1. Regional development- Why do some regions perform better than others ?

The Basan survey has, not surprisingly, found that there are very big differences in the development of the regions around the Baltic Sea. Most 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 in Sweden, Oulu in Finland, Estonias, Latvia, Poland, 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 far north in the Bothnia Bay. However in all three cases their strong position has been built up during several years.

Regional based industries belonging to strong clusters tend to be long-lived and to be able to cope with pressure from outside. However history also shows that previously flourishing regions can loose the dynamics totally and become a hindrance for new developments (example: Lolland-Falster page x). Long-term cluster-dynamics requires an intensive external interaction through international markets and an ability to attract dynamic entrepreneurs.

In the context of Basan it would be of importance to know, why certain regions show radical changes in their development patterns, and to know how a positive change can be initiated.

q What is needed to establish expansive clusters in a region? (cluster perspective page x).
q How important is the access to knowledge (universities, research centres), the presence of dynamic companies and an efficient public innovation strategy ?(Triple helix perspective, page x).
q How important is the geographic location?
q What are the other important factors ?

Internationally there are many positive examples of changes in the development patterns of individual regions. The most famous is perhaps the transition of Silicon Valley from a farming region, specialised 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 Massachusetts state in the USA puts much emphasis on the creation of clusters as a means of regional development. They stress that a cluster in order be become successful should include not only industry, but also a network of supporting organisations that help create a climate for successful business competition: Universities and research institutions, banks and specialised financial institutions, consulting services and so on.
(The triple Helix model)

In the Baltic Sea area the Uppsala Biotech Valley case is a good example of cluster dynamics:
The Uppsala cluster, "Uppsala Biotech Valley", was originally centred around the large pharmaceutical company Pharmacia and Uppsala University. In 1993 Pharmacia was fusioned with an American company – Upjohn. The whole management and R&D were moved to the USA. However, the cluster survived, and it has now become more diversified with many new small research-dependant companies, of which some have been set up by former Pharmacia employees.

The closedown of the old innovation-system forced scientist, entrepreneurs and investment funds to build 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 creation of local network and infrastructure. And it has been possible to attract international companies within biotech and IT.

1.1.Innovative clusters as a regional development tool ?
The cluster model derives from the works of the Harvard professor Michael E. Porter (M.E. Porter,1990, The competitive advantage of nations. London and Basingstoke: Mac Millan). According to the report "Innovative Clusters in Sweden" (Daniel Hallencreutz and Per Lundequist, NUTEK,2001) 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".

The cluster perspective has become to be a means of working with national and regional

development. It is a process-orientated way of working that aims to better utilise a regions development potential.

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

There are many examples of successful regional clusters in Europe, of which some are situated in Baltic Sea countries. However only very few are based on food/agro-industrial activities.

Examples of successful Baltic Sea clusters in the Life science area are:
q The biotech cluster in Umeå, Sweden
q Västerbottens Woodworking cluster in Sweden
q Medicon Valley in Sweden/Denmark (the Øresund region)
q The biotech cluster in Oulu, Finland

The only example of a large regional food cluster, we have been able to find, is in the Parma region in Italy, where more than 200 small and large companies are producing ham. The Scottish Food and Drink Ass. has set up a "cluster strategy" towards the year 2010 called "Scotland's Food and Drink Cluster" involving the whole of Scotland. It includes primary production, basic processing, value added processing, retailers and end users, including service functions and research institutions.

Examples of "micro-clusters" can be found on the two Danish islands – Lolland and Falster (page x). 25 owners of cherry plantations have e.g. created a "production cluster" delivering cherries to a local juice producer. There are also micro-clusters of:

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

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

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

An example of a dispersed agro-industrial cluster is the lavender cluster in the xxx region in France. This cluster is totally dominating the European lavender oil market, and it includes both primary producers and processing companies. 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 sharing experience. 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.

1.1.1.Potential agro-industrial clusters in the Baltic Sea region
As mentioned there are very few examples of food/agro-industral cluster in Europe and none in the Baltic Sea region. There are however some obvious candidate sectors, where cluster creation could be beneficial for the Baltic Sea regions. Potential clusters are:

q Green energy
o Solid fuels
o Liquid fuels
q Functional foods
q 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 is very much different from what is required for the liquid fuel production.

As mentioned in section x the potentials for fuel production are considerable, and there are also large potential markets both locally and in the neighbouring countries. Solid fuels (e.g. pellets) are often produced in small units, the production may be labour and energy demanding and poor logistics increase the production costs (page xx).

A solid fuel cluster might focus on logistics, exchange of knowledge and skills on wood waste utilisation, growing and harvesting of energy crops (page x), and joint marketing and distribution.

Liquid fuels, bio-diesel, may also be produced in small units (page x), even on farm level, and the product will most often be sold locally. However large biodiesel plants do exist in the Baltic Sea area , and new are under planning (page x). Bio-ethanol plants must for economic reasons 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 with not only food technology, but also clinical tests and food analysis.

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

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

The network of excellence should be designed to strengthen excellence on a particular research topic by networking together 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.

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

There are only few of such centres in the Baltic Sea region. Alone they are scientifically relatively weak, and they have limited international influence (below the critical mass of resources). But together they would form a strong scientific and technical 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 upon this knowledge and the many discoveries and ideas developed through EU and national programmes.

Also here the local bio-industrial institutes have an important role to play. They have jointly the capability to transfer the internationally generated know-how into practical applications in the Baltic Sea area.

It is often so that innovations processes including research and development, are inspired by international impulses and should have an international market orientation. (Example: EU research programmes). It is however on the local level that the research and development results are transformed into commercial productions, often by individual entrepreneurs (examples: Bioraf and Camolina, pages x and x).

Global R&D projects like most EU projects, where institutions and companies in a number of

countries work together requires a constant competition between national units and hidden agendas, where participants from one organisation is more interested in the benefits for their own organisation than in contributing to the overall research goal. Real quantum leaps are created in small close groups with a dynamic leadership closely linked to local partnerships.

1.1.3.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.

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.

Still according to Hallencreutz and Lundequist the following traits are common to most cluster creations:
Cluster animators.
In order to initiate and carry out a cluster strategy it is necessary to charge one or several individuals to act as "cluster animators". These individuals – entrepreneurs – can come from the business society or public sector. One of their most important characteristics, however, must be that they have the capacity to act as "netwokr brokers" between different sectors and party interests.
An advisory board should be created.

Support competence and skills development
A fundamental precondition for success with cluster initiatives is that the cluster's system for maintaining specialised skills and expertise is secured. Thois support system may involve niche training programmes for the cluster companies.

Meeting places
Different type of cluster specific meeting places have to be established to strengthen unity, increase exchange of experience, facilitate development of specialised skills etc.

Division of labour
It is essential that different players identify their strong areas and thus work in these areas to contribute to the development of the cluster.

Brand building
A cluster brand must be developed to strengthen the competitiveness of the cluster companies. The bran will three functions:
q Strengthen the attractiveness for new investors, venture capital and cutting edge skills
q Function as a unifying force for the cluster participants
q Complement to the cluster companies own marketing effort.

Cluster vision
It is essential to create a widely based vision of a regions future to be used as a platform for a cluster strategy.

Focusing on cluster-specific preconditions
Focus should be put on strengthening the existing regional competitive advantages and to create resources and capacities that will facilitate the development of innovation.

1.2.Regional impact of research. University – industry co-operation
1.2.1.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. The State and Quality of Scientific Research in Finland, The Academy of Finland , Helsinki 2000).

Good examples of regional impact of universities are provided by the regions of Oulu in Finland and Luleå in Sweden (see page xxxx). 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 (Luleå and Oulu) build their success on high tech sectors such as biotechnology and information technology. These emerging sectors are crucial as engines of economy-wide innovation, and for these regions. They may also play a role in the development of rural areas in general, as spin-offs from these disciplines no doubt could lead to new business opportunities even in the agro-industrial sector (see page x). It is however hard to imagine that these high tech disciplines will ever become an important part of the solution to problems in rural areas in general.

1.2.2.The regional food industries and bio-based non-food industries

Regional innovation policy, which focuses too much 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 must larger scope as locomotives for development of rural areas in general than high tech areas like information technology and biotechnology..

The bio-based non food industry is more complex including traditional industries such as textile industries, paper industries, cosmetics industries, and new industries such as solid fuel industries and biodiesel and bioethanol producers, producers of plant extracts for dyes, flavours, pharmaceutical etc. To this may be added emerging areas such as molecular farming (page x). Some of these areas are high tech areas including both biotechnology and information technology.

1.2.3.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 however scarce in the regions around the Baltic Sea.

Unfortunately the population basis in most of the remote regions in the Baltic Sea area 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 to universities, and as very few universities exist in the rural areas, science parks are not the solution. Part of a solution might be that the few existing regional food and non-food research centres in the Baltic Sea area 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 x).

A few examples of university – industry co-operation in the agro-industrial area can be found in Europe, as is mentioned in section

1.2.4.Capacity to absorb new knowledge

The supply of new knowledge from universities and research institutions is thus probably necessary, 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. (see page xxx).

Innovation is a very complex process involving interactions between 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 developing of new biotechnological tools have increased the potentials 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 to businesses than the underlying technologies themselves.

1.2.5.The public environment
Finally there must be a legislative and fiscal environment, which places no unnecessary obstacles in the way of entrepreneurial activities. (see page xxx).

1.2.6.Triple Helix
Triple Helix is a model to analyse the interaction between university, commerce and local policy (Jan-Evert Nilsson and Åke Uhlin: “Regionala Innovationssystem, Vinnova rapport VR 2002:3, march 2002)

Fig x: The triple Helix model

There are two types of Triple Helix models:

One model is assuming that the three spheres are three independent institutions interacting across their institutional borders. The interactions are managed through specifically established units. Typically a university would establish a contact secretariat or a business incubator. The assumption is, that innovations follow a linear model from basic research through applied research to product development. The university will focus on a transition of new knowledge to market relevant innovation.

The other model is based on the assumption that the three spheres are overlapping. This model is becoming more and more popular, and there are many recent examples of universities that have taken up tasks that previously have been performed by commerce or the public authorities. Many universities have built science parks including commercial companies. Some universities have established companies that have the objective to help the university scientists commercialise their results. In other cases the universities have established holding companies in order to be able to participate as owners of spin-off companies. It is also more and more common that universities are engaged in company-financed research. The change in the functions of universities that is seen these years is almost revolutionary. The universities are more and more becoming an integrated part of the economic development of regions. In the Baltic Sea area Sweden is in the forefront. The Swedish Parliament has thus given universities a third role – besides the traditional education and research – to contribute to the development of society.

The second Triple Helix model is so far mainly applied in technical and business oriented universities (e.g. Oulu university in Finland, Lunds university and Luleå technical University in Sweden etc.). The most well know and most studied are the MIT and Stanford universities in USA. To our knowledge very few agricultural universities in the Baltic Sea region and in Europe as a whole, are applying the Triple Helix principle. An exception is the Agricultural University of Wageningen in Holland that a few years ago fusioned with a semi-commercial agro-industrial research centre (ATO-DLO).

In Denmark the agricultural research centre “Foulum” has established a science park for newly established agro-industrial companies and the centre’s own researchers, who would like to commercialise their research results. The science park has now existed a few years, but the

success has so far been very limited.