

## **BORNHOLM REPORT**

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### **<>Introduction**

Bornholm is an island in the middle of the Baltic Sea. It has 45 000 inhabitants. The main income sources are agriculture, tourism and fisheries.

Like other areas in the Baltic Sea region Bornholm has problems with social desertification. The younger generation leaves the island, and the average age of population is increasing.

The unemployment rate is higher than in Denmark as a whole, and the average income is lower. In 2001 the employment rate was 9,7 %, which is a little higher (0,6 %) than the year before, and much higher than the country average -4,6 %

The industry is mainly focused on processing of agricultural and fisheries raw-materials. Most of the companies are very small. The majority has less than 20 employees, and only 31 companies have more than 50 workers. 9 % of the population is self employed. 22 % of the workforce is employed in industry and 7 % in the transport sector.

The entrepreneurial spirit is modest on Bornholm. Only a few new jobs have been created during recent years, and many of these jobs have been created in the public domain and in the service sector. A few have been created in existing industries and very few in new industrial enterprises. For comparison, in USA 44 % of all new jobs are created by start-up companies. (Illinois Institute for Rural Affairs, Rural Research Report, vol.9 issue 4, 1998)

Bornholm has only a few knowledge based companies such as information technology firms and no high tech biotech companies, and it might be very difficult to make Bornholm more attractive for "high tech" entrepreneurs. Very few from the local labour force will presumably have the necessary skill needed by high tech companies, and it might be difficult to persuade academics from e.g. the Øresund region to move to Bornholm.

The above conditions may in the future become a major problem for Bornholm, as knowledge competence and knowledge management presumably will become increasingly important in the start-up of new enterprises especially in regions like Bornholm, where production and distribution costs generally are higher than in less remote regions. In addition Bornholm is a "high salary area". (in comparison with other regions around the Baltic Sea.). Therefore new productions that include a high level of innovation, should have the best chances for success.

## **Barriers**

### *Geographical position*

The industry suffers from a number of problems due to the remote position of Bornholm. The commodities produced on Bornholm have to be exported by boat or air to the markets in Denmark and elsewhere, which is costly. During the years many companies have closed down and very few new companies have been established.

## **Labour Force**

The current industries on Bornholm only to a limited extent require employees with higher education. As a result young people from Bornholm with higher education will have to leave the island in order to find jobs suited for their qualifications. In other words the island is experiencing a "brain drain" to more dynamic areas such as the Øresund region.

Another problem is that academics, who might want to move to the island, often are married with academics, who will not be able to find a job suited for their qualifications on the island.

## **The Company Structure**

Bornholm has a handful of large firms dominating the local business (e.g. transport company, farm commodity merchant), almost with monopoly status, and a number of very small companies, of which few have a visionary management. None have their own research, and there is little experience in co-operation with R&D organisations.

## **Local Assets**

### *Primary producers*

The farmers are well educated and skilled in plant growing and post harvest technologies.

Bornholm is well suited for production of not only traditional crops, but also speciality crops like medicinal plants and non-food crops; the growing season is longer than in other parts of Denmark, and the soil fertility is excellent in many areas. Most common soil types are represented on Bornholm. Due to its remote position, allowing for efficient security measures, Bornholm would also be a good place to establish molecular farming projects, when this becomes relevant.

The farmers are well educated and very skilled in plant growing and post harvest technologies, and the local "Farmers Union" has established an efficient extension service that helps farmers not only with agronomic problems, but also with planning of future expansions, book keeping etc.

Most farmers are traditional farmers, the number of organic farmers is however growing.

According to the local "Farmers Union" the farmers are good at adapting to changing condition and willing to change traditional production practise. Especially when investments in new harvesting machines, storage facilities etc. can be avoided.

However the farmers are more reluctant to participate in the establishment of new industrial productions. And it is rather unlikely that farmers on Bornholm would participate in financing productions like the ones described in the two virtual factory examples.

### *Local incentives (innovation practise)*

A number of innovation "tools" and incentives are available for entrepreneurs, who want to establish new businesses on Bornholm.

- Some land has been set aside for new industries, these areas can be purchased at reduced price
- A plan for improvement of (the telecommunication – it Bornholm) infrastructure has been set up
- There is access to a number of both governmental, regional and EU funding schemes, such as:
  - EU regional fund
  - INTERREG

- Vækstfonden (national fund)
- Bornholms Erhvervsfond (local fund)
- Bornholms Sparekasses fond (local and private fund)
- The Danish government is subsidising the ferry traffic from Bornholm
- Venture companies have access to a large variety of public assistance schemes, such as:
- Iværksætterkontaktpunkt: free legal (lawyer) and accountancy advise
- Iværksætterkurser: Assistance with development of business plans, securing of intellectual property rights etc
- Virksomhedsservice- Bornholm and Bornholms Erhvervscenter (BECT):
- Customer-interviews
- Competence building: management, employees
- Mentorservice: Temporary help from retired business managers
- "Green" business development: Green certificates etc.

#### Access to Knowledge:

- Bioraf Denmark Foundaton
- Center for Regional og Turismeforskning

#### **Regional Funds and Business Angels**

A handful of local businessmen (business angels) invest in local companies, who have temporary financial troubles, on ad hoc basis. Their involvement in the individual companies is often on short term basis.

In 1976 local agro-industries established a fund, "Den Animalske Fond" that has as objective to help animal farmers on Bornholm with loans. The industries behind the fund are; a feed mill, a slaughterhouse and a dairy. Also Bornholms Erhvervsfond participates.

"Sparekassen Bornholms fond" was established in 1990 in connection with a fusion of 2 local banks. The net capital in one of the banks( Sparekassen Bornholm) became the backbone of the fund.

The objectives of the fund is to financially support the society in general on Bornholm, however emphasis is put on sports-clubs, youth organisations, cultural projects and research and development projects.

Under special circumstances the fund can support production companies e.g. with shareholders capital. In addition it can through its daughter company – Sparbo Finans – give small loans to companies with temporary financial problems.

The size of the donations may vary from 50.000 DKK. to 2-4 million DKK.( 7.000 – 500.000 EURO).

Recently Sparekassen Bornholms Fond has donated money to chicken farmers, an abattoir for cattle, sheep, goats etc, a chipboard factory and a research centre.

#### Reaction to the virtual factories:

The Fund management seldom supports the establishment of new companies, it is however not excluded that the fund might participate, with a limited amount of money, in a financing package, including banks and investment funds, who have evaluated the prospects and risks involved in the project. The fund might equally support part of development work linked to establishment of a new activity.

Bornholms Erhvervsfond is a public fund that was established in 1972 with a start-up capital of 10 million DKK. Today the total capital is 90 million DKK. (12 million EURO).

The objective is to support existing and new business activities on Bornholm with loans, warranties and shareholders capital. Also companies who seek co-operation with companies in East European countries can receive financial support for such activities.

The interest rate is below market. currently 3.5 % p.a. In 2001 loan and financial support were given to

20 projects ( 10.4 million DKK.) of which 4 were in the food industry sector and one in the farming sector. This is less than the year before, where 18 million DKK. was spent. It is expected that the 20 new projects will create 39 –52 new jobs.

Bornholms Erhvervsfond may support with up to 30-35 % of total costs for a given project. The largest single loan given is 4 – 5 million DKK.

### **The Virtual Factories**

The Fund is positive towards the project and might be able to give financial support, provided the business plan, including calculations and market analysis, are realistic. The fund may also participate actively in eventual modifications and fine-tuning of the business plan.

### **Access to knowledge**

Bornholm has two research centres: Centre for Regional- and Tourism Research (Bornholms Forskningscenter) in Nexø and Bioraf Denmark Foundation in Aakirkeby.

#### *Bioraf Denmark Foundation/Bioraf A/S*

Bioraf Denmark Foundation is an international oriented non-profit research and development organisation, founded with the purpose to support innovative development of new sustainable products and production systems based on agricultural raw-materials in co-operation with universities, research institutes and industry organisation

Bioraf Denmark was established in 1989 by three Danish counties (regions) - Viborg Amt, situated in Jutland, Bornholms Amt and Storstrøms Amt (two islands, Lolland and Falster, situated in the Baltic Sea). The establishment was supported financially by the three counties, the Danish State, the Danish Farmers Union, private enterprises and the EU Commission.

Apart from serving the local regions Bioraf Denmark has established extensive links and networks to universities, research institutions and commercial companies throughout Europe, China, Australia and in the USA.

Since the establishment Bioraf Denmark has participated in and co-ordinated a number of successful EU supported research and development projects (ÉCLAIR, AIR, Life-science), and as a result new processes and products have been developed from laboratory research via pilot scale trials to demonstration productions. Currently a number of demonstration productions are under negotiation for entering into small-scale industrial production units suited for the regions that Bioraf Denmark serves.

The Foundation has its own pilot plant facilities, where small batches of specialty (made to measure) products are developed and produced in co-operation with industrial companies in Europe and overseas.

Besides Bioraf runs a modest commercial production of plant oils for food (ALLARA).

The Bioraf Denmark has more than ten years of experience not only with technology development and technology transfer, but also with the challenges and constraints involved in all the individual links in a complete innovation chain.

Bioraf has, probably as the only research centre in Denmark, no basic public funding, which is a severe handicap for a research institute. The institute is mainly financed by individual public and private projects, where the money is "earmarked" for specific tasks. The necessary maintenance and modernisation of equipment has to be financed by other means, predominantly from the commercial production of vegetable oil and ad hoc tasks for industries.

#### *Centre for Regional and Tourism Research*

The centre was established in 1994. Until May 2001 it was called "Bornholms Forskningscenter" (Bornholms Research Centre). However May last year it changed name to "Center for Regional og Turismeforskning". (Centre for Regional and Tourism Research).

As the name indicates the main research areas are tourism and regional development, and the centre has the intention to focus on the conditions on European islands. The number of employees is 18, of which 14 are academics covering scientific disciplines such as: Economy, geography, history, sociology and politology. 70 % of the research is applied, and 30 % basic research.

The centre receives from the Danish government 5,5 million DKK. pr. Year as basic funding and 3-4 million DKK. from projects

#### *Agro-industrial companies*

The bulk of the agricultural production is not processed on the island, but exported and processed elsewhere. Bornholm has however a number of, mostly small, agro-industries that process the local raw-materials. Some of these are very successful, and some find it increasingly difficult to obtain a reasonable profit.

It seems that the most successful ones are those, who have specialised in one or few products of very high quality, (Examples are: speciality chicken, rye biscuits, blue cheese, virgin rape-seed oil). Common for these products is that they have received up to several national and international awards, and they are known and sold not only in Denmark but also exported to other European countries. Apart from one, they are old and the product quality has been established during many years.

The less successful ones have in common that they are producing bulk products for low-price markets, and their main competition parameter is price. (Examples are: dried green crop pellets, chip-boards, cereal flour).

One company is dominating the agro-industrial scene on Bornholm, namely BAF. BAF functions mainly as a farm product merchant, who imports and exports agricultural products like animal feed and unprocessed crops in bulk. Many of the farmers on Bornholm are to some extent dependant on BAF. It gives credits, buys the farmers harvest and sells feed to dairy, poultry and pig farmers.

Recently (2002) was established a small slaughterhouse. The plant shall slaughter cattle, pigs, goats, sheep for the local market. A butchers shop has been established in connection with the slaughterhouse.

#### The principal agro-industries on Bornholm are currently:

- BAF: Bornholms Andels Foderstofforsyning
- Baltic Board – chip-board factory
- Boværk Bioraf – feed mill
- Bornholms Andelsmejeri, Klemensker – Dairy, cheese production
- Bornholms Valsemølle A/S, Aakirkeby – flour mill

#### Slaughterhouses:

- Steff Houlberg - pigs
- Danpo – chicken
- Håndværksslagteren – cattle, pigs, goats sheep
- Johannes Dam og Søn – Biscuit factory
- Allara – virgin rape-seed oil

#### **Agriculture**

The animal production is the main income source in agriculture on Bornholm.

According to "Bornholms Erhvervsråd" in 2001 were produced 40.000 tons milk, 407.000 pigs, 2.800 chicken and 2.500 tons eggs.

Cereals dominate the plant production with a total production in 2001 of 151.000 tons, which is a serious reduction from the year before, where the farmers produced 193.500 tons.

113.000 tons is used as fodder. 2.000 tons for flour production and 36.000 tons is "exported" (27.000

tons feed grain, 3.000 tons for flour and 6.000 tons malting barley).

Of rape-seed was in 2001 produced 3.500 tons, of which 2.700 tons was "exported"

The "Farmers Union" on Bornholm has supplied the following statistics:

Number of farms: 870

Farms by size: 2-10 ha: 12,4 %, 10-50 ha: 55,1 %, > 50 ha: 32,6 %

Value of land: 5.000 €- 16.000 €

Arable land: 33.800 ha

Plant production in year 2000

Crop ha Yield tons/ha

Wheat 14.300 8

Barley 8.000 6

Oats 900 5,5

Rye 209 6

Oilcrops 2.100 3

Protein crops 100 4

Speciality crops 2.100

Other 6.200

Soil types:

Clay: 30 %

Sand 70 %

Set aside land: 42 %

95 % of the primary agricultural production is sold unprocessed

### **Emerging Trends in the Community**

The average age of farmers is increasing, indicating the possibility of necessary take-overs by younger farmers in the not so far future. This is however contradicted somehow by a trend towards part time farming and "gentleman" farming.

The average farm size is increasing, and the number of farms is decreasing, the average efficiency and yield seem however to be rather constant. From 1995 –2000 the number of farms was reduced by 3 % ,while the average size of farms has increased by 2 %.

Some industries have been forced to reduce or stop their production due to bad economy, and very few new industries have been established, not only agro-industries, but industries in general. On the other hand many of the established industries seem to have a financial solidity that is above country average. 5,4 % of the companies have in 2001 increased both income and employment.

In general, however, the industrial sector does not foresee any increase in employment in the near future.

Currently there are very few IT based workplaces (e-trade, programming, call centre) on Bornholm. Only 0,7 % of the workforce work in this sector, which is far below the country average of 8,8 %. It has officially been decided to establish incentives for strengthening this sector on Bornholm, not least in view of the fact that IT work is not very dependant on the geographic location of the workplaces. A new project/concept, "Digital Bornholm" has thus recently been launched. It is therefore anticipated that new employment opportunities will be created in the IT sector in the coming years.

### **Value Added Opportunities From Agricultural Products**

From locally produced by-products:

- Whey- specialty protein for food and non-food industries.
- Bran- specialty products for food industry
- Protein cakes and secondary metabolites- specialty proteins for food and non food application.

pharmaceuticals

- Slaughterhouse waste
- Wood waste - Fuel pellets

From traditional crops:

- Linseed/flax- specialty products for non-food industries, water purification etc
- Cereals- prebiotica for food industry, non-food commodities
- Oil-crops- biodiesel, lubricants, solvents

New crops and specialty crops

- Protein crops -lupins
- Medicinal plants and herbs, e.g. mint
- Plants for cosmetic industry

## **Conclusion (what can be done)**

The public innovation practise on Bornholm is well developed and the local incentives available for entrepreneurs are extensive.

Thus the local authorities and the Danish State have established a good public environment for a dynamic business climate, although regrettably so far with little avail concerning establishment of new production companies and industrial jobs.

That may partly be due to the fact that the main innovation barrier, the remote position of Bornholm, which is the reason for most of the obstacles, cannot easily be overcome. Another barrier is the lack of higher education possibilities on Bornholm. It seems that the most innovative and dynamic regions in the Baltic Sea area are those, who have access to universities or other higher education centres.

It might be concluded that what the county has done so far is impressive and also necessary, but not enough to initiate new productions on the island. Therefore new incentives and assistance strategies, well within the power of the local municipality should be initiated.

The county might consider to:

- Establish a scout function to scout for entrepreneurial opportunities arising from spin offs from existing local companies, local research and development centres and EU research programmes. Example is the local business visitation programme established by the "International Science Park of South Denmark". The science park has during the last year so far interviewed approximately 200 local SME's and already established co-operation between some of the companies and the university.
- Improve the visibility of the local innovation support services, and assess the needs (besides financing) of individual potential entrepreneurs.
- Act as nurturer and convener . Bornholm might be too small for the establishment of a business incubator (example: Kauna Business Incubator, Lithuania), however the county might consider to create a kind of "incubator-without-walls" – a forum where entrepreneurs can meet with each other to share experience on management, marketing, financing etc.
- Develop a plan to attract successful entrepreneurs, from e.g. congested regions, who might want to leave their region and set up business operations in smaller, slower paced communities. Create contact with local stakeholders.(local funds, banks, municipalities etc.)
- Create an "Incentive package".
- Make better local use of the two existing research centres. Formal contacts to universities in Denmark and Sweden (and eventual Germany and Poland) should be established, and training schemes for students and ph.D's should be developed. This is a "next best" solution. The best solution – to establish an independent higher education scheme on Bornholm- is probably not feasible due to the small population basis.

## **Case Studies**

Companies, local farmers union, local funds and local authorities have been interviewed and asked to

fill in the questionnaires. Also an entrepreneur, who has considered to move his activities to Bornholm, has been interviewed.

#### Local SME's

##### Boværk

Boværk is an old agro-industry that until recent years with success has been able to adapt to the inevitable changes in markets and technology that have occurred throughout the years. The company was established in 1941 by local farmers as a co-operative. Today it is a joint-stock company with farmers as major shareholders.

The company started as a flax factory, and it soon became one of the most modern flax factories in Denmark. As flax fibre production became less and less profitable after the War, it was in 1949 decided to expand activities to other production areas, and this resulted in the establishment of one of Europe's first green crop drying plants. At that time it was a new idea to produce dried grass meal, and later Boværk became the first company in Denmark and one of the first in Europe to produce fodder-pellets from alfalfa and grass on a large commercial scale. Green crop drying became later a relative large business with more than 50 production plants in Denmark and a yearly production close to one million tons/year. Due to a number of factors, such as increases in oil prices, reduction of EU subvention, reduction of cereal prices etc., it is today difficult to make a profit in the green crop drying industry, and Boværk has, with some success, tried to find new business activities. A plant for production of fodder-mixtures for cattle, pigs and chicken was built in 1979. Today Boværk produces only 3000 tons pellets pr. Year, which is no more than 10 % of the production potential. Boværk has modified some of its drying drums to dry cereals. The capacity is rather high, 30 tons/hour, and Boværk has in wet harvesting seasons saved the harvest for many farmers on Bornholm. However the profit from the seasonal cereal drying is modest.

Boværk has been engaged in establishing many new activities on Bornholm such as wood chip (fuel) factory, a chipboard factory and a biorefinery. The chipboard factory, called Baltic Board, is still in operation, while the wood chip plant has closed down. In the middle of the eightieths Boværk had ambitious plans to establish a large agro-industrial conglomerate together with BAF, Baltic Board and the Carlsberg brewery. BAF and Baltic Board are physically situated very close to Boværk, and the idea was to have an interchange of by-products and products between the three companies and Carlsberg. The synergy effect would be considerable. Also the town of Aakirkeby was interested, and the municipality had plans to establish a central heating plant based on byproducts from the conglomerate.

Boværk was previously regarded as a technology leader in its field, and the management team had for many years a look of entrepreneurial spirit and willingness to invest in new technologies. However today the activities at Boværk have been reduced considerably, and most of the plant is rented to a feed mill (Bornholms Andels Foderstofforsyning – BAF).

##### Johannes Dam og Søn

Johannes Dam og Søn is a family company. It was founded in 1885, and has been owned by the same family in five generations. The only production is rye-biscuits that are produced on the basis of a secret recipe inherited through generations. The quality is outstanding, and the product has received many national and international rewards. The products are sold in Denmark and exported to Sweden, France, Switzerland and Germany. The marketing function is out-sourced to a wholesale dealer (Bornngros).

The rye flour is milled at the local mill (Bornholms Valsemølle A/S in Aakirkeby) and the cereal grain is purchased through the local grain merchant – BAF. The company has very specific quality demands concerning the grain. Demands which not always can be met by BAF. The company is a small customer in the eyes of BAF, which in practise is the only importer of grain, therefore it is sometimes difficult to obtain the right flour quality.

The annual turnover is approximately 7 million Dk kr. (1 million €), and the company has 10 employees.

The owner has concrete plans for expansion of production leading to new working places. He is, however, to a large extent reliant on external capital, and he has not yet been able to raise the necessary capital (approximately 2 million kr. – 250.000 €). The necessary technical know how is achieved through the machine manufacturers and through consultation with technological development centres.

#### Allara

Allara was founded approximately two years ago, and the turnover is still very modest. Allara is selling high quality rape-seed oil produced at Bioraf Denmark Foundation's pilot plant. Allara buys the rape-seeds from BAF, and the seeds are processed at Bioraf Denmark's pilot plant. Allara receives the oil in bulk and taps it on bottles in its own bottling plant.

The company is still in the expansion phase, and it is a family company with only one employee. It has however already received its first award ( five cooks caps) for outstanding quality, and the product is now sold in most parts of Denmark. Allara is financially weak, and further expansion is totally dependant on whether it can get access to external capital or not. Another barrier is high transportation costs to the major markets (big cities).

The rape-seed variety influences the taste of the oil, and it is not always possible to purchase the most optimal variety. Allara is in this respect in the same situation as the biscuit factory. It is a small customer, and therefore reliant on, what BAF has in stock. The oil cakes are sold as fodder either through BAF or directly to farmers.

#### Bornholms Valsemølle A/S, Aakirkeby

Bornholms Valsemølle produces wheat- and rye flour. It was established in 1867, and it is today still owned and managed by the same family (third generation). Both production and profit are modest. There are 9 employees, and the management has no plans for expansions. Approximately half of the yearly profit is used for modernising the plant. The management has no need for external help such as access to financial advice, technological knowledge, marketing etc. The mill has access to technical know how through the companies who produce the equipment that is being bought in accordance with the modernisation scheme.

The mill produces various qualities of flour. The best flour is produced from durum wheat, grown on Bornholm by organic farmers. The climate and soils on Bornholm are excellent for growing of wheat, and the quality can be very high. Bornholm is the only locality in Denmark, where durum wheat can be grown in satisfactory quality and yield.

The grain is bought through BAF, who purchases the grain from local farmers and also imports grain from, primarily, Germany. The mill has no storage facilities for grain, and therefore it is stored in the grain storage at BAF. BAF also buys the by-products from the mill (bran).

The majority of the flour is sold in sacks through a retailer, however a minor proportion of the top quality flour is packed in 2 kg bags by the mill itself and sold (locally) as the mill's own brand.

#### Baltic Board

Baltic Board was established in 1973 on the initiative of the director of Boværk and Bornholm.

Baltic Board produces thin, paper coated, chipboards for the furniture and building industries. The process is continuous (calander rollers) and the plant was in the beginning of the seventieths rather advanced. The press itself is somewhat similar to a paper forming machine, and it was expected that the production process would be much cheaper than for production of traditional chipboards. There is however one serious disadvantage, namely that the plant can only produce thin boards (up to 8 mm thickness). To this comes that the quality is not outstanding in any way. This limits the market possibilities considerably. As raw-material is primarily used wood from the forests on Bornholm.

Baltic Board has for many years had financial problems. The bulk of the production is exported mainly to the UK. The competition is tough, and the only sales parameter, the company has, is price. It would be very costly to improve the quality of the boards, as this presumably would imply the installation of a new press, which is the most expensive equipment in the plant.

Baltic Board was recently (for the third time) reorganised and new capital has been found.

Entrepreneur, who has considered to start production on the island  
George Mhlanga has a master degree in agronomy from the Danish University of agriculture. He has developed a process for production of flocculants ( pectic substances) from by-products from linseed oil production. The flocculants may be used for water purification, and the municipality of Copenhagen has expressed interest in using his product in their water purification plants.

George Mhlanga has received financial support for the preliminary development work from public and private funds, and the process is now so far that he is negotiating with commercial companies on establishing of a commercial production unit.

He has co-operated with Bioraf, who has pilot plant facilities suited for his production. Bioraf has produced test batches intended for the further testing of the market.

Mhlanga is interested in a further co-operation with Bioraf and would like to establish his processing plant on Bornholm. He has not been in contact with the local innovation centre and is not aware of the innovation tools available on Bornholm.

Mhlanga has however no intention to move his family to Bornholm. His wife is also an academic, and she wants to continue her academic carrier, which presumably would be difficult on Bornholm due to lack of jobs, where her qualifications are needed.