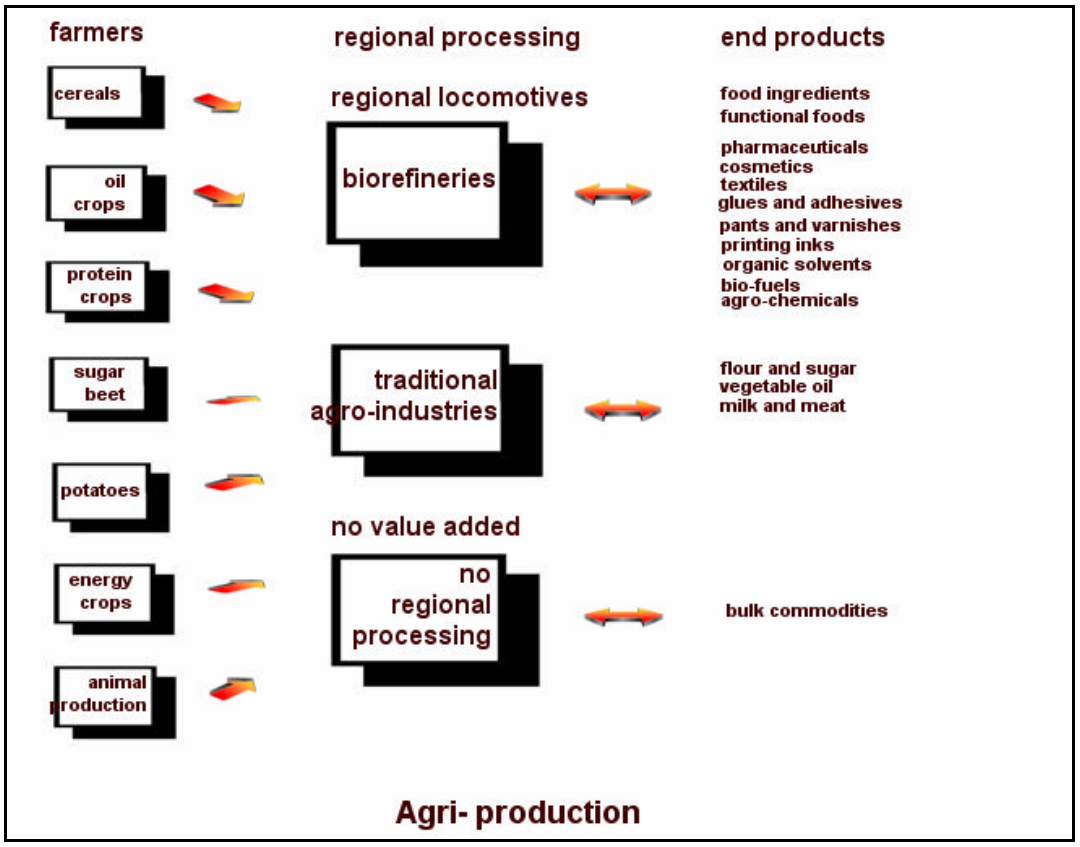


10.2. Agri-production

"Agri-production" means efficient production and processing of bio-materials for food and non-food applications.

The liberalisation of the agricultural markets under Agenda 2000 (and the revision) will give farmers more options concerning the ways they use their land, which in turn will provide a potential outlet for more intensive non-food crop production, etc. It might be agreed to set aside a certain percentage of land in the candidate countries to reduce the overproduction of certain agricultural commodities. If the same rules shall apply as in the current set aside scheme in the EU, then this could open up for a large production of non-food crops that could be grown on set-aside land without the loss of subsidies.

The bio-based non food industry is more complex than the food industry. It includes traditional industries such as textiles, paper and cosmetics, and new industries such as solid fuelsand biodiesel and bioethanol producers, producers of plant extracts for dyes, flavours, pharmaceuticals, etc. To this may be added emerging areas such as molecular farming (chapter 11.5.2).



In the past, agricultural groups fought one another over stable markets. The vast majority of R&D funding has gone into this kind of competition. Advances in making high fructose corn syrup undermine sugar markets. Wheat starch competes with maize starch and potato starch, etc. Competition is healthy, but in general, such competition does not increase the total demand for agricultural products.

In a global perspective, it would be much more sensible to focus on substituting fossil-based products with commodities produced from biological materials. In our part of the world, we should increasingly base our economy on resources from photosynthesis (biomass) and energy from the sun and be prepared to rely less on cheap fossil reserves. We must accept that these reserves are finite, whereas photosynthesis is not. We should not squander our resources and energy derived from the sun, but go for complete resource utilisation.

A trend towards a more bio-based economy than today - an industrial sector mainly based on biological raw-materials – would certainly be of great relevance to the Baltic Sea Region with its vast forests and (surplus) agricultural land. The region could not only

become a supplier of bio-energy, as suggested in chapter 11.2, but also many other commodities as explained in chapter 11.

The potential market for bio-based non food products is (apart from the bio-energy market) not as big as the food market, but is still quite substantial. Many of the non-food production opportunities are attractive to rural areas for several reasons.

- They tend to be environmentally benign
- They use a renewable feed-stock produced locally
- They often rely on biological processes that operate at low temperatures and at ordinary pressures
- They may be competitive even on a relatively small scale.

An ethanol refinery, for example, is about a third to a tenth as large as a petroleum refinery. A bio-chemical plant can be as little as one-hundredth the size of commodity biochemical plants. A bio-mass gasification plant may compete with a coal gasification plant five times its size.

10.2.1. Biorefineries

The relative modest scale of biorefineries means that they can proliferate in rural areas, It also means that these new types of manufacturing enterprises lend themselves to co-operative ownership.

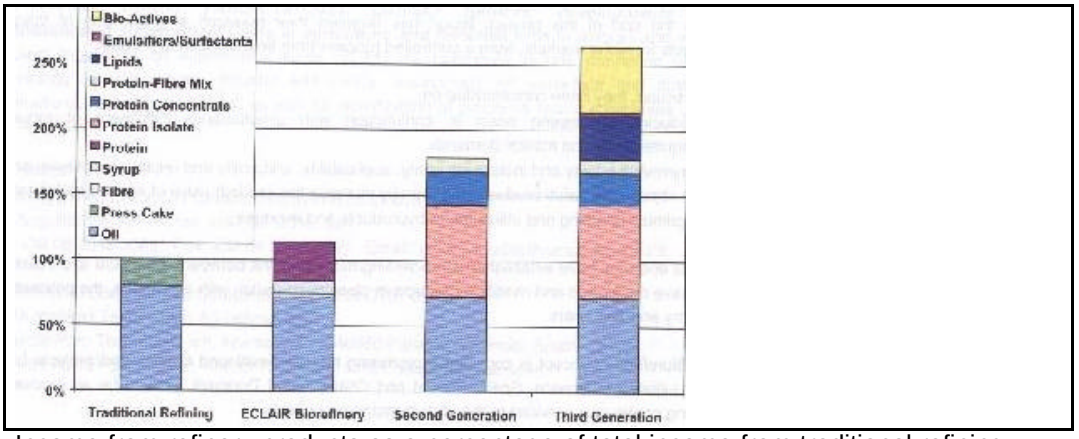
Co-operative bio-refineries (food or non-food) can be the vehicle for linking a bio-based economy to rural economic development. They may maximise the income that remains in the local economy. A biorefinery is a link between agriculture and industry, which is useful to support the bio-based industries of the future with homogenous raw materials of good quality. It is also a tool for securing a decent and stable income for farmers.

A biorefinery resembles an oil refinery. Like most agricultural crops, crude oil contains a number of chemical constituents. It is characteristic for an oil refinery that all constituents are utilised as optimally as possible. Nothing is wasted. It is also characteristic that the refinery is highly flexible both technically and economically. The proportion of the different product flows can easily be changed according to actual demand and market prices.

The same flexibility is included in a biorefinery. The refinery should be able to collect all constituents (including the stem) of a given crop (whole crop harvesting) separate the crop into its botanical constituents and pre-treat these according to their final application. A concept in which all parts are utilised in different market segments will help to “spread the risk” and make the integrated agricultural/industrial sector less vulnerable to fluctuations in harvest yields, prices, market demands, etc.

This possibility of separating a given crop into individual components is illustrated in the Vita Wheat Project (chapter 12.1), whereby **wheat** is separated into 7 product groups with added value as functional food and nutriceuticals.

Bio-refining of **rapeseed** is another example (chapter 11.6.1.2). Figure 15 (below) thus shows the added value effect of an optimal utilisation of all botanical components in rapeseed.



Income from refinery products as a percentage of total income from traditional refining: (Coombs and Hall, 2000)

A third example is the concept developed by Professor Hubert Kolodziej and Dr Andrzei Vogt of the Bio-fuel Energy Centre, Wroslaw, Poland (appendix: minutes of the fourth regional meeting).

Their concept includes the combined production of solid fuel (straw), liquid fuel (rapeseed oil ethyl ester) biogas and electricity. The project is still at the pilot plant stage, yet a small production unit is currently on the drawing board. The optimal size of one plant is 30,000 tons of ester per year. Forty plants of this size could directly and indirectly employ 450,000 people and lead to the substitution of 1.2 million tons (reduced import of crude oil, CO2 reduction).

10.3. The food industry of the future (2010)

The Danish MAPP Centre for Research on Customer Relations in the Food Sector has together with the Technical University of Denmark (Dept. of Engineering and Management) set up three scenarios for a possible future development in the food sector (Sonne 2001).

The aim was to identify the demands that the food industry can expect in the future plus to identify the research areas that public research should prioritise in order to support the development of competence in the food industry.

Although the scenarios are isolated developments, in practise the future is likely to be a combination of the different tendencies within the scenarios. The work is based on Danish conditions. Yet as food production and consumption is international, the results will probably be valid for the other countries in the Baltic Sea Region as well.

Naturalness
The first scenario, "naturalness", focuses on consumers who emphasise sustainability from farm to fork and consider organic foods to be more wholesome. These consumers feel a growing need to protect nature and to live a healthy life. They reject genetically modified foods.

This consumer group will undoubtedly be attracted to **the *"Agri- Culture"*** scenario, and they will become major customers of the small agri-culture producers.

Technology driven health
In the second scenario, the consumers have a quite different perception of food. These consumers have accepted functional foods and genetically modified foods. They have confidence in modern food production and believe they are well-informed and have a realistic picture of how to produce modern food.

The challenge in this scenario is the accumulation of knowledge that has to take place in order to develop and produce "high tech" foods. The scenario calls for research and development, and it is questionable whether individual companies will be able to finance and organise this.

The "technology -driven health" scenario is linked to the ***"Agro-Industry"*** scenario. The two virtual factory examples are good representatives of the food/health sector, and the **stage-gate principle (page x)** would in many cases be the best way to perform the necessary R&D.

Tight spending
The last scenario, "tight spending", is based on a lower disposable income and extensive internationalisation. Prices are the main criterion of choice with the result that quality foods and organic foods are niches for this consumer group. The focus on value for money is the central driving force of this scenario.

Central retail chains dominate the distribution of these food products, and the retailers more or less dictate price and quality. The large retailers often want their own labels on the products.

Also this scenario is linked to the ***Agro-Industry*** scenario.

Most large companies have foreseen a development like the above, and they are making a number of strategic responses, which involves a mixture of cost minimisation and product differentiation.

Also medium-size to large companies are well suited for meeting the future consumer demands. They are capable of exploiting the economies of scale in production, andthey are flexible and rapidly respond to market changes

Small companies can survive by lowering costs or producing highly specialised products for niche markets or by developing products in new market areas and through greater flexibility

11. New Production Opportunities in the Baltic Sea Region

Traditional food production will remain the main source of income for most farmers in the Baltic Sea Region. However, we will presumably see a much more diversified agriculture, including forestry, tourism, landscape maintenance, etc. We may also see a more pronounced division of farmers in those who deal with agri-**culture** (in the original meaning of the word) and those who are dealing with agri-**production** (chapter 10).

11.1. New production opportunities

A broad spectrum of potential, new, industrial applications for agricultural products both in the food and in the non food area is available, including products that can be produced in small scale production units placed in rural areas.

The economic feasibility of most of these applications depends strongly on the price and quality (homogeneity) of the agricultural raw material. It has been predicted (Wondu Holdings, 2000) that by 2010-2015, raw material costs of e.g. biopolymers produced from plants will become competitive with those made from oil. A new **ligno-cellulosic economy**,based on wood and agricultural wastes, is emerging to complement the petrochemical economy. The potential size of the market, even with a small share, is significant in terms of supplying just a small part of the materials used in automobiles, and in the building and construction industry**.** For some years now, **starch and sugar and vegetable oils** have been able to compete with petrochemical products in production of speciality lubricants, cosmetics, pharmaceuticals, etc.

As was illustrated in chapter 5, a few main crops dominate the agriculture of the countries in the Baltic Sea Region. The main raw materials in the Baltic Sea Region are, as already indicated, biomass (wood waste, straw, etc.), cereal grains, potatoes, sugar beets and oil crops, and new activities would naturally be focused mainly on processes based on these raw materials. However, in some regions it will presumably be advantageous also to grow speciality crops for use in the food, cosmetic and pharmaceutical industries .

The BASAN scout function has carried out a survey of the new production potentials that have been derived from the EU research and development programmes during the last 15 years. Those potentials of most interest for the Baltic Sea area are listed in the appendix.

Bioenergy

Although bioenergy is a low cost and low profit commodity, the prospects of establishing small scale energy units on the basis of biomass are good. Such units will create new activities and secure additional income to rural areas. The products may be bio-fuels – logs, pellets, briquettes - for export out of the regions or heat and electricity for consumption in the region.

Food
There are numerous possibilities for the production of profitable new food products in the Baltic Sea Region. The most obvious product areas are presumably unique regional foods and high added-value functional foods and food ingredients.

Non-food
In the non-food area, focus should not only be on the use of the primary plant components, such as starch, sugar and vegetable oils, but also on the extraction and use of minor constituents with high potential value from the agricultural crops. It is often here the highest added values and profits are found. Such products can be used for many purposes in the cosmetic, pharmaceutical, chemical, paint and varnish industries.

As also shown elsewhere in this report there is no lack of new business opportunities for the rural areas of the Baltic Sea Region. In the following, a number of new unconventional production possibilities that might be of special interest to various rural areas in the Baltic Sea Region will be discussed. A distinction is made between productions based on traditional crops, new crops and on by-products from established industries.

11.2. Bioenergy

With the upward trend in energy prices and the increasing concern about the C02 emissions, the interest in the use of biomass for energy is considerable in all the markets around the Baltic Sea, as well as in the rest of Europe.

The World Energy Council Committee estimates that by year 2020, the share of renewable energy will have grown to 21–30 % of the total energy consumption. In a shorter term the EU assumes that the share of renewable energy in the fuel and energy balance will rise from 6 % in 1998 to 12 % by 2010 (EU White Paper on Renewable Energy,1997).

This forecast may have to be changed, if rapidly developing countries like China expand their demand for energy at a faster rate than today. It has been calculated (Berlingske Tidende, 27 October 2003) that by the year 2015 China may have the same consumption of fossil energy per inhabitant as South Korea does today. This means that in 2015 China could have a demand equalling 83 % of the total oil production in the world

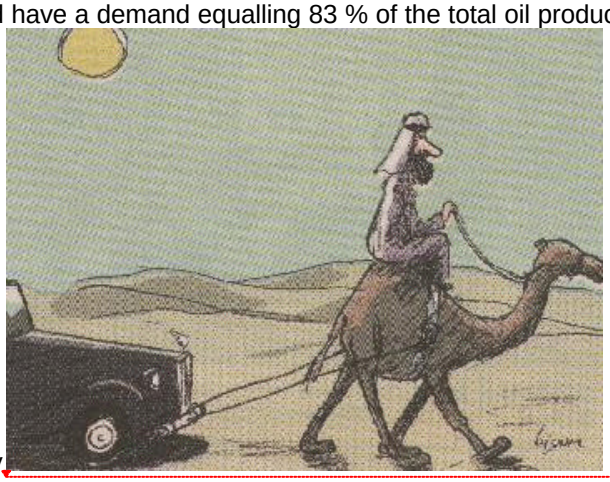


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Figure x: The energy situation in the year 2015 ?

11.2.1. Solid bio-fuels

Solid bio-fuels are residues from forestry, industry and agriculture and – still to a very limited extent – energy crops grown especially for energy purposes. At the second BASAN regional meeting in Helsinki, Rolf Olsson, Sweden, gave an overview of the potentials for new fibre crops such as reed canary grass and new fibre hemp varieties (appendix: minutes of regional meetings).

The production of biomass is considerable throughout the Baltic Sea Region, and a large part of the production - cereal straws, wood waste, etc. - is still considered to be waste products. Therefore, considerable potentials for an increased bio-fuel production exist.

According to an EU report – Increased Production and Use of Biomass and Other Renewable Energy (2001) - the use and potentials of biomass as energy in the Baltic States are shown in table 2.

Table x. Biomass (wood and straw) for energy. Potentials and current utilisation

GWh/year	Techn. Potential	Utilisation	Use in % of potential
Denmark	34.000	9.546	28 %
Estonia	9.730	7.196	74 %
Finland	117.200	67.300	57 %
Germany (Schleswig-Holstein/Mechlenburg-Vorpommern)	10.125	601	6 %
Latvia	41.139	12.576	31 %
Lithuania	8.815	3.999	45 %
Poland	187,777	15.285	8 %
Russia (St Petersburg and Kaliningrad)	2.000	346	17 %
Sweden	165.000	78.200	47 %

As the table shows, Sweden, Finland and Poland in particular have a large production potential.

Extensive exports from the Baltic States to Scandinavian countries, etc., have already been established.

Energy prices of bio-fuels vary from country to country indicating a market for international trade. It might be feasible to establish small-scale briquetting or pelleting plants for wood and straw in the rural areas, especially of the three Baltic States, where bio-fuel prices are very low compared to countries like Denmark, Finland and Sweden. There seem to be good prospects for exporting such pellets or briquettes to the other countries in the Baltic Sea Region, especially if a quality control system is established. This control system should be centralised in order to reduce costs and secure a homogenous product.

At the first regional BASAN meeting in Warsaw, a description of a small Polish briquetting plant was given (appendix; minutes from regional meetings). The raw materials used are sawdust, wood waste and shavings. The process is labour intensive and the logistics can be complicated.

In all countries around the Baltic Sea, the use of solid bio-fuel has increased in recent years. The potential for further increase is still very great, however, and the countries have very ambitious plans for the future.

11.2.2. Liquid bio-fuels

Another option is the production of liquid bio-fuels such as bio-ethanol and bio-diesel.

Given current technology, it would be rather costly to produce bio-ethanol in small units, while it has been shown in Germany and other places that it is possible to establish competitive productions of rapeseed oil for energy, combined with a production of fodder cakes, in small plants placed in rural areas. A prerequisite for the competitiveness of bio-diesel is energy tax exemption, however.

The European gas oil market amounts to approximately 200 million tons per year. Bio-diesel has been produced on an industrial scale in the EU since 1992, largely in response to positive signals from the EU institutions. Current production runs at 1,100,000 tons, mainly in Austria, France, Germany and Italy. The total production of bio-fuels (bio-diesel and bio-ethanol) is about 1,500,000 tons. This is less than 1 % of the market for conventional fuels.

By 2005, bio-fuel production should rise to more than 6 million tons in order to meet the 2 % target set by the EU member states. This means that an **additional 4 million hectares of non-food and energy crop surfaces are needed in order to fulfil the first 2 % target.**

This could represent a very important absorbing potential for additional acreage coming into the enlarged European Union from new East European member countries.

The European Union is committed to an 8% reduction of greenhouse gases emissions by 2010. The continuous strong growth in C02 emissions is inconsistent with this commitment. The transport sector's overwhelming dependence on oil is a strong factor in the increase of oil imports, expected to reach 90% by 2030. The transport sector alone is thus responsible for many of the challenges that the Union has to face in terms of meeting its greenhouse-gas emissions targets and of securing an alternative supply of energy.

The European Commission has therefore adopted an action plan and two proposals for directives to foster the use of alternative fuels for transport, starting with the regulatory and fiscal promotion of bio-fuels. The Commission considers that the use of fuels (such as ethanol) derived from agricultural sources (i.e. bio-fuels) is the technology with the greatest potential in the short to medium term. The action plan outlines a strategy to achieve a 20% substitution of diesel and gasoline fuels by alternative fuels in the road transport sector by 2020. It concludes that only three options would have the potential to achieve individually more than 5% of total transport fuel consumption over the next 20 years: bio-fuels which are already available, natural gas in the medium term and hydrogen and fuel cells in the long term. One proposed directive would establish a minimum level of bio-fuels as a proportion of fuels sold from 2005, starting with 2% and reaching 5.75% of fuels sold in 2010. The second proposed Directive would give Member States the option of applying a reduced rate of excise duty to pure or blended bio-fuels, when used either as heating or motor fuel.

11.2.2.1. Biodiesel

Modern conventional oil mills, producing products for food and non-food purposes, are normally very large. For instance in Germany the central oil mills have a capacity of up to 4000 tons of seed per day, and 14 oil-mills jointly process 7 million tons of oilseed. However in Germany there are also 80 small oil mills, mainly situated in the southern Germany with a capacity of up to 25 tons of seed per day. The area from which these small mills are supplied is normally less than 50 km from the plant (F.Tack, 1999). In Denmark, micro (on farm) oil mills have been established in recent years for the production of rapeseed oil for food consumption and linseed oil for technical use.

In the Slubsk region of Poland, a rapeseed processing plant with a annual capacity of 150,000 tons of rapeseed is under consideration. The plant shall produce biodiesel (RME) (appendix: minutes of first regional meeting).

Also in Poland a "Bio-fuel Energy Centre" is been planned. It will be located in Skoszyce. The centre shall produce biodiesel (ethyl ester) and electricity (appendix: virtual factories).

11.2.2.2.Bio-ethanol

Although the cost of making ethanol from biomass has dropped significantly over the last several decades, biomass-derived ethanol is still too expensive to compete with fossil fuels without subsidies. Therefore the key challenge is to reduce the major operating costs: Primarily pre-treatment and enzymes.

All over Europe, also in the countries of the Baltic Sea Region, projects on a semi-industrial scale are currently running with the objective of reducing production costs. Pilot plant experiments are being carried out in Wroclaw, Poland , and in northern Sweden a pilot plant is being established with a feed stock input capacity of 2 tons/day. The plant will be open to co-operation with partners from all over Europe. It will be located in Ornskoldsvik, close to Umeå.

The plant is affiliated to the three universities in the region: the University of Umeå, Mid Sweden University and the Technical University of Luleå. A commercial company – Etek Ethanoltechnik AB – will be responsible for the technological development.

Wismar University, Mecklenburg-Vorpommern, has set up a small pilot plant for the production of ethanol from wood waste and cereals including straw and grain (appendix: minutes from 6th regional meeting).

11.3. Combined fuel and feed production. Animal protein feed as a co-product

It might be feasible to establish small-scale bio-diesel/protein-feed plants in the regions around the Baltic Sea, especially in the view of the current high price of mineral oils and a growing demand for "safe" protein feed. An increasing percentage of consumers are concerned about the new biotechnology, and they do not want to eat genetically

engineered food products. This has made farmers reluctant to use gene-modified soy-cakes from the USA in their animal feed, and the demand for protein concentrates without genetically modified components, such as European-grown rapeseed cakes, is increasing. Also, the ban on the use of meat and bone meal in animal feed, due to the BSE crisis, has boosted the demand for vegetable protein. To this can be added that organic farmers find it increasingly difficult to find organically produced protein feed for their livestock. All in all there might be scope for a number of units with a combined production of protein feed and rapeseed oil /bio-diesel for energy purposes. Experiments in Denmark and elsewhere have shown that rapeseed oil is an excellent fuel for oil heated furnaces and in micro heat and power plants.

The economy could be additionally and substantially improved if the by-products are used for the production of high added-value products, such as bio-pesticides and pharmaceuticals (chapter 11.6.1.2.).

11.4. Food and non-food products

11.4.1. The food sector

There are major differences among the areas of the Baltic Sea Region as to the nature of their food processing and distribution and in the attitude to traditional versus “modern” food processing. ,Finland for example, is at the forefront of Europe concerning functional foods, and several products have already been marketed (page xx), while functional foods are almost non-existent on the Danish market due to very restrictive legislation. New business opportunities in the food sector greatly depend therefore on local conditions. Another crucial factor is the risk of competition from existing food industries. The Scandinavian countries are thus dominated by a few very large, mostly multinational, food companies (meat, dairy, cereals) and food retailers, who to a large extent control the food market.

Country	Market share %
Finland	95
Sweden	79
Germany	52
Denmark	46
Norway	25

Table 3: Grocery market share of the top five food retailers in Europe (CAFÉ network, final report, September 2003).

The large retailers are able to dominate the food production in a given area. However, as the survey performed by BASAN has indicated, there will always be room for small, unique, high-quality regional food products, and it even seems that consumers increasingly prefer that kind of product. In addition there will be room for industrial groups engaged in the supply of specialist food ingredients, such as amino acids, vitamins, flavours, thickeners and emulsifiers.

Preparation convenience is a key feature of foods purchased by busy modern consumers. Six significant growth trends in consumer demands have, according to Connor et al (1997), been identified:

1. More convenience
2. Ethnic foods and regional specialities
3. Age-related foods (speciality food for elderly people, weaning foods etc.)
4. Low calorie foods
5. Healthy foods
6. Natural foods

Value-added producers should focus on products that fulfil these consumers' desires or market niches. By utilising value-added precepts for business development, producers can identify the wishes of consumers and target markets rather than taking the commodity to the market and hope that consumers will like it and use it.

In other words, it is important that new food industries from the very beginning are attuned to the needs of the marketplace, instead of concentrating only on production and ignoring the final marketed product.

Frozen or "bake-off" dough products are examples of convenience commodities that meet the above criteria. The current trends in most European countries indicate a substantial increase in consumption, particularly in large urban areas.

Even today many examples of successful, small-scale productions of **regional specialities** can be found (e.g. chapter 10). Such businesses are important to the owner and his family. The impact on the dynamics and development of the local community is modest, however. Examples are given in the country reports, e.g. the reports from Bornholm and Lolland Falster.

The commodities from the two virtual factories address the issues in points 3-6. The two examples in chapter 12 are also typical representatives of production units that seek to utilise all components in a given (traditional) crop as optimally as possible for the production of specialist food ingredients and non-food components alike. Such factories are often called bio-refineries. Other bio-refinery examples are mentioned in chapter 10.2.1. They include traditional production units such as potato starch factories and oil extraction plants.

11.4.2. The non-food sector

The bio-based non-food industry is more complex than the food industry and includes traditional industries such as textiles, paper and cosmetics, and new industries such as plant extracts for dyes, flavours, pharmaceuticals, etc.
As table 4 shows, the market for non-food products from renewable raw materials is still modest in Europe. The potential is great, however.

Application	Total current EU market 1000 tons	Current proximate market for RRM 1000 tons	Current market penetration	Approximate total potential market for RRM 1000 tons	Approximate total market penetration %

			%		
Polymers	33.000 (1998)	50 (1997)	0,15	300	1
Lubricants	5.000 (1999)	100 (1999)	2	1.000	20
Solvents	4.000 (1999)	60	1,5	235	12,5
Surfactants	2.300(1998)	460	20	2.300	100
Fibres and composites	Na	90	Na	Na	Na

EU Commission, Chiaran Mangan, IENICA, Melwyn Askew, 2003.

RRM= renewable raw materials

11.5. New crops: speciality crops

Small scale productions that provide goods to a very limited market may become a very important source of income for individual farmers who have the necessary skills to produce a given speciality item, although niche productions will never be able to solve the general problems of rural areas.

Examples of such niche productions are:

1. Mint: for pharmaceutical and food and cosmetic industries
2. Mustard: for the food industry
3. Buckwheat: for the food industry
4. Hops: flavouring, mainly for the brewery industries.
5. Camelina: for food ingredients

The aspects of production and processing of Cameline in Finland is discussed in the minutes from the second regional BASAN meeting in Helsinki.

Table x shows examples of more unconventional speciality plants that are currently being tested in Denmark, Finland, Germany and Sweden, either on a commercial scale (C), a pilot scale (P) or experimentally on a laboratory scale(E).

The table indicates that the number of potential plants is large. However, one should not forget that these crops are aimed at very specialised markets. An overall market estimation is not available for the full range of speciality crops and products thereof.

French estimates suggest an annual world production of 45,000 tons of essential oils and 50,000 tons of aromatic plants. It is crucial to note, however, that market demands and prices are highly variable and react quickly to market supply, magnitude of potential harvests and quality.

Table 5 derives from the IENICA report to the EU Commission (Askew,2000).

Crop	Denmark	Finland	Germany	Sweden
Allium		C	C	E
Amaranthus	E	E		P
Angelica		P	C	E
Artemisiaa		E		P
Anethium		P	C	
Basil		C	C	
Black currant		C	C	C
Caraway		C	C	C
Chamomila		C	C	C
Quinoa		P		E
Chrysanthemum		E	E	
Digitalis		E	C	
Dill	C	C	C	C
Echinacea	C	C	C	E
Fennel		C	C	
Hypericum	C	P	C	P
Lovage		E	C	E
Madder	E	E	E	
Marjoram		C	C	C
Melissa		C	C	C
Parsley	C	C	C	
Peppermint		P	C	E
Sage		C	C	E
Sambucus		E	C	E
Sea buckthorn	E	C	C	P
Taraxacum		E	C	
Tagetes	E	E		
Taxus		E	E	
Thymus		E	C	C
Valerian	E	P	C	E
Woad		P	C	

Table 5: Unconventional crops of interest to the Baltic Sea Region
Source: IENICA, 2001

Europe plays an important role in the international trade of medicinal and aromatic plants with an average of 120,000 tons imported annually from more than 120 countries. Germany, Poland and Bulgaria are among the world's top exporters. Between 1,200 and 1,300 species native to Europe are commercially traded, and though some species are cultivated, wild plants still play a major role. The source of these wild plants is mainly Albania, Turkey, Bulgaria, Greece and Spain. The overall volume of wild plants collected in Europe is estimated at 20,000–30,000 tons annually. According to "Europe's Medicinal and Aromatic Plants; their use, Trade and Conservation" at least 150 species are threatened as a result of over-collection, destructive harvesting techniques and habitat loss and change. To this may be added that the pharmaceutical companies which process the wild plants have increasing problems with large variations in qualities and a limited reliability of supply.

The above indicates a potential for the development of new markets from potential new crops and the cultivation of wild species.

The natural colorant and dyes markets are much larger than the medicinal plant market. In 1989, the value of the food colorant market was USD 320 million, approximately 50 % of which consisted of natural products. The market for natural products is growing by 10 % per annum. The value of the world's dye market was USD 2.5 billion per annum (1997), and the consumption of dyes for colour textiles on a world scale is 700,000 tons per annum (IENICA final report,Askew, 2000).

11.5.1. Molecular farming

There is an emerging interest in molecular farming, especially in Denmark and Sweden, though still primarily limited to scientists and biotech industries. Workshops have been organised to determine the interest and discuss the benefits and problems. The outcome of these workshops has been positive, and discussions are now focusing on how to proceed.

If molecular farming ever becomes politically acceptable and technically feasible, the Baltic Sea islands may be well suited for the establishment of future molecular farming activities. On the islands it would be possible to contain the speciality plants within an enclosed area. The farmers are skilled and they have a well-functioning extension service, and it would be possible to set up efficient control systems. It should be stressed, however, that such productions will not be established in the next many years mainly due to the current public scepticism towards new biotechnological tools.

Plants have a highly advanced and unique metabolic capacity to synthesise specific high-value bio-molecules such as sugars, proteins, oils, fatty acids, fibres, flavours, fragrances and health-promoting compounds, such as flavonoids. Using novel biotechnological techniques plants can be genetically triggered to produce bio-molecules with a desired functionality or other genes can be created/transferred/triggered to produce entirely new molecules with novel properties.

Efficient methods have recently been developed for introducing genetic information into plants. Procedures are now also available for expressing transgenes in highly specific organs and tissues. Introduction of genes from other plant species or from animals, fungi or bacteria results in the production of specific components such as fine chemicals, high-value protein, vaccines and other medicines. Based on the current understanding of the genetic regulation of plant metabolic pathways, we are now in a position to modify these biosynthetic routes genetically in a predictable manner. The new technologies have also opened up the possibility of producing antibodies, interferon, vaccines and industrial enzymes.

Host plants for the production of specialty products could be rapeseed, linseed and potatoes (report from workshop on molecular farming, february 1998, Copenhagen).

11.6. By-products from agro-industrial productions

The main crops grown in the Baltic Sea Region typically contain one main component, such as starch, vegetable oil or protein, together with a number of by-products that often are considered as waste products, e.g. potato pulp, wheat bran and hulls and oil cakes. In some cases, such by-products are used as animal feed or for energy and sold at very low prices. However, these by-products contain potentially valuable components that can be

sold at high prices, if they can be extracted in a pure form and possibly processed even further.

Examples are:

- Alkaloids from lupins
- Beta carotin (vitamin A precursor) and alkaloids from alfalfa
- Beta glucan (thickener for use in the food industry) from barley and oats
- Polar lipids (emulgators and antioxidants) from oat germ and wheat gluten
- Dietary fibres from cereal brans and husks
- Dietary fibres from potato waste
- Oligosaccharides from cereal brans and potato waste.
- Glucosinolates from from brassicae
- Glycoalcaloids from potatoes
- Phenyl propanoids from many fruits.

11.6.1. By-products from agro-industries

Commercial exploitation of by-products from milling, brewery, potato and starch industries for the production of new classes of functional food ingredients and high added-value products for the pharmaceutical and cosmetic industries is a very promising area for the entire Baltic Sea Region. Large milling, brewing, starch and potato industries are situated in all the countries of the Baltic Sea Region, and the by-products are normally available at low prices. Small-scale units could be established in the Baltic Sea Region for extracting and further processing valuable components from these by-products.

11.6.1.1. Cereals

As wheat is the main crop in the countries of the Baltic Sea Region, wheat bran would be an obvious potential raw-material. Currently, most of the bran is poorly utilised in animal feed or simply disposed of. The commercial potential in the utilisation of bran is described in detail in chapter 12

11.6.1.2. Oil crops

As previously mentioned, rapeseed and linseed are also grown in the Baltic Sea Region in relatively large amounts. The vegetable oil is used in the food industry and in the non-food industry for production of lubricants, hydraulic oils, printing inks, solvents, etc. Most of the oil crops are processed in large oil mills, and it would presumably be very difficult for small village-sized oil mills to compete with the large mills on the traditional markets.

As mentioned in chapter 11.2.2.1, small-scale oil mills do exist, and they survive because they produce speciality products and/or serve a limited local market. New technological developments have increased the number of speciality products that can be extracted from an oil crop, leading to an almost total utilisation of all the valuable components in the crop. The market for these speciality products is so limited that the interest from the large vegetable oil companies is modest. This might be the chance for small units to take up such productions. These niche products are high added-value products and they can add significantly to the overall economy in a small oil mill.

Oil crops are very versatile and have a number of very useful minor components. Given current technology, it is possible to extract and separate all the minor components. It is also possible to utilise these components in an optimal way. These separations and extractions can also be performed on a small scale, thereby opening up for an economically feasible small-scale production of speciality components.

A new processing/extraction principle that allows the isolation of undamaged glucosinolates has been developed by an international research team consisting of the Bioraf Denmark Foundation and the Royal Veterinary and Agricultural University (Denmark), INRA (France), Scottish Agricultural University (UK), Institute Sperimentale per le Colture (Italy) and The Frauenhofer Institute (Germany). Their work opens up for the application of these important molecules in the production of bio-pesticides, pharmaceuticals and other products. An additional benefit is an increased nutritive value of the oil and protein fractions.

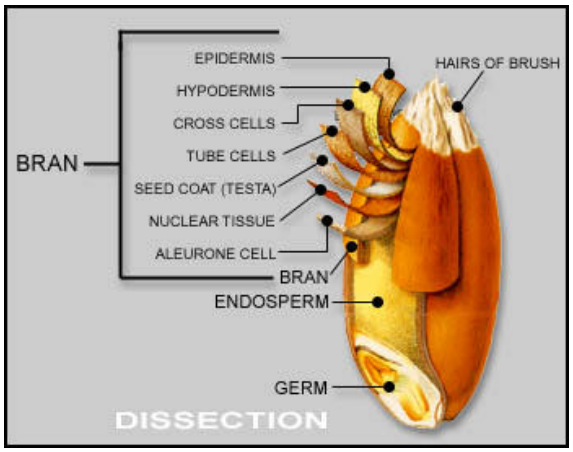
12. Virtual Factory Concepts

The idea behind the two virtual factory concepts is to create a realistic basis for the development of a "best practice" for bio-industrial technology transfer. The factories are designed on the basis of results from two EU research projects, including pilot plant research.

Business plans have been developed and preliminary market studies have been carried out. The business plans have been presented to stakeholders in Denmark, Latvia, Estonia, Lithuania and Sweden, and the two concepts have been presented at two international conferences: 1)The BASAN Final Conference, September 2003, on Bornholm, and 2) at "Green Tech", 3rd International Congress and Trade Show, Amsterdam, The Netherlands, 24-26 April 2002, and at a workshop; "Innovationen Gehen in den Markt", 28-28 November 2002, in Schwerin, Germany.

The general conclusion from the stakeholder feedback in the Baltic Sea Region is that the format is excellent for presenting new concepts to potential investors before the development activities have been finalised. However, more evidence is needed if the business plans are to be used for decision-making concerning establishment of full-scale production units. To that end, test productions and more elaborate market studies will be needed. (The stakeholder reports are presented in the appendix.)

12.1. The Vita Wheat Company



The Vita Wheat Company is an ambitious project with very high profit potential, but also entails high investments and high risks. It is still classified as an SME according to the EU Commission definition, but the total concept is so large that only a few regions will be able to accommodate it. Nevertheless, the concept is a good example of a "locomotive" project that would presumably have a considerable impact on a given region. Apart from creation of new jobs, it would improve the dynamics and lay the groundwork for further initiatives and developments (see chapter 10.2).

It is clearly stated in the business plan that more R&D work is needed. Furthermore, although the market analysis gives an impression of very profitable emerging markets (based on current selling prices of comparable products), it is very difficult to predict the future market sizes and prices.

A sensible approach to full commercialisation would be to start up (on a small scale) with the productions that have been tested on a pilot-plant or semi-industrial scale, and then, step by step, continue with other productions as they become ready for production (a so-called stage/gate system).

In this way it would become possible to test the functionality of and markets for the individual products, thereby reducing the risks before the decision on the final investment is made.

12.1.1. The concept

The production lay-out and the economic viability calculations are based on the experience and results of several years of research, partly on a laboratory scale and partly on a pilot scale. The pilot scale development work has not completely finished, and additional pilot scale research is needed before a decision on commercial production can be made. In addition, market tests, and assessments of product quality and functionality should be made before making the final decision.

As a result, the present business plan should primarily be seen as a tool for organisations which might wish to consider financing the development work that is still needed, before a final decision on commercial production can be made.

As the Vita wheat products are intended for emerging markets, and as some of the products are not well known to potential customers, emphasis has been put on market survey and evaluations.

12.1.2.The company

The company is called "The Vita Wheat Company" (VWC).
An optimal production capacity is approximately 7 tons/hour, and the labour requirement is 72 full-time workers. The raw material demand is 50,000 tons of soft wheat per annum.

12.1.3.The economy

The economic calculations are based on the results of pilot and laboratory scale experiments and are therefore encumbered with uncertainty.

- Annual turnover: EUR 64 million
- Net profit before tax: EUR 38 million
- Investment costs: EUR 53.5 million and working capital requirements: EUR x million
- Payback time for the full investment is less than 3 years
- The break even capacity is 19 % of total capacity
- Return on capital employed (ROCE): 40 % after 30 % tax deduction

12.1.4. The products

The Vita Wheat Company shall produce high added value commodities for the food ingredient and health food markets. The Vita wheat process opens up for a number of product opportunities, however the strategy is to focus on seven products with good chances of success on the European market. A second generation plant may include further components and products with higher degrees of purity. The seven products are:

Product	Production capacity Tons/year	Effect	Use
A starch	24,000	Traditional wheat starch	Food and non-food industries
Resistant starch	8,500	Prevention of colon	Bakery products,

		cancer and diabetes, improves gut function	breakfast cereals, health bars, meat products
Gluten	4,000	Traditional vital gluten	Bakery products, non-food industry
Aleuron protein high in folates	3,000	Reduces risk of of spiral tube defects in babies, cardiovascular diseases and perhaps cancer. Age related diseases (e.g.Alzheimer)	Bakery products, dairy products
Xylo-oligosaccharides	1,750	Improves gut function, bone health and probably reduces risk of cancer and cholesterol	Bakery products. Dairy products, soft drinks, meat products
Dietary fibres Tocol and sterol rich germ oil	1,000 225	Fat mimetics E-vitamin and antioxidant activity	Low caloric foods In speciality foods

12.1.5. The market

The products are meant for the profitable diet and health market. Projections indicate that this market will continue to increase in importance. This includes prebiotica, calorie controlled foods (low fat diets) and tailored nutritional foods (use of natural vitamins, anti-oxidants and minerals, etc).

Today, some of the Vita Wheat products are well known by the market (dietary fibres, gluten protein) and are already produced in large quantities, while others are currently produced in limited quantities, for an increasingly larger market, however.

12.1.6. The raw material

Soft wheat produced throughout the Baltic Sea Region will be used as a raw material. This crop is well known to farmers. They know how to grow it under the local conditions, and they have the necessary equipment to harvest and store it. Besides, soft wheat is grown in excess in the EU, and it is a relatively cheap raw material.

12.2.The LUPRO PROJECT

Fig. X: Lupine seeds

The LUPRO project supports the commercialisation of a technology to produce made-to-measure adhesives and specialty proteins for use in baby food and as meat extender. Raw materials are lupins that can be grown in most areas of Europe.

The project is proposed by an innovation company – the Bioraf Denmark Foundation – which has already researched and developed the basic technology up to a pilot-plant scale on its own initiative, with the support and collaboration of an adhesive manufacturer (Frede Andersens Fabrikker, Denmark), which has researched and developed specific adhesive formulas from the lupin products. Also involved in the project is an agricultural research centre with expertise in the agronomics involved with production and harvesting of lupins (IBMER, Poland)

The concept, which includes the development of small-scale production units, has the capability to be applied in most regions of Europe.

The core organisations of the consortium have already worked on the technology, but it is intended that new partners with market-oriented skills and competencies join the project. These competencies include knowledge in intellectual property right issues, innovation finance and early stage marketing.

12.2.1. The company

The company is called: “The Baltic Protein & Prebiotic Products (PPP).
An optimal production capacity is approximately 3 tons/hour, and the labour requirement is approximately 20 full-time workers. The raw material demand is approximately 20,000 tons of lupine seeds per annum.

The production layout and the economic viability calculations are based on the results of almost 10 years of research and pilot-plant experiments, partly financed by EU research programmes. The protein products have been tested commercially on a large scale by an adhesive manufacturer.

12.2.2. The economy

The economic calculations are based on Danish conditions. The figures will naturally vary somewhat from one location to another.

- Annual turnover: EUR 24 million
- Net profit before tax: EUR 9.5 million
- Investment costs: EUR 14 million, and working capital requirement: EUR 2 million
- Payback time for the full investment is less than two years
- Payback time for machinery and equipment is less than one year of full operation even with a 30 % reduction in capacity.
- The break-even capacity is 12 %
- Return on capital employed (ROCE) is 49 % after 30 % tax
- Internal rate of return (IRR) is 84 %
- Net present value (NPV) based on a 10-year cash flow schedule is EUR 41 million

12.2.3. The products

The factory is designed to produce two product types from lupines:

- Protein concentrates and isolates. 7,000 tons/year
- Prebiotica and fat replacers – dietary fibres (5,000 tons/year) and oligosaccharides (2,000 tons/year.)
- By-product: 5,000 tons of hulls that are sold to local feed mills.

12.2.4. The markets

The two product types are meant for existing markets. The protein markets are reasonably stable, but product prices can fluctuate. The prebiotic and fat replacer markets are relatively new, and demand is increasing. Common to both product types is the fact that the economy is so strong that it might be feasible to compete on price, at least during an introduction period.

12.3.Summary of reactions to the virtual factories

(the full text can be found in appendix)

Denmark: two investment funds *were in principle* willing to co-finance the two projects provided that other investors with the necessary technical knowledge would recommend the projects and invest themselves.

However, the management set-up and the skills of the management staff must also be professional and dynamic.

Latvia: The Vita wheat concept might be of interest to Latvia, yet any serious considerations on the part of Latvia would require the involvement of foreign expertise and foreign investments.

Latvian researchers consider the Latvian climate and soil conditions to be very favourable for lupine growing. There is plenty of unused land, which can easily be adapted to lupine growing. A recent prognosis foresees an increase from 150 ha in 2001 to 10,000 ha in

2005. Latvian plant breeders suggest research on lupine growing in Latvia, and provided that the outcome of this research is positive, they see no problem in implementing the lupine project in Latvia.

Lithuania: Two Lithuanian companies have expressed interest in exploring the possibility of establishing productions in Lithuania. They have concluded that the information in the two business plans is sufficient for a preliminary evaluation, yet more information is needed before decisions can be made. Contacts have been made with western companies, meetings have been held, and funds are currently being raised for carrying out a more detailed feasibility study based on the conditions in Lithuania.

Estonia: 1) The protein factory: the business plan needs to be more detailed and realistic before a proper evaluation can be made. Lupins may not be available in sufficient quantities and qualities in Estonia. Doubts are expressed about market. The local market is presumably too small for the intended production size, and therefore export will be necessary. Therefore the project is not feasible for Estonia.

2) The Vita Wheat factory: The project is better elaborated and especially the market study is good. The project scale is large making it difficult to realise it in Estonia. The market must necessarily be found outside Estonia, which could be problematic. The project may have some potential for Estonia, but needs professional management.

Sweden: 1)The Vita wheat factory: As concept the business plan has merit and is interesting. As a business plan, further evidence is needed to show with more certainty that potential customers are ready to buy such products at the postulated prices. The processes need to be worked out in more detail, before final decisions on investments can be made.

2) The Protein factory: To market a Baltic “soy product” is interesting and has merit. Before investment considerations can be made, it must be assured that there are customers for such products. Trial applications and detailed market analysis are needed.

12.4.Questionnaires

Questionnaires have been distributed to agro-industrial SMEs in the participating countries. 20 SMEs in the food and non-food sectors have filled in the questionnaires. Responses have been received from Finland, Latvia, Estonia, Poland and Denmark.

The companies were asked to indicate their perception of the most important incentives and barriers in the agro-industrial sector. The results are shown in the two diagrams below.

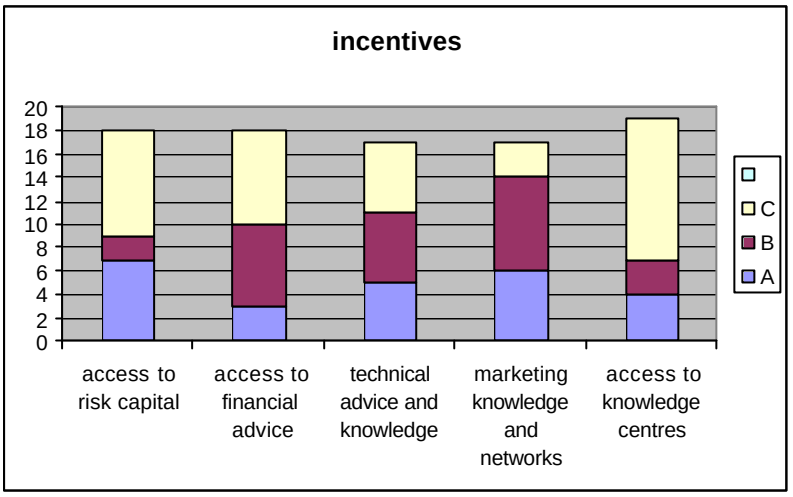


Figure 16 The most important incentives

A= most important: B= very important: C= important

The figure shows that access to risk capital is considered to be the most important incentive, while only a few of the companies find that access to financial advice and knowledge centres is most important.

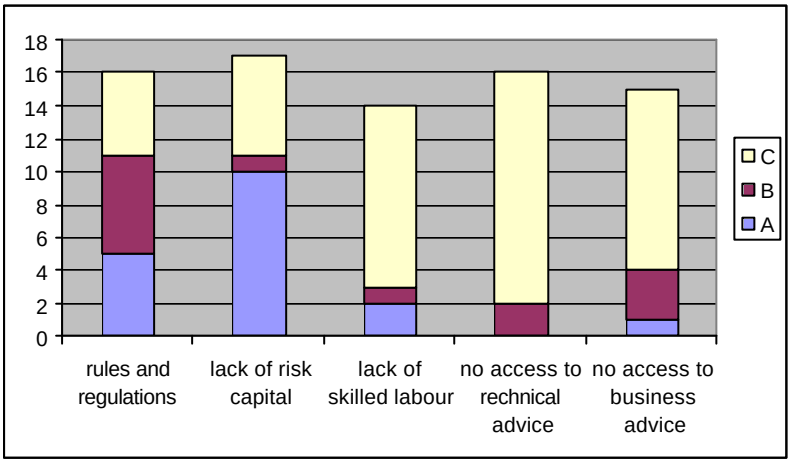


Figure x: Important barriers
A= most important: B= very important: C= important
A lack of venture capital and rules and regulations are by far the most serious barriers, while insufficient access to technical and business advice seems to be of less importance.

When analysing the above results one should bear in mind that a majority of the companies questioned are small and mainly operate on domestic markets only. Besides,

not all of the companies are technologically advanced, and furthermore they may not have any wish to make technological changes.

13. Generating Agro-industrial Activities in a Rural Area of the US

It is often claimed that the Americans have a much more highly developed entrepreneurial spirit than Europeans. For example, almost half of all new jobs created in the USA are created through the establishment of new companies. Even in the agro-industrial sector, the establishment of new activities is more frequent than in Europe as a whole. Therefore, it might be worthwhile to study the American way of innovation in the agro-industrial sector. In the following, a number of schemes that have been successful in establishing new enterprises are analysed.

Agro-industrial venture organisations in the USA

	Funding	Target group	Service offered	Achieved
21.st Century Alliance	Private Members fee Service fee	Farmers and Co-ops. (1000 members)	Own entrepreneur Scouting Financing establishing	8 new companies in three years
Kansas Value Added Centre	Public	Small businesses	Technical and commercialisation support Pilot plant facilities	Commercial holding company established
New Uses Council	Private and public	Companies, farmers org. universities State agencies	Establishes strategies Info. service	?
AARCC	Public (revolving fund)	Farmers and SMEs	Create private/public partnership (pre-commercial)	After 3 years: 60 projects 3000 jobs
VADG	Public	Farmers and SMEs	Financial support Feasibility studies Working capital	?

13.1. 21st Century Alliance

The 21st Century Alliance has its headquarters in Manhattan, Kansas – a location that is roughly at the centre of America's "breadbasket". The Alliance was established in 1995.

The Alliance helps farmers, mainly in Kansas, to increase their scale of operation through value-added agribusiness. In just three years of operation, the Alliance has led

to the formation of eight new companies. The core of the Alliance is made up of a relatively small number of dedicated people working diligently to extend the value chain for farmers, and to improve rural economies. It is best described as an entrepreneurial agri-business organisation that is both focused and flexible in its business start-up activity.

The Alliance has approximately 1000 members, who each have paid USD 500 for membership. The recruitment of members was not limited to Kansas, but included neighbouring states as well. The new enterprises include 2 dairies, a flour mill, an edible dry bean factory and a fiberboard factory. The factories are financed by stock sale. For example, when the mill was established, the producers could participate by investing USD 5,000 in a share that included an obligation to deliver a specific amount of wheat to the mill.

13.1.1. The Alliance organisation

The Alliance organisation includes the members, a governing board, professional management and staff, and consultants as needed. The number of members is currently approximately 1,000. Members have an opportunity to invest in each of the new businesses as it develops.

The organisation's agenda includes four key elements:

1. An aggressive pursuit of new business opportunities
2. A reduction of risks by carrying out a thorough analysis before entering into any new business.
3. The monitoring and refining of business plans of ongoing businesses (business metrics, market and competition).
4. A spirit of co-operation to enhance business opportunities and promote a new approach to agri-business- The Alliance seeks business relationships across state and country borders to improve profitability.

Members pay USD 100 a year creating an annual pool to run the secretariat. The Alliance also creates revenue through a 6 % service fee generated from the sale of stock in each new venture. These funds allow the Alliance to carry out its role as an entrepreneur, which specialises in the creation of value-added agricultural business, specifically by providing venture capital and business start-up expertise.

13.1.2. The process

The process begins with an idea about a new business venture. These ideas can be top down or bottom up. The Alliance stresses strongly that the key point is to ensure that the right leadership is in place prior to any idea being investigated by the organisation. This usually requires five or six committed persons, e.g. primary producers, who can eventually be the core of a board or an (ad hoc) committee in a value added business.

The process includes the following:

- Business concepts that receive a positive recommendation at the first representation to the board are then investigated in further detail. A governing board is created that usually includes the ad hoc committee as its core.

- A development service contract is prepared. The contract details the work to be done leading to start-up, and the relationship with the Alliance. The agreement covers items such as: due diligence, marketing, engineering, financing. Consultants are used. The work performed during the due diligence phase helps define the risks and solution to problems. Many projects do not pass this stage.

- A feasibility study is conducted. If positive, the next step is to initiate the creation of a formal organisation and to raise the necessary capital.

- A contract is prepared that outlines the financial arrangement, including the type of financing and the terms of reimbursement to the Alliance.

The Alliance has a strong position as it includes farmers that own land for production of the raw material for the factories. The large corporations cannot duplicate the farmer system, so competitive opportunities exist for the local producers to capture niche markets.

13.2. Kansas Value Added Centre

The objective of Centre is to "enhance the Kansas economy by providing assistance to agriculturally related value added endeavours".

It was set up in 1988 as a non-profit organisation. In 1994 a "for profit organisation" KVAC Holdings Inc. was created, which allowed the organisation to receive royalties from successful technology developments. In addition it has revolving loan capacities to reallocate return on investments from successful ventures.

KVAC is mainly funded by proceeds from the Kansas Lottery and Racing Commission through the Economic Development fund, and it is governed by a 16 member Leadership Council.

Its goals are:

- To create and/or expand business and rural opportunities related to agriculture
  - Stimulate new options/uses for Kansas agricultural products
  - Identify/assess technology suitable for Kansas.
- Implement a commercialisation and financing system to assist KVAC clients at each stage of development.
  - Implement a commercialisation charter for KVAC Holding Inc.
  - Implement an effective technology transfer system

- Improve and enhance strategic alliances

KVAC offers both technical support and commercialisation support (financing, technology transfer) and it issues newsletters, arranges workshops and seminars and helps in building strategic alliances. It has access to 9 pilot plant facilities and contact with a number of technical experts.

13.3. New Uses Council

The New Uses Council Inc. is a non-profit organisation located in St. Louis Missouri. The Council was founded in 1990 and is dedicated to expanding new non-food markets – industrial, energy and fuel – for American agriculture.

It has a membership of approximately 250 members, including individuals, companies, agricultural organisations, universities and state and federal agencies.

Activities include regional meetings, development of a new uses policy and strategies. The Council has also set up an information service, and it currently publishes a quarterly newspaper.

The New Uses Council has established a partnership programme for individuals and organisations that do not choose to become members of the Council, but wish to provide designated or un-designated support. Organisations can support the Council at several Partnership levels from USD 500 to over USD 10,000.

13.4. Alternative Agricultural Research and Commercialisation Corporation (AARCC)

AARCC was a federal agency, operating within the US Department of Agriculture. It was closed in 1999 in connection with a change in US agricultural policy.

According to Robert Armstrong, US Department of Agriculture (1996), it was created in 1992 as a response to a very ambitious government goal ("the New Farm and Forest Task Force report" for the Secretary of Agriculture Block, 1987) to generate 750,000 jobs, increase farm income by USD 30 billion and add USD 100 billion in national economic activity within a time-frame of 25 years.

In the spring of 1993, the AARCC Board conducted a series of hearings around the country to get advice from the public as to how they felt the Centre could best accomplish its mission.

The objective of the AARCC Centre was to facilitate commercialisation by forming private/public **pre-commercial** partnerships. This helps to initiate market penetration strategies early in their product/process development. It also places the private sector in the lead; the guiding philosophy being that the private sector has much more knowledge of the marketplace than a government-run organisation. Moreover the centre concentrated on the critical pre-commercialisation stage, because that is the most difficult stage for a company to secure funding. Most estimates cite the pre-commercial expenses as being 100 times greater than the expenses of basic laboratory research.

An important aspect of the AARC Centre was its re-investment strategy. The Centre was funded via a revolving fund and not on an annual "use it or loose it" appropriation. Money provided to a firm for commercialisation a product is repaid.

Only three years after its start, the Centre was financing nearly 60 projects – mostly SMEs – with some USD 21 million. About USD 73 million from the private sector was also invested in the projects. The projects not only generated demand for agricultural raw materials, they also generated new jobs in the rural areas; approximately 3,000 new jobs were created over the years.

Among the products developed were:
Ethanol and other chemicals from lignocellulosics
Straw pulp
Kenaf newsprint paper
Molded furniture parts
Insulation boards
Oil absorbant
Panels
Slow release bio-pesticides
Cosmetics

13.5. The Agricultural Community Action Process (ACAP)

(Report: "Beyond the Farm Gate, Agriculture in the 21st Century. Illinois Department of Commerce and Community Affairs, November 2000)

The objective of the ACAP programme is to engage small rural communities actively in economic development efforts in agro-industries. It assists in building relationships among primary producers, agri-business leaders, economic development professionals and the scientific community to create new economic development through value-added agri-business opportunities.

ACAP has developed a manual to help rural communities get organised, create a vision for the area and initiate an action plan. It stresses the importance that the rural community itself takes the initiative. However, the Illinois Institute for Rural Affairs and the Illinois Department of Commerce offer to assist and establish contacts with experts, consultants, investment funds, etc.

The following strategy is suggested:

- *Entry-level*. Value added agricultural opportunities are explored. Partners, assets and resources have been identified. Economic development organisations are encouraged to target value-added agricultural business development.
- *Mid-level*. Two or three value-added agricultural projects have been identified, and the pre-feasibility phase has been completed. Additional staff time is needed at the economic development office for co-ordination, further education, research, and resource identification to take projects to the capitalisation point.

- *Project development.* Two or tree projects have been evaluated; and the pre-feasibility study has been completed. Further research and development investments are needed for capitalisation.
- *Project implementation.* Feasibility phases are completed and organisational structures are identified. Assistance is needed to complete business plans and financial packaging.

13.6. Value-added Agricultural Products Development Grants (VADG)

VADG was established under the "Year 2002 Farm Security and Rural Investment Act" better known as the "Farm Bill". The Farm Bill establishes four related, but different programmes from the USD 40 million of annual funding. The programmes are:

- VADG producer grants
- A resource centre
- A series of agro-industrial innovation centres
- University research on the impact of value-added activities

USD 33 million is available for the VADG programme annually. The objective is to help farmers, farmers co-operatives and producer-based business ventures establish new value-added productions based on farm products.

Financial support may be given to two types of activities:

- Developing feasibility studies or business plans needed to establish a viable value-added marketing opportunity for an agricultural product
- Acquiring working capital to operate a value-added business venture or an alliance that will allow the producers to better compete in domestic and international markets.

The maximum award per grant is USD 500,000/year, and applicants must provide matching funds at least equal to the grant.

13.7. Rural development policy

The US rural development mission co-ordinates programmes that are related to rural economic and community development. Led by an Undersecretary of Agriculture for Rural Development, the following programmes and services are provided through a rural developments network of national, state and local offices:

- Rural housing service: help finance, repair or relocate housing for low income families
- Rural utilities Service: loans and grants for electricity, energy, telecommunication, and water and waste disposal projects.
- Rural Business co-operative Service: provides technical and financial assistance and business management services to rural areas.
- Office of Community development: through innovative programmes it develops strategic plans to forge alliances among private, public and non-profit entities.

In addition, a number of programmes to help rural businesses have been created.

14.BASAN Final Conference
Bornholm
18-19 September 2003
Summary

The following is a short summary of the papers from the conference. The proceedings including the conference papers are presented in the appendix.

Representatives from all countries around the Baltic Sea, except Russia, attended the conference that was held on Bornholm – a small Danish island situated in the middle of the Baltic Sea. The participants were national and EU parliamentarians, scientists, industrialists, businessmen and farmers. Thus the audience was "mixed" which presumably was one of the reasons for a very lively and engaged discussion during the two days. The first day's presentation gave an impression of the current situation in the Baltic Sea Region, while day 2 focused on the opportunities for development.

14.1. Need for change

It was clear from the discussion and papers presented that the Baltic Sea Region faces many challenges, although these challenges may not necessarily be the same in all countries.

On the other hand, the region has plenty of natural resources, a surplus of agricultural land and relatively easy access to large markets due to a well developed infrastructure, and thus it also has the potential to become a very dynamic and prosperous area.

It was mentioned that the Baltic Sea region might become one of Europe's new growth areas, where we will see trade develop faster than in the rest of Europe. However, visionary people with an entrepreneurial spirit are needed.

Biotechnology and information technology will become key elements in this development. Diversification in agriculture and new uses of products from agriculture are needed. The challenge is to learn how good ideas are effectively developed and transformed into profitable and sustainable productions.

By themselves, the separate regions are too small, but together they could form a strong link between old and new Europe.

14.2. Success stories

An exhibition of successful regional products was established to illustrate that it is also possible to produce high quality products in remote regions, although often on a small scale. Most products are sold on local markets, but some are also exported.

In addition, three papers dealing with success stories from Latvia, (marmalade and juices), and Germany, (insulation material from seaweed and building boards from straw), were presented.

14.3. New business opportunities

Several speakers referred to the recent WTO summit in Cancun, and it was a general perception that the competition, especially from developing countries, on traditional agricultural and agro-industrial commodities will become stronger in the future. Therefore Baltic agriculture and agro-industries should put more focus on production of speciality crop and products.

An overview of the trends in the international food sector was given, and the great potentials for functional foods and food ingredients were illustrated.

Another area with great potential for the Baltic Sea Region is the production of bio-fuels , both solid and liquid. 50 % of the land is covered with forests and 20 % is arable land. Some of the agricultural land is today abandoned and some is cultivated extensively indicating a very large potential for a production of energy crops, fuel pellets, liquid fuels (bio-ethanol and bio-diesel).

It was also illustrated that the potential for a future production of pharmaceuticals, cosmetics, paints, fine chemicals, etc., from agricultural raw materials is considerable.

Finally, the strategy for initiating new activities, based on the discussions at the regional BASAN meetings and referred to in chapter 4, was presented and discussed.

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