Roadmap for ICT solutions for rural areas and maritime regions

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WP3: Business models

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CONTENT

9. CASES FOR BUSINESS MODELS

Rural Wins is a thematic network for R&D in the 5th framework programme. Rural Wins project was started July 1, 2002. The objective of Rural Wins is to produce a roadmap for broadband in rural areas. Rural Wins also will gather a group of professionals in different areas into a larger constituency (LC) to give advice on future priorities in the 6th framework programme. Persons participating in Rural Wins LC will have strategic competences in area ICT or from being politicians or officials in rural areas. Members of LC will be offered participation in seminars and workshops and will gain access to internal information on broadband and on ICT applications.

Rural Wins has 30 participating organisations. More information about Rural Wins can be found on www.ruralwins.org

The roadmap, to be produced will contain two business models for broadband in rural areas and maritime regions. In this annex we present cases that are the underlying information for the report on business models. The cases are:

- Development of broadband through a conscious strategy for regional development in the region of Extramadura, Spain
- Infrastructure dark fibre in a remote rural area – Sorsele municipality, Sweden
- Infrastructure dark fibre in integrated and intermediate rural area – Stokab in Stockholm archipelago, Sweden
- Infrastructure satellites for farmers and forest owners – Tiscali and LRF
- Infrastructure ADSL in a remote rural municipality – Skanova in Överkalix, Sweden
- Wireless LAN in Nora villages, an intermediate rural area, Sweden
- Wireless LAN in Salvatierra-Agurain, in the Basque region, Spain. An intermediate and integrated rural area

Broadband services which we describe are

1. Delocalisation
2. Call centres
3. eLearning
4. Food safety

In the report exchange rate for August 2002 has been used instead of the rate at the time the investment was made, which would have been the most exact method. The difference is, however, negligible. In August 2002, the exchange rate for €1 was 9.2235 SEK.

A. INFRASTRUCTURE

10. CASE 1: EXTRAMADURA REGION, SPAIN

10.1 BACKGROUND

The region of Extramadura is an example in which broadband is being developed through a conscious strategy for development of the region.

Extramadura is located in the south-west of Spain. The region has a surface of 41 634 km^2 and 1 070 244 inhabitants with a population density of 25.7 inhabitants per km^2. Compared to the Swedish cases the region has similar population density as Nora (which has 16.8 inhabitants per km^2). In the Rural Wins typology, the area can be considered as an integrated and intermediate rural area.

In Extramandura there are 382 municipalities, each smaller than most municipalities in Sweden. Another difference is that municipalities in Sweden have the right to tax citizens, and most taxes collected are for municipal services. These facts influences how broadband can be facilitated.

10.2 TECHNOLOGY

When development in Extramadura started, the technological prerequisites were:

- Minimum deployment of cable
- ADSL was available to the city population on an average level but hardly available at all in the rural areas. Per inhabitant ADSL was available for citizens in Cáceres (33%), Badajoz (16%) and 51% had no ADSL. In most municipalities, 90% of the inhabitants had no access to ADSL.
- Local Multipoint Distribution System (LMDS) was almost nonexistent
- Mobile telephone had good coverage

In 1997 Extramadura started working on a regional strategy for an information society for Extremadura (Infodex European Project). In 1998 this resulted in a proposal by the president of Extremadura's regional government on a strategy for a regional development model, taking advantage of the possibilities offered by the New Information and Communication Technologies (NICT's). In 1999 a director Strategic Plan for the Development of the Information Society in Extremadura was created. The plan included programs in telecommunication, administration, education and businesses. The Extremadura Autonomous Government supported development of the strategy.

10.3 INFRASTRUCTURE

The technological framework includes investment in an intranet in Extramadura. The strategic plan includes a plan for development of information society and setting up of an advanced telecommunication service infrastructure aiming at modernising:

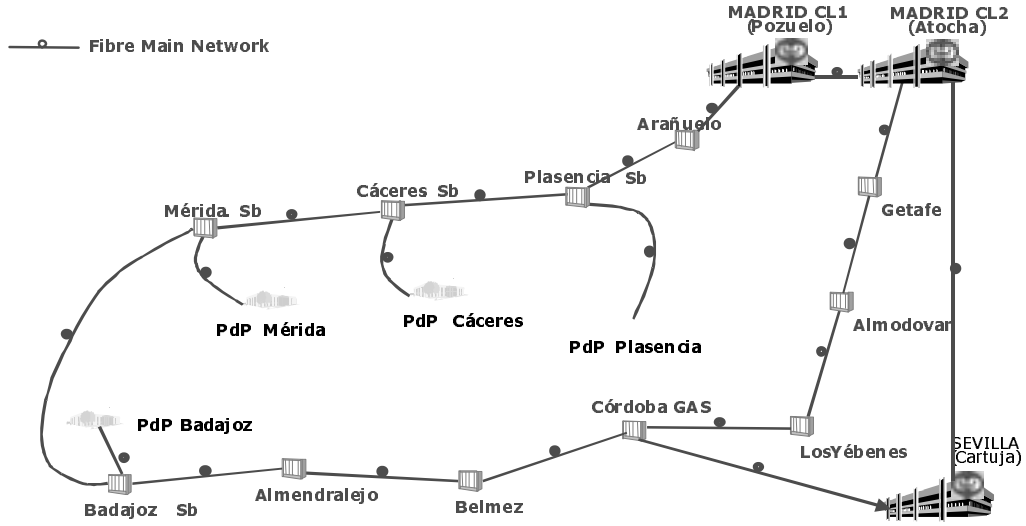
- Administration (administrative virtual network)
- Education centres (education technological network
- Health system (health system virtual network)

The objectives of the investments are to guarantee interconnection and to facilitate technological literacy providing advanced telecommunications infrastructure and articulating socio-economic development. The objective is to offer an advanced service network with the following characteristics:

- Voice services: Connection of all the administrative buildings, education and health centres
- Data services: Connection of 1,478 points in administrative and education buildings (first phase). The minimum broadband is 2 Mbps at all points.
- Mobile telephone service: A coverage of more than 90% of the population was requested, with messages services, integration in the data network and migration to GPRS and UMTS

A competition for broadband was arranged resulting in Retevision S.A. being awarded the contract to provide broadband and mobile telephone services being awarded to Telefonica Servicio de Mobiles.

The applied technology
Project by the Extremadura Autonomous Government



The applied technology
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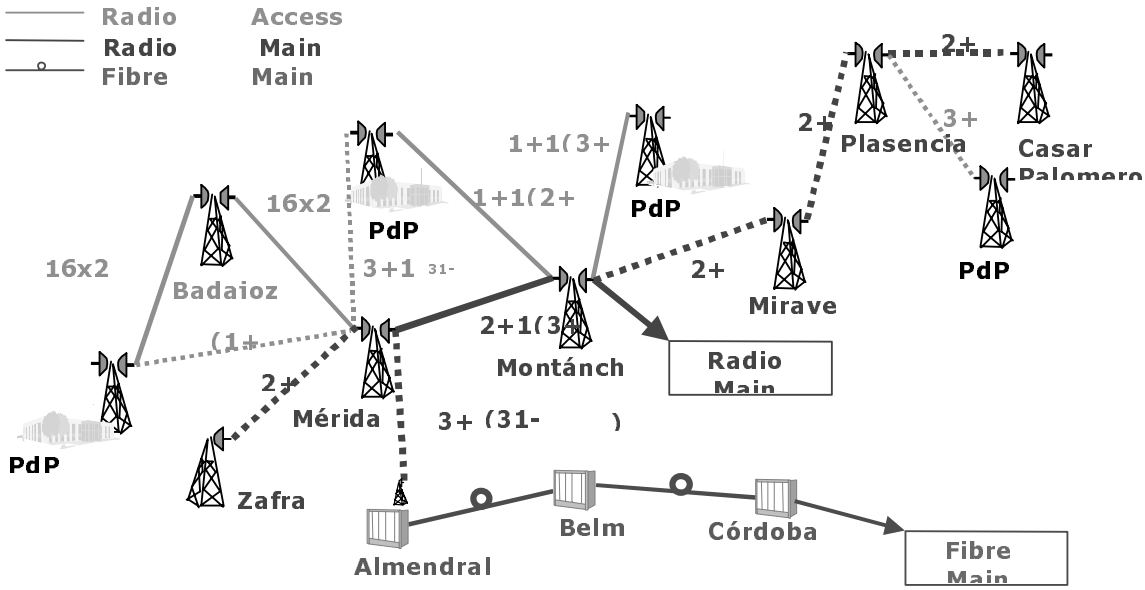


10.4 PRICING AND FINANCIAL MODEL

Unfortunately there are as yet no pricing or financial models available from the Extremadura case, as the strategy covers a whole region and is yet not completed. The interesting issues with Extremadura is not the cost for various plans but that an entire region has set in action a strategy to obtain broadband and achieve a multiplier effect of the actions and initiatives.

Another important effect is that more than one hundred partners participate, among them trade unions, professionals, SME- and social associations, enterprises, telecommunications operators, province and local institutions, and the Regional Autonomous Government.

11. CASE 2: DARK FIBRE IN SORSELE

11.1 SORSELE, IN VÄSTERBOTTEN COUNTY

The rural municipality Sorsele is situated in Västerbotten County; the population centre of Sorsele is situated exactly 1 000 kilometres from Stockholm.

The number of inhabitants is 3 095 (2002) out of which 45% lives in the population centre of Sorsele. Other centres are Blattnicksele, Gargnäs, Ammarnäs. The municipality has an area of 7 493 km^2, which results in population density of 0, 4 inhabitants per square kilometre.

The climate can be very hard during the winter with temperatures down to –40 C and more than 1, 5 meters of snow. Summer can be very warm with temperatures up to 27C. Sorsele is very close to the Artic circle, which gives light summer nights. At midsummer it is light day and night.

The population in the municipality has diminished during the last 40 years and there now is a population bulge of the 45 to 64 age group. As in all rural communities, the percentage of women in the population is low.

Most municipal buildings are situated in the population centre Sorsele. Schools and fire stations are located in Sorsele, Ammarnäs, Blattniksele and Gargnäs. The health care centre and emergency ward is located in Sorsele.

11.2 SMEs IN SORSELE

Sorsele municipality has a well developed sector of small and medium sized industries (SMEs) with enterprises in every village. The main industry is production of high quality pinewood flooring in Sorsele. The main municipal offices are located in the population centre Sorsele. In the village

Gargnäs there is an electronic plant with production of cables in Russian (Murmansk) and in Lithuania (Riga). Both plants had to reduce production during the recent years.

Sorsele Municipality is the most reindeer dense municipality in the county. Rans and Grans Sápmi-villages have reindeer in the municipality and a large number of persons are working as herds. A food plant has been set up to process the reindeers. The village Ammarnäs, located in the Vindel mountain reserve, is known for its reindeer herding and small-scale ECO tourism.

Tourism in Sorsele municipality offers riding (Iceland horses), dog sledge driving, fishing, hunting, scooter driving, and skiing on the programme.

The basic industries (agriculture and forest) have always been of great importance for the economy in Sorsele. Sorsele has been adversely affected by the structural changes in agriculture and forest industries that a large number of the citizens have moved south.

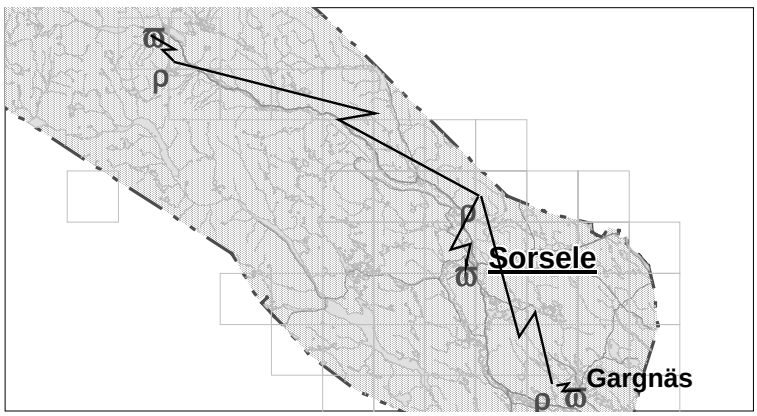
Now days the agricultural sector is limited by the climate and distances to markets; farmers produce mainly milk, potatoes and vegetables. A large number of small enterprises process the products.

In the near future, a gold mine is planned at Ersmark mountain (Blaiken mine), and a car-test facility is under development.

11.3 DEVELOPMENT IN SORSELE

11.3.1 ICT DEVELOPMENTS IN THE COUNTY 1996-2000

The County of Västerbotten started ICT through an extensive development of regional broadband network, AC net, in 1996. The AC net was financed by EU Structural funds and by the County administrative board. This network connected Sorsele municipal administration with other administrations in the County through a logical network with many operators. Today the municipalities, county council, County administrative board, and industries in the county own the AC net in a shared limited company. Today the capacity of this AC net is far too low.



11.3.2 PRESENT DEVELOPMENT – "FIRST PHASE 2001-2002"

The present development was made possible by central government funding of broadband access. The first ICTdevelopment plan was decided upon in 2000 revised in 2002: "Local ICT-infrastructure programme 2002-2010 for Sorsele Municipality". The municipality received support of €8 673 for making the programme.

The programme outlines an Interurban network for the municipality and local and area networks in the population centre: Sorsele, and in the villages Gargnäs, Blattnicksele and Ammarnäs. It also outlines future development in the rest of the villages down to population centres with 10 inhabitants.

During 2002 building of the first phase was started. The municipality had to choose between using an external operator's network or building its own networks, but building its own networks seemed more cost efficient. The cost of building the entire network will be the same as renting a network between Sorsele-Gargnäs for 5 years. The cost for present development amounts to 30% for the interurban network and 70% for the local and area networks.

Sorsele municipality rents space on electricity transmission poles from the electricity distributor Vattenfall he broadband network being hung on the pole timber besides the electricity lines. The pole timber is rented during 25 years at a cost of €6 505 a year. The municipality is responsible for hanging the broadband network and finances this with governmental support. The cost is €1.25 per meter net for a total of €151 786 for 100 kilometres.
The cost to excavate the cable in the local and area network is double that amount.

The cost for the network amounts to	
Population centre Sorsele	672 196
Central parts of Gargnäs	108 419
Central parts of Ammarnäs	140 944
Central parts of Blattnicksele	151 786
Extra	32 526
Total	€1 105 871

The rest of the cost is for the Interurban network. The total budget for present development of the Interurban network and for the local and area networks in Sorsele, Gargnäs, Blattnicksele and Ammarnäs amounts to €2 602 049. Added on that are €325 256 for connections to Norrbotten County (phase 2).

11.4 FINANCING

The interurban network is financed by:

The county administrative board	21 684
The county council	3 614
Sorsele Municipality	63 092
European Commission Structural funds	54 789
Swedish national government	1 149 629
Own contribution with work	22 406
Total	€ 1 315 213

The local and area network in Gargnäs, Blattnicksele, Sorsele, and Ammarnäs has been financed by:

The county administrative board	21 684
The county council	3 614
Sorsele Municipality	63 092
European Commission Structural funds	54 789
Swedish national government	1 149 629
Own contribution with work	22 406
Total	€1 315 213

11.5 THE CUSTOMER

The fee for connection to the network varies for households and Sees. Households pay €339 in a fixed fee and is imposed work by the village cooperative during the connection phase. The village cooperative undertakes to carry out one/some of following tasks:

- Information and organisation of the village cooperative
- Collection of applications of interest
- Settlement agreements
- Digging and canalisation of fibres
- Welding and connection of end equipment. Own work is valued to €17, 89 an hour (Swedish values for work in Structural fund projects). Broadband operation fee is set at €27 a month and will hold for households for 5 years.

Connection fees for SMEs vary depending on circumstances. Monthly fee for SMEs vary with quantity of data and other prerequisites and will be from €434 – €27 per month. For single owned enterprises with minor data quantities, operational costs will be similar to those for households.

During 2001, 70% of the households were offered connections to broadband and a large number accepted, including older residents. During 2002 a further 10% of households will be offered broadband connections. Connections for the Sápmi is solved with a radio transmission linkage between Sorsele and Ammarnäs. This link does not have the same capacity as fibre broadband connections. Thus far there are no connections for reindeer herders of and for tourists in the fells.

11.6 DEVELOPMENT AFTER 2002

Development of broadband networks at present at the break-even level. Operation in future will require increased funding or higher prices for the users. In near future, a regional ICT infrastructure program will be developed with recommendations on:

- Important “routes” with special requirements
- Connections created for redundancy, i.e., reserve routes
- Connections with special requirements for instance fibres

The picture shows the commercial network in Västerbotten County (thick red lines) and suggestions for Interurban network (thick blue lines). Sorsele Municipality is situated in the left upper corner. The suggested interurban county network is thick blue vertical lines. The creation of the network allows for connections and redundancy with Norway.

For a rural municipality like Sorsele, development of broadband will mean that more than 500 of the best telecom customers are likely to switch from fixed telephone line to IP telephony. It is likely that no fixed telephone lines will be built in villages in future. Whether the development of GSM and building of 3G will fill the gap between broadband and fixed telephone lines is an open question for the moment.

11.7 BROADBAND SERVICES

There are no special “Sorsele” services apart from Sorsele Municipality homepage, and most enterprises have their own homepages. The municipality finances an Internet café and has a qualified search service at the library. The municipality plans to encourage service providers to create more services for the area.

Today the broadband is being used by the schools in Sorsele, Gargnäs and Ammarnäs, all of which have good computer training on their curriculum. In Ammarnäs the pupils are offered training in all three Sápmilanguages; north Sápmi, Lule Sápmi and south Sápmi on the Internet. Grammar school students in Ammarnäs work one day a week from home with computers and commute to Sorsele the other four days.

In Sorsele the University of Umeå offers distance training at college level for engineers.

Training of residents in use of ICT and Internet has been carried out by the Citizens Adult Education Associations. No data is now available on how many persons have attended these courses. The impression is that most citizens have learned by doing and by support from neighbours.

11.8 CONCLUSIONS

The following factors ought to be stressed for success in development of broadband in rural areas.

- Government funding to finance development
- Coordinated planning process in which the county has played an important role and supports ICT specialists (IT-Västerbotten)
- Authorities in the county coordinating requirements and municipalities using a collective procurement
- Teams in each municipality sharing experiences over municipal borders, allowing use of different competences.
- Municipal ICT development plan focusing on development and customer perspectives and not on technological solutions
- Sorsele municipality having short way between suggestions and decisions. Political principal issues have been decided upon by the municipal council and operational decisions by the municipal committee
- Sorsele municipality having had an opportunity to test broadband by participation in the municipal network AC-net that was financed by the county administration board and the European Commission. During that period, officials and politicians had a chance to develop their own ICT competences.

The following problems still are to be solved:

- The operating cost of the broadband network
- Effects on market for fixed telephone and for GSM and 3G when the most affluent customers leaves the network for broadband
- How the last 15-20 % of the residents will be connected after 80-85 % of the village population is connected is an open question. The financial issue and cost for this is also open.
- Development of broadband influences distribution of income and wealth in the municipality by affecting prices of houses.

12 CASE 3: DARK FIBRE BY STOKAB IN STOCKHOLM ARCHIPELARGO

12.1 STOCKHOLM COUNTY AND STOKAB

Stockholm County consists of 26 municipalities, the most prominent being Stockholm city. Within the county, both integrated and intermediate rural areas are represented in the archipelago, with its 25,000 islands.

The city of Stockholm owned a cable TV company, which was sold to Singapor Television (today owned by UPC). When the cable TV company was sold off, the infrastructure was retained, and in 1997 the city identified needed telecom services to schools and hospitals.

Stokab was given a municipal monopoly to be responsible for all broadband within the City border. Being a municipally owned company, Stokab is obliged to follow the laws for all municipal companies[1] which does not allow Stokab to discriminate between their customers according to the princip of equal treatment and to make no more profit than the long interest rate on the business according to the at-cost principe.

The monopoly within city borders was mainly initiated for practical reasons; most areas where broadband is developed can only host a certain quantity of fibre since only a certain amount of space is available in sewage systems, electrical networks, district heating networks and metro tunnels. As an alternative to constructing their own networks, operators are offered to leases fibre in Stokab's network in the desired topologies. Dark fibre may be regarded as "raw material" in the operator's product range and imposes no limits on the services that may be offered.

Today Stokab has approximately 60 operators as customers. They can be broken down into the following primary groups: telecom operators, Internet operators, cable TV companies, mobile telephony operators, and network capacity operators. If all of them were to have claimed the right to build their own network, the city would have become a permanent ditch.

[1] The Local Governmental Act regulates municipal utilities and other enterprises. The legislation is based on four main principles; siteing principle, equality principle, at-cost principle and the principle of public access to official records. The at-cost regulation was set up for all municipal utilities to prevent them from overcharging their customers. Municipal companies therefore can not set prices that gives them more return on own capital than the long interest rate. The legislation was introduced decenniums ago to ensure that municipal utilities did not overcharge their customers.

Many of the major market players work within most of the areas stated above, while other companies are more niche-oriented in different customer segments, geographical markets, or services.

Service now has been extended to most municipal centres and other densely populated and commercial areas. Stockholm County has a vast archipelargo with more than 25 000 islands. In the terminology of Rural Wins project, the islands make up an integrated rual area and to some extent intermediate rual areas. Today Stokab has supplied most islands with broadband connections. This development has been possible by financial support from EUs Structural funds and by development aid to islands by the county administrative board. Most of the funds has come from turnover on city operations.

Today Stokab operates 1 000 000 kilometer of fibre, which is the largest broadband network in a single area.

12.2 DARK FIBRE

The broadband infrastructure is of optic fiber that is produced by glass from silicon sand. By leasing several connections with the same and/or different delivery points, the customer can create its own network in various forms (point-to-point, ring, or star structures). Fibre-optic connections can be provided in quantities from a single pair and upwards, but only in pairs.

Redundant connection: The connection has different routings in addition to the connection to the property. Fully redundant connection: The connection has different routings even in the access network to the respective property. The connection is normally provided at a delivery point in the block or property where it is possible for Stokab to establish the network. Long distance connections may require amplification along the routing. Upon request, Stokab also provide space for such repeater equipment.

12.3 BUSINESS MODEL

Stokab's operations are characterised by four basic elements:

1. Dark fibre
2. Independent ownership
3. Telepolitical focus
4. Regional development

Stokab´s business model include development and operation of the fibre-optic network in the Stockholm region where optical fibres are leased to operators and end customers. Stokab's customers obtain exclusive use of their "own fibre-optic infrastructure".

Stokab's business is limited to dark fibre, i.e., fibre without active equipment. This makes it possible for Stokab's customers to assume responsibility for the electrical equipment required for the transmission of telecommunications and data traffic. In order to maintain high network accessibility, network service is available 24 hours a day, 365 days a year.

Some of the islands in the Stockholm archipelago also have connection points in the network. In addition to operators offering their services via Stokab 's network, most hospitals, major medical facilities, universities, and colleges in the region are connected.

12.4 THE MARKETPLACE

The marketplace is a type of pool or bourse based on trust and openness. The marketplace is called “Meeting Point”, where Stokab's customers can meet.

Currently, a number of industries are represented at Meeting Point, as well as operators, tele companies, banks, ICT-companies, medical companies, media companies, municipalities and county councils.

The uniqueness of the Meeting Point is that it is operated by an independent owner, Stokab. The Meeting Point marketplace enjoys a very high level of security including protection against unauthorised access, alarm monitoring, reserve power, emergency service, and the possibility to obtain 24-hour access. For the sake of order, Stokab installs power equipment, alarm monitoring, and all racks.

12.5 PRICING MODEL

Stokab´s pricing model is to some extent independent of distance. In most parts of the city, the customer pays a “crow´s flight” distance.
where crow flies. In the archipelago and other rural parts of Stockholm County, the price model is based on a subsidiary, so the price is not altogether dependent on distance. In the archipelago the households and SMEs therefore do not pay the cost of broadband; instead some of the cost is carried by city customers.

The list price is normally applied in conjunction with pricing of connections between different addresses in Stokab's network, up to 20 km. The standard price consists of the leasing fee and a one-off fee. The leasing fee is based upon the distance calculated as a straight line between two addresses in which the metre price decreases as the distance increases. The leasing fee is paid quarterly and determined by the length of the connection. The one-off fee is a connection fee which is paid in conjunction with the first invoice.

A price calculation tool has been developed to make it easier for the customer to quickly receive an answer as to what the estimated quarterly costs would be for a fibre connection.

The fee per delivery point is a quarterly fee paid for each connected delivery point in the ring structure. Each connection has a fixed, quarterly fee irrespective of the length of the connection. The one-off fee is a connection fee which is paid in conjunction with the first invoice.

Stokab also operates antenna sites. Antenna sites can be leased for installation of radio antennae or radio relay links. Indoor technical space or land for the customer’s technical shed is offered in connection to certain antenna sites.

A basic fee for each antenna site (irrespective of the number of units installed by the customer) is charged on an annual basis. The amount of the fee is based on the highest point above sea level at which any of the customer's equipment is located. An additional fee per installed radio relay link and radio antenna will be charged on an annual basis. The fee for a radio relay link is based on the diameter of the radio relay link. The fee for a radio antenna is based on the wind area of the antenna, i.e. the surface on the radio antenna, mast, or stay which is exposed to wind.

12.6 END CUSTOMERS

Companies requiring high data-transfer capacity and efficient and secure communications can lease "their own" fibre-optic connections from Stokab. Because the end customers are responsible for all communications equipment, they benefit from freedom of choice and complete control. This also means that it is easier to influence and change transfer speed and communications technology.

Stokab´s end customers include banks, insurance companies, retailers, media companies, university colleges, urban networks, property owners, computer and IT companies, and other companies that require high capacity.

The areas include:

- Banks that connect their offices via their own fibre-optic networks;
- Companies that connect their various operations and customers;
- Shops that connect their other shops, warehouses, and other operations;
- Media companies that broadcast television programmes, print periodicals, via their own networks;
- Mirroring of data

12.7 THE FUTURE

It can be argued that rural areas that are close to large cities are better off despite all state aid which is allocated to development of broadband in remote rural area in Sweden. To some extent the city of Stockholm has "repeated" the model for deregulation of electricity trade where the company that holds the network concession is obliged to give all final household customers the same price for transmission of electricity despite the distance. This model has a built in subvention from households in cities to households in rural areas. Since no "concession" system was set up when broadband was being developed, this model can only be used where public authorities own the infrastructure, such as in Stockholm.

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It can be argued that areas where the market could make most profit on withdrawal of the monopoly are areas where the citizen's disadvantage from competition (traffic jam from disturbances of work in the streets) is largest. Swedish municipalities have had a pragmatic view of ownership of electricity networks and other utilities. The argument has been that since the network is regulated, there is no point in owning it. Ownership of broadband is more interesting from an industrial policy point of view. By creating the transport network for the ICT industry, a huge market place is set up. If the politicians in the city of Stockholm continue with the present policy if generous outside offers land on their desk is an open question.

13. CASE 4: SATELLITE LRF-TISCALI

13.1 LRF: A FEDERATION FOR FARMES AND FOREST OWNERS

Combined with processing industries, Swedish agriculture provides employment for 270 000 people. In most municipalities outside the major metropolitan centres, agriculture accounts for 10-15% of employment, and much more in many cases. Consequently, the agrarian sector is of major importance for rural communities.

The food sector is an important component of the Swedish economy and employment - the sector is the second largest in the country in terms of production value and the third largest in number of employees. The forest sector accounts for 15% of Sweden's total product exports and is the largest net exporter, with exports valued at almost €7, 8 billion.

LRF is the interest and industry federation for Swedish farmers, forest owners and the agricultural co-operative movement. LRF´s task is to create the conditions for efficient, market oriented and competitive companies. By advancing the economic interest of farmers and developing rural communities, the conditions are also created for promoting and satisfying social and cultural interests. Membership in LRF is designed to provide influence, profitability and fellowship. LRF consist of some 140 000 individual members, along with the 50 incorporated associations that make up the agricultural co-operative movement and 13 industry organisations. The individual farmer is usually linked through personal membership and via membership of the agriculture cooperatives. The cooperatives have approximately 300 000 memberships.

LRF has developed a broadband satellite service for their members.

13.2 START-UP WITH ONE-WAY COMMUNICATION

The first LRF model for satellite broadband was developed by Swepet Satellite AB, a subsidiary of the state-owned telecom operator Telia, in cooperation with Nordic Satellite AB, partly owned by the Rymdbolaget. The Satellite Sirius 3 had coverage all over Sweden and was also used for TV transmissions for Viasats. This satellite was one-way satellite connection. It could be used to download large files and videos but sending documents the other way was not possible. The national telecom operator, Telia decided to withdraw from the satellite offer. After that, LRF made an agreement with Tiscali, an Italian company which offers Internet connections, ADSL and broadband with satellite connections. Tiscali buys the satellite service from Giliat Sat Link.

13.3 TISCALI-LRF SATELLITE BROADBAND BUSINESS MODEL

The agreement between Tiscali and LRF is set up so that LRF offers their members a two-way broadband communication on satellite with incoming max 500 Kbps and outgoing max 140 Kbps at a price of €62 a month. The user also has to pay €59 a year to the Swedish National Post and

Telecom Agency (PTS). The investment cost for the parabolic dish and other equipment is €1 388. The offer is limited to one PC connection per customer.

Since farmers are self-employed they can charge their business for all costs for broadband. Another option is to claim a reduction in taxes, which can be made for broadband investments from the Swedish tax authority for costs above €867.

It is estimated that out of LRF´s 150 000 members 55-60% will not get broadband by ADSL or fixed broadband connections. Among this group Tiscali estimates that 20% are potential customers for the LRF-Tiscali offer.

Competitors to LRF-Tiscali satellite broadband are:

- ADSL connections
- Dark fibre broadband
- 3G and 4G

ADSL and fibre broadband are only competitive in regions where the technological prerequisite is available. Dark fibre broadband is sparsely developed to reach farmers living outside villages. For farmers three opportunities are available; satellite, 3G or normal modem connections.

13.4 TECHNICAL REQUIREMENTS

The technical requirements are a normal PC, a parabolic dish (with a minimum radius of 75 cm), cable model for satellite, and an Internet connection. The parabolic dish must be placed in an open southern spot near the house with the PC.

The quality of the connections with satellite broadband that LRF-Tiscali offers is on a level that it cannot be used for interactive games or similar activities. This means that eDoctors and interactive eLearning facilities and similar services that demand fast connections in both directions cannot be used. The service level is, however, quite sufficient for “normal office use”, to download videos and send pictures.

13.5 SERVICES FOR FARMERS AND FOREST OWNERS

Most services used by the general public and SMEs are also used by farmers and other citizens living in isolated houses. Services specially needed by farmers are

- Maps for forest planning and for CAP funding built on GIS technology
- Websites and networks for farms with shops on the farm
- Websites with promotion of “staying on a farm” a hotel service with a personal touch
- Sites and “ISO” systems for agricultural products and for traceability of products

14. CASE 5: ADSL BY SKANOVA IN ÖVERKALIX, SWEDEN

14.1 BACKGROUND

The municipality of Överkalix is situated in Norrbotten County and consists of a population centre, located 1 000 kilometers from Stockholm, and 12 villages. There are 4 300 inhabitants in the municipality, which has a population density of 2 persons per square kilometer.

The climate can be very hard during the winter with temperatures down to -40C and more than 1.5 meters of snow. Summer can be warm with temparatures above +20C degrees. The Arctic Circle runs through Överkalix, so that at midsummer it is light day and night.

The population in the municipality has diminished during the last 40 years, and today the population bulge at the 45-64 age level. The percentage of women is low per inhabitant.

Most municipal buildings are situated in the population centre of Överkalix, where schools, municipal buildings and fire stations are located.

The dominating employment is in the service sector. Tourism is also important in Överkalix, with fishing, hunting, and scooter driving, and skiing.

14.2 SKANOVA

In 2002 Skanova was commissioned to set up a broadband network in Överkalix. Skanova is owned by TeliaSonera, the leading telecommunications group in the Nordic and Baltic regions. TeliaSonera is controlled by the national state-owned telecom operators in Sweden (Telia) and Finland (Sonera). TeliaSonera's home market is comprised the Nordic countries and Baltic region. TeliaSonera operates under the Telia brand in Sweden and Denmark, under the Sonera brand in Finland, and under the NetCom brand in Norway. In the Baltic regions TeliaSonera operates through subsidiaries and associate companies. In addition, TeliaSonera has mobile subsidiaries in the emerging GSM markets of Azerbaijan, Kazakhstan, Georgia and Moldova, and associated mobile companies in Russia and Turkey.

All network operations for TeliaSonera ADSL technology is included, is handled by Skanova in Sweden (i.e, national backbone network, interurban networks and area networks). Skanova´s customers are both rural and urban municipalities. Within the categories in the Rural Wins project, the technology is available in integrated, intermediate as well as in remote rural areas. Överkalix is a municipality that can be classified as a remote rural area.

14.3 ADSL

The first field trials with ADSL in Sweden were carried out 1995 and large scale field trials continued during 1996 in Sundsvall, Stockholm and Gothenborg. The first commercial ADSL

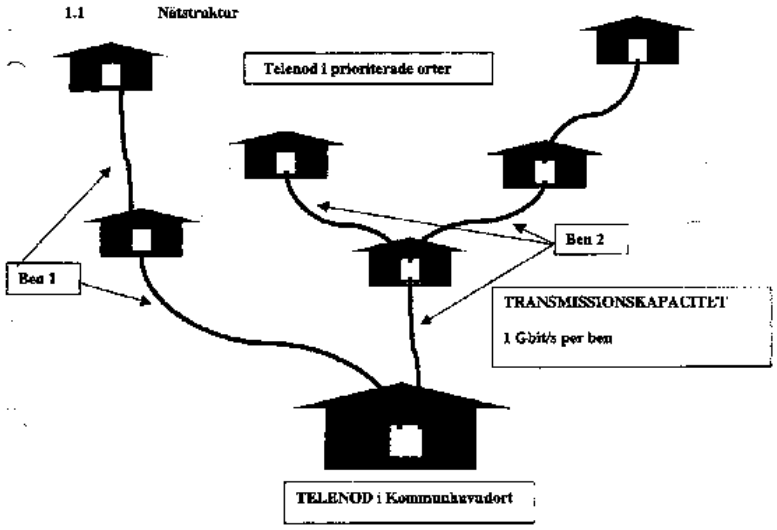
service in Sweden was launched by Telia in 1998. In the end of September 2002, almost 380 000 Swedish households and SMEs were using ADSL. ADSL is a cost-effective solution the users the available infrastructure (telephone lines in copper), no fibre needs to be placed underground and ADSL can be installed in a short time.

xDSL is a family of technologies with a higher bandwidth over normal telephone copper lines. Of these, ADSL is the most commonly employed. ADSL technology can give an asymmetric bandwidth of up to 8 Mbps downstream (to the user) and up to 1 Mbps upstream. The maximum reach of an ADSL-equipped line is normally around 4.5 kilometres, depending on the quality of the copper pair.

The main advantages with ADSL are that it can be rapidly deployed at a comparatively low cost, since the only new local infrastructure is installed at the telephone exchange. As these exchanges normally are connected to the optical fibre network, expensive investments are kept at a minimum. As the exchange usually services a large area, ADSL-services can be offered in a wide area around the exchange.

Compared with Ethernet LAN technology, ADSL is especially favourable in the countryside where the costs for installing a new fibre infrastructure are prohibitively expensive. In more densely populated areas, with high-rise buildings or in dense residential estates a copper-based Ethernet-LAN infrastructure (cat 5 cable) will be more competitive than in the countryside, especially at high levels of penetration. Offering internet services to the last 5-10% of the countryside population will still be expensive compared with the per-capita cost of covering the first 90-95%, but much less expensive with ADSL than, for example, with a fibre network.

ADSL technology is based on fiber with Ethernetswitch placed in the broadband nod which is placed in the telephone stations.The main nod is in the population center in Överkalix and then the network is divided up in different legs.



14.4 POLITICAL CONDITIONS IN ÖVERKALIX

When it was realised that there was no interest from the market to develop broadband in municipalities such as Överkalix, the Swedish Parliament decided that funds would be allocated, and system for state funding of broadband was set up. Decisions were delegated to the county administrative boards.

Överkalix applied for governmental support to develop broadband and was granted funding. Skanova was commissioned by the municipality of Överkalix to develop the Interurban network. To finance the development, structural funds as well as govermental funding will be used.

The figure shows the structure of the ICT network in Överkalix.

14.5 SKANOVA´S BUSINESS MODEL

The business model used by Skanova in Överkalix:

The municipality commissioned Skanova as net operator Skanova developed the network for the municipality. The main network is built with fibre. Between three villages and Överkalix, the network is based on radio link. Connection with ADSL is possible within 4.5 km from the telephonstation. The standard is 520 Kbps, but connections up to 2 Mbps are possible.

Skanova is not offering the ADSL to end customers. After the infrastructure is set up, service providers may make agreements with Skanova and offer their services to the municipality and to the SMEs and households. One of the service providers is Skanovas owner, the telecom operator Telia, which offers ADSL connections to households, enterprises and institutions.

Different technical solutions can be used on Skanova´s network, such as Private Virtual Networks or ADSL broadband, as well as WLAN and LAN-LAN. (WLAN is a number of logical networks which

can be operated in one physical network, and LAN-LAN is communication between different branch offices or schools.)

The tasks that Skanova was commissioned to carry out for the municipality of Överkalix include developing an Interurban network to Överkalix with a capacity of 1 Gb per second connections to 12 villages. The commission also includes development of an area network with ADSL technology to the 12 villages. According to the plan, the area network was to have been set up in March 2003.The connections in the houses would be yet to come.

It is estimated that the area network will be available for up to 90-95% of the population. Almost every household that has a fixed telephone line will have the option to connect. The number of households that ctually will connect will be dependent of what services are available on the net and the cost for the services.

14.6 PRICING MODEL

Skanova charges the service providers who deliver ADSL and other services. These charges have to be competitive with price on other solutions (dark fibre or satellites).

The normal cost for a household to install ADSL (for example, with service provider Telia) is, modem €108, and initial cost for opening a connection €55. Flat rate per month €.

Cost for SMEs at max 2 Mbps is:
Initial cost for opening connection, only access (without modem), €43 excl. VAT.

Access includes Ethernet-modem for connection to the computer network €173 excl. VAT Router-modem access to the computer network inclusive router and firewall, €390 excl VAT.

Monthly charge for the Internet access via ADSL with speeds up to:
0,5 Mbps € 54 excl. VAT
1 Mbps €108 excl. VAT
2 Mbps €184 excl. VAT

14.7 FINANCIAL MODEL

Costs for the network:

Total cost for Interurban network	870 819
Financed by Skanova	84 133
Överkalix municipality	786 686
The cost for a fixed connection of 34 Mbps is	€212 175

Överkalix is eligible for support from the Swedish governments funds for broadband development and EU structural funds.

The system in Överkalix will be available for 90-95% of the households with telephone lines. What the connection rate will be is an open question. Total cost for society is €1 082 994 or €252 per person.

15. CASE 6: WIRELESS LAN IN NORA VILLAGES, SWEDEN

15.1 NO SUBSIDIES TO NORA

Nora municipalities lie outside the areas that are eligible for governmental support in Sweden. With 10 000 citizens (6 500 in the population centre and 3 500 in the villages) and a history as a mining district (iron mining since the 1 300) where the last mine being closed in 1968, the municipality had no ICT identity and a poor ICT infrastructure.

To get broadband connections Nora municipality had to rely on its own resources. A group of young people who wanted Internet connection in Nora villages built a wireless LAN, which they connected to Skanova´s optic fibre.

Starting point was a group of young people who wanted cheap internet access. The vision was to offer Internet connections everywhere in Nora; at the cafés, the beach-walk, the library, and even from the benches by the church at the square in Nora. This group had the technical skill and know-how but they lacked administrative experience, something which SMEs and representatives for the regional bank, municipality and others brought in. The group agreed on the objective of putting Nora on the ICT-map as an example for small communities. The aim was to create a "community network" in which the

- Technology (ICT) served the citizens
- Gave power to the local community and
- Created learning by doing

15.2 NORA 4U

To build and administrate a network a non profit organization, Nora 4U, (4U stands for Development, Education, Entertainment and Youth* (in Swedish Utveckling, Utbildning, Underhållning och Ungdom) was created. The aim of the organization was to have an administrative body in which people could work together for a common purpose. The organization looks for support locally from private enterprises and from authorities.

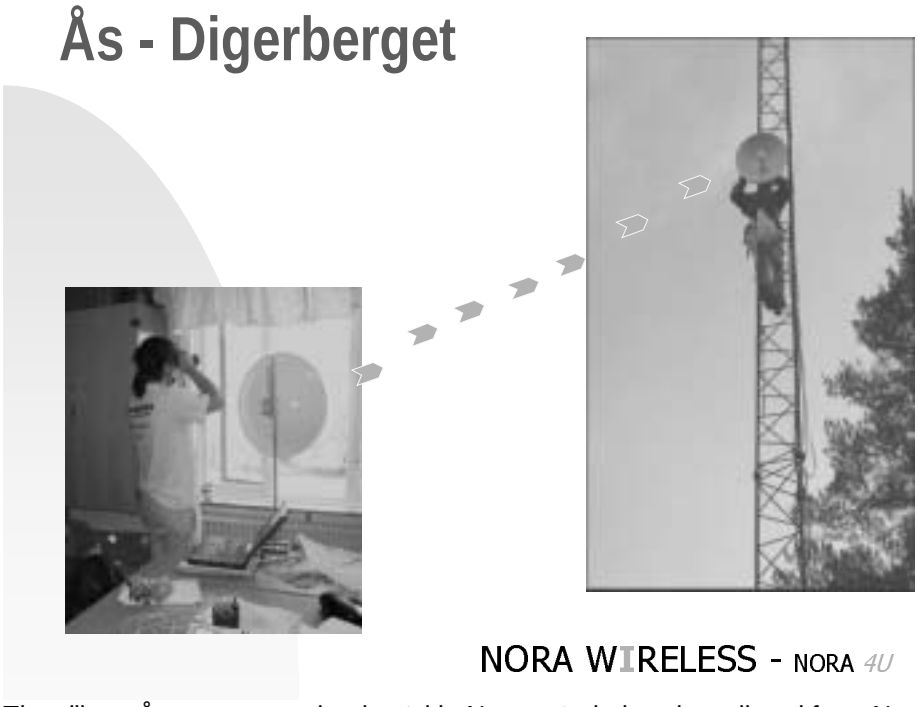
The aim of the project is not only to build a network but also to market Nora as a beautiful cultural town with first class ICT technology available to all.

15.3 TECHNOLOGY

The radio technology:

- 2.4 GHz radio band
- Unlicensed spectrum
- Running IEEE 802.11b standard
- Using Open Source code (Linux)
- Support and technology from the Royal Institute of Technology (KTH)

So far most material has been given to the non-profit organization by sponsors and the wireless industry. The network is being connected to a network in the county and to the nod in Stockholm.



The village Ås grammar school outside Nora get wireless broadband from Nora 4U.

The villages in Nora municipalities have also been connected, a significant example being the connection of Ås, outside Nora (intermediate rural area).

15.4 BUSINESS CASE

The wireless network in Nora is being built on non commercial basis. Some material was given to the non-profit organisation Nora 4U, the rest was bought by founds which were raised among SMEs and the authorities in Nora. Most of the development for the network was financed by citizens through their own work.

The network today offers broadband free of charge to everyone in Nora. In the long run this price policy will be difficult to maintain, particularly when the number of clients increases and the network needs to be maintained. But the example shows that with a gathering of resources, broadband can be supplied at very low cost.

16. CASE 7: THE EPPER PROJECT IN THE BASQUE REGION, SPAIN

16.1 BACKGROUND

In this project, the Basque telecom operator Euskatel has been assigned to build a local loop. The objectives of the project were to test a Wireless LAN (WLAN) platform with broadband networks in a rural region with apartment blocks, houses, premises and a municipal building.

Within the Rural Wins definitions, the project is located in an integrated and intermediate area and illustrates how citizens in densely populated areas subsidise rural customers. Funds were made available through the Basque government and the city of Salvatierra-Agurain.

The services to be promoted are Internet access with 11 Mbps wireless broadband in a local loop, Internet access via Web-TV and voice over Internet Protocol (VoIP).

The technology has the features of being low cost and sustainable, with low environmental impact. The combination of Local Multipoint Distribution System (LMDS), satellite, as well as WLAN technologies is to be tested.

The status of the project: WLAN network has been installed in Salvatierra-Agurain, with 67 users of the services. Tests was carried out on VoIP and Web-TV at the end of 2002 and found to be successful.

16.2 INFRASTRUCTURE

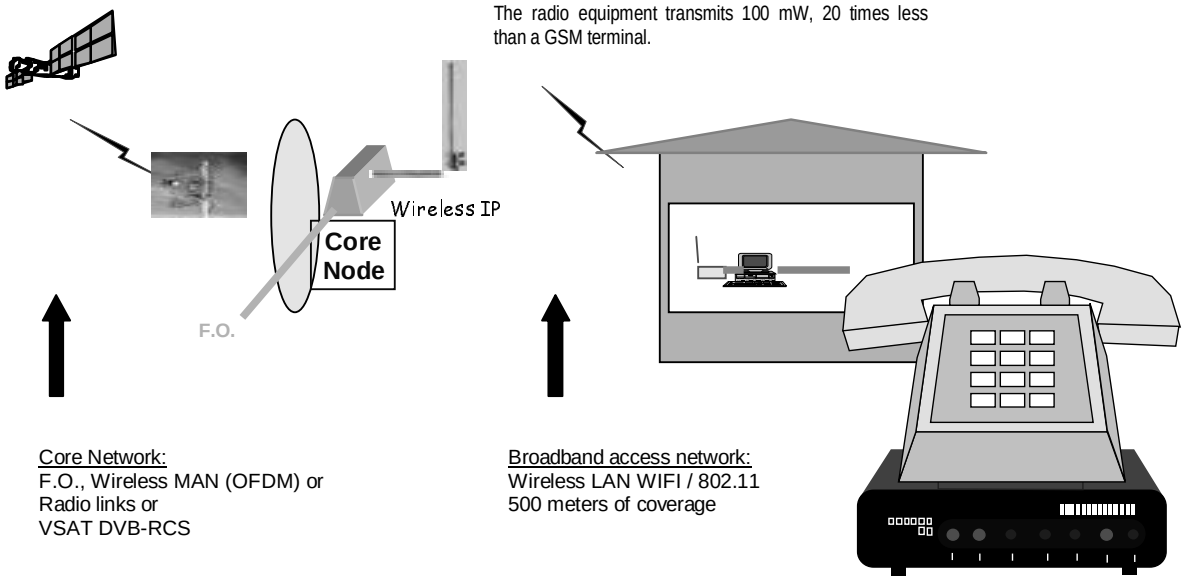
The services that will be offered in the project are:

- Fixed broadband Internet access at 11 Mbps local access, VoIP and Web-TV in rural areas
- Mobile broadband Internet access in public centres such as hotels, airports, cafes, conference rooms
- Mobile broadband Internet access in enterprises

The technical model that is being used includes:

- Optic fibre network, Super High Definition Digital Cinema radio links (SDH), Wireless Metropolitan Area Network (WMAN) (and use of 802.16/European Telecommunication Standardization Institute Broadband Radio Area Network Orthogonal Frequency-Division Multiplexing (ETSI BRAN OFDM), Local Multipoint Distribution System (LMDS) or Very Small Aperture Terminal (VSAT)
- Access network based on Wireless LAN (802.11b) technology
- Link between core network and core node: Satellite, F.O, RadioLink (LMDS)
- Primary access network: F.O., WLAN (2.4, 3.5 ó 5.8 GHz; 802.11, OFDM, Proprietary solution)
- Secondary access network : 2.4 ó 5.8 GHz; 802.11, OFDM, proprietary solutions

- Ends of the network: Ethernet 802.3, 802.11b WLAN



16.3 FINANCIAL AND PRICING MODEL

The total cost for the 24-months project with investment for 67 users was €1 407 114. This cost cannot be compared with the cost for rollout of broadband from the Swedish cases, since this project mainly is aimed at testing technology and the number of actual users is very low.

Cost for users is set between €15 and €30 per month. When profitability increases the monthly fees will be increased and costs for equipment will be decreased.

Presently public funds are needed for profitability and are allocated for investment in a backbone network. The problem of deciding on backbone ownership and management is still to be solved. Public funds for investment are also needed for interurban network and for investment in customer equipment.

The project is an interesting example of private-public partnership. Participants were Euskatel, Fagor Electrónica Comunicaciones, T&N Telecom, Eusko Jaurlaritza Bobjerno Vasco, Spri, and Salvatierra Agurain.

B. SERVICES

17. CASE: LOCALISATION OF ENTERPRISES AND INSTITUTIONS

Most governments in Europe have tried to influence structural changes that have taken place after the Second World War. Close-down of plants in mining and steel industries and labour lay-off in forest sector during the 1960s are important milestones. In some cases, such as in mining and the steel industry, the cost for production in European plants was significantly higher than the cost of production in emerging markets. In the forest sector, the structural change was dependent on introduction of the motor chain saw, which replaced manual labour.

The member states governments have tried to combat rising unemployment which the changes led to by education, retraining and financial support for workers to move to areas with better prospects. In some cases, generous pension schemes were initiated. A parallel strategy has included delocalization of governmental institutions or departments.

With these methods many old cities were revived during the 1970s and 1980s. In cities like Lille, New Castle, Birmingham, Bilbao, Malmö and Norrköping, the strategy has been successful to the extent that new industries/services have replaced old and the inner cities have been renovated.

Means to influence localization to rural areas have not been available until now. The effects of the introduction of motor chain saw in the forest industry, which mainly affected remote rural areas, led to halving of population. In retrospect, no efficient mean to relocate jobs were available. Now, when the ICT sector makes us more independent of distance, the situation is different.

The ICT sector likes to promote the image of a mobile person. The image is that new technology will make it possible for us to work independently of distance from the job. This is true in theory, but in practice a number of prerequisites have to be complied with out of which access to infrastructure at a reasonable price is the most important. This is often bottom-line for localisation. Other prerequisites are low costs for transport in time and travel, access to training and access to business networks and stimulating environment.

ICT will make it possible to locate enterprises and governmental agencies in rural areas. In this chapter we will look in to demands that different institutions have had on rural environments to make delocalisation possible. We will link our examples to the rural typology we have defined in Work Package 1 (intermediate, integrated and remote rural areas).

There is confusion in the terms we use for localisation. More research needs to be done to gain more distinct definitions. We will use the term localisation when “new” agencies or activities are set up and delocalisation for moves of department or agencies from population centres. The term decentralisation will not be used as this term in some countries means a move of executive power from one organisational level to a lower level.

- INTEGRATED RURAL AREAS are situated close to cities. In these areas it is possible to set up new agencies or to delocate departments of old authorities. Professionals such as architects, ICT consultants and similar groups with their own enterprises or self employed can move out to these areas. Premises are less expensive in these areas, and working from home is also an option. The development of ICT has diminished the need for

premises in the city, and commuting to meetings is not time-consuming or expensive from these areas. Delocalisation of Stockholm Police Department for Report Notifications to three islands in the Stockholm archipelago is a good example of new working methods.

- INTERMEDIATE RURAL AREAS are distant from urban centres and therefore reurbanisers or commuters are not so frequent and the community is more dependent on agriculture, forest industries and tourism. In this chapter we show how a big organisation, Scandinavian Airline Systems (SAS), broke out a group of activities and located them in different parts of Europe. The delocalization includes direct sales and support for English speaking customers to a "candidate" country (Tallinn in Estonia) where the Euro Bonus Europe, Middle East and Africa are served. Sales and support for Scandinavian customers is delocated in Sveg (intermediate), Östersund and Frösundavik, Sweden.

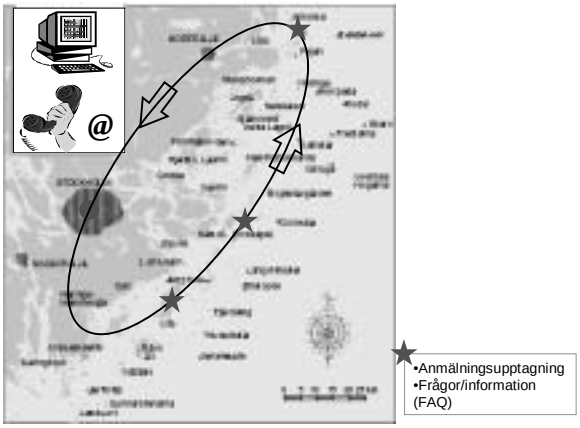
- REMOTE RURAL AREAS have the lowest population density of the three. In these areas the population is most dependent on agriculture, forestry and tourism. In northern member states (Sweden and Finland) the reduction of forest and agricultural sectors during the 1960s led to the service sector today being the dominant occupation. Localisation of the car test industry to remote rural areas in the north of Sweden to municipalities, Sorsele, Malå, Arjeplog, Arvidsjaur, Jokkmokk, Älvsbyn and Kiruna is an example where the regions advantage (cold climate) is the localization factor.

18. DELOCALIZATION OF POLICE DEPARTMENT FOR REPORT NOTIFICATIONS

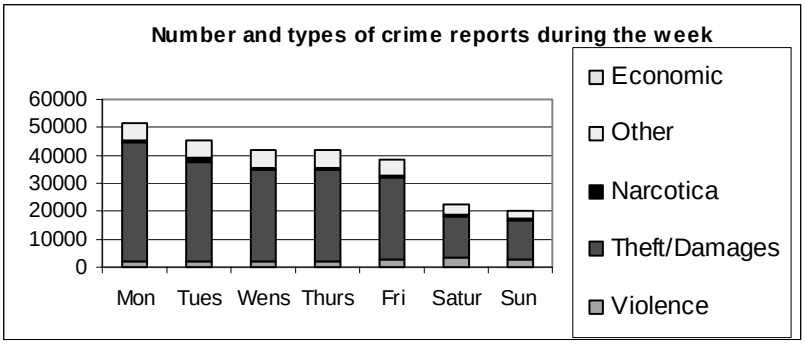
18.1 TO REPLACE MANNED LIGHTHOUSES

Stockholm Police Department of crime report notifications has been relocated to three islands in the Stockholm archipelago. The delocalization started when manned lighthouses were closed-down in the beginning of the 1990s. The county administrative board sought replacements and allocated financial support. The Police Department of Stockholm initiated a report-centre for loss and crime-reports on the island Sandön in the Stockholm archipelago. This centre was soon a success and was followed by two in the Stockholm archipelago. Now the three report centres cover the areas Arholma-Sandön-Ornö in a virtual network.

Using the Rural Wind classifications, the island Sandön can be considered as integrated, whereas Arholma and Ornö are intermediate rural areas.



The subjects that the report centre deals with during a week are:



Most reported crimes have to do with thefts and damages.

To get in contact with the report-centre the victim phones 112 or the Stockholm Police 401 00 00. Urgent calls are redirected to ambulance or police communication centre. Calls that are not urgent are directed to the report notification centre. Calls regarding traffic are directed to the road authorities and passport calls to the passport unit by special pre-choice selection. The crime report notification centres on Arholma, Sandö and Ornö are open 07.00-22.00.

Today the three crime report notification centres have 40 employees, with a preliminary inquiry manager as head of the department. At each report centre a head of unit is also available to coordinate contacts, manages personnel and be responsible for short-term planning. Within some limits the work groups are self-governing units.

Apart from doing crime reports, each employee has his/her own area of specialisation, which can be work environment, telephone operations and ICT, alarm, equipment, security, education or training and management.

The employees have an introduction course during the first four weeks of employment with one week of theory and three weeks training under supervision. Generally, the personnel have more formal education than employees in the city. They have more experience from different work types and from life, since they are older than new employees in the city. Most of them come from the service sector and competence is developed further during the introduction training course. Many calls can be characterised as debriefing – such as to calming down an elderly person who has lost his wallet. Another usual service is advice to persons who have lost their credit cards. The personnel are well aware that they are the police authorities face to public.

During a normal week the report-centre has dealt with

- 11 975 errands
- Receives 11 560 calls
- Writes 9 054 reports
- Answers 2 506 questions
- Receives 47% of all telephone calls to the Stockholm Police and
- Reports 27% of all new crimes in the county

The present report centre is not dependent on broadband technology but will be in the near future when operation will include video- and voice communications, now being tested in a pilot study.

One of the objectives with introduction of this new technology is to improve cooperation in the virtual organisation.

The Royal Institute of Technology (KTH) has developed a system for video communication which is free of the usual noise and other disturbances and allows eye-to-eye contact. The person who calls is reproduced in natural size on the screen. The transmission requires broadband connections (dark fibre) with high band-width which allows for video and voice transmissions of high quality.

18.2 CONCLUSIONS

During the next 25 years the work force in countries like Sweden will diminish rapidly since a large numbers of persons born in the 1940s will be retired. This will put pressure on authorities to create new labour saving work methods. Recent service levels are difficult to keep up today. In some rural police departments in the north of Sweden, one single police officer has to cover an area of 150-200 square kilometres. Virtual report centres could certainly ease the work situation for them and improve the level of service to the public. When a large number of officers are retired new, working methods will have to be implemented and access to broadband with very high speed in both directions will be necessarily.

19. CALL CENTRES (TELECENTERS)

19.1 CUSTOMER RELATED MANAGEMENT

There is confusion about what a call centre is. Generally speaking, a call centre supplies contacts between industries and authorities and their customers. There are two types of call centres; in-house or outsourced. The in-house call centres are located customer related management (CRM) activates to a separate department or result unit. In many cases the located centres is moved out from a cities (such as the SAS call centres in Sveg and Östersund). The outsourced call centre is often run by international companies specialised in CRM, with operations in many countries.

The services a call centre offers is within CRM, such as order and support. Contacts can be done via telephone, fax, post or electronically.

There is a negative feeling about that call centres as ICT industries:"Mac Donald-work". This can be an unfair view. The services that the call centres offer vary a lot from simple mechanical services to more qualified services.

19.2 WHY CALL CENTRES

There are a number of reasons why company's uses external call centres or CRM technique. One reason is to reduce costs; another is that investment in customer services is a means to getting more customers or share of a large market.

The competitive situation today presses the margins for most companies. To combat this situation other means of competing are being invented, such as CRM.

Trends from 1998:

- Growth of contact centres, i.e., call centres that can deal with all sorts of media (fax, e-post, telephone or ICT) in the customer dialogue.
- Increasing mobility in society, with virtual and distributed call centres.
- Telephone and ICT are mixed over the net.
- Industry grow on the service side as well as on the product side.
- Standards developed.
- Development of Internet Business Solution Centres (IBSC), which complete customer services with Internet, connected to a call centres. This centre will take care of all services for an authority or enterprise.

19.3 CALL CENTRES IN SWEDEN

Call centres are not dependent on distance and therefore suitable for localization to rural areas. The lack of statistics on this subject makes it difficult to estimate the size of the call centre service. The Invest in Sweden Agency (ISA) estimates that there are 33 000 jobs in the sector in Sweden. Growth is estimated at 30-35%. With this prognosis, call centres will have around 100 000 employees in five years.

Most frequent users of call centres in Sweden are[2]:

1. Banks and insurance (24%)
2. Manufacture and distribution of consumer goods (21%)
3. Telecom (12%)
4. Travel, i.e., ticket booking (11%)
5. Remote shops i.e., mail order firms and Internet trade (8%)
6. ACT (8%)
7. Others, such as SOS (7%)
8. Electricity, Gas and Water (5%)
9. Entertainment (4%)

19.4 SAS SALES AND SUPPORT IN ESTONIA AND SWEDEN

SAS CRM activities startled in Sveg (intermediate rural area) in 1980s, and Sveg now has become Sweden's leading call centre municipality. Today SAS booking office in Sveg employs 70 persons.

The CRM centre that SAS operates in Sveg takes booking calls from the SAS Swedish market in Swedish language. The municipality of Sveg stresses that access to high speed connections and good telephone connections is a necessity to make these types of localizations possible. The call centre in Sveg has also been complemented with training, research and development programs at the local college, Mitthögskolan.

After investigation SAS started a CRM centre for English-speaking customers in Tallinn, Estonia, in 2000. Intentions were that, Estonian unit should cover UK, Netherlands, and Italy but since the operation was so successful, France and Finland have been added. Today the centre in Tallinn has seven customers within SAS which make 30.000 calls per month. Besides SAS, the centre in

2 Statistics from Ovum

Tallinn also serves Lufthansa, Star Alliance and Austrian Air. The CRM centre will be expanded in 2003 to having responsibility for Canada and the US as well as Internet support for SAS customers.

All staff is employed by SAS but the CRM centre has been a separate result unit since April 2002. The unit charges other departments for their services. Forty-seven persons are employed in Tallinn (January 2003). Their competence is mainly good oral English and Finnish (besides Estonian and Russian). After being employed by SAS, personnel get 3 weeks training in ICT systems and SAS products. After year, the staffs get complementary training in tariff issues.

Most personnel have studied at university level and have experience from the service sector. It is easy to find qualified personnel in Estonia and their education is good due to a good school system. Basic knowledge is therefore high and now-days students also get good training in English.

The cost for personnel in Tallinn is approximately 1/3 of the cost in Sweden (January 2003). Costs for premises are much lower but ICT costs are about the same. The staffs works 8-hour shifts with the operation running 24 hours.

The technical platform now is ISDN but will be upgraded if and when broadband is available in Tallinn. The capacities on the telephone lines in Tallinn are exhausted today.

19.5 CONCLUSIONS

There are only a few studies on localization of CRM centres available. The interviews in this study stress that

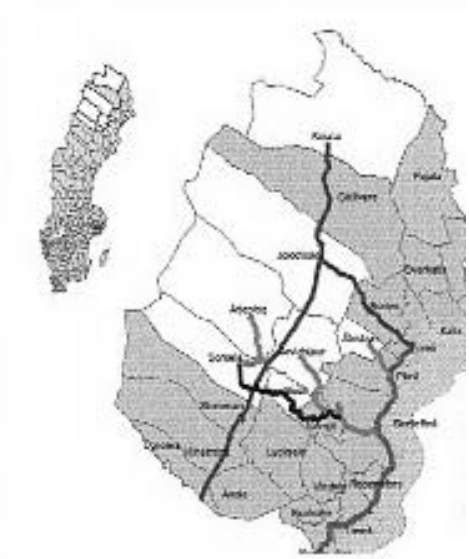
- Call centre technique opens possibilities in time, room and space. A call centre does not need to be located in a big city or offer work hours between nine and five. Most call centre employees distance work from their homes and are geographically spread over the country. Broadband technology will allow connection of different call centres independent of their location to virtual call centres. This technology is already available but not put to use.
- Access to high speed connections is a necessity. This is particularly important in the future to reduce telephone bills for the CRM centres.
- To make delocalization to RURAL areas or to CANDIDATE countries possible, well trained personnel with good language and service skills need to be available.
- There is ongoing development from large pan-European call centres to small regional language call centres. This means that countries with similar languages can coordinate their call centres.
- Effects of call centres on rural economies need to be studied, particularly when one area becomes dependent on a single call centre company or industry.
- The largest proportion of call centre workers is working from their homes. Yet home as a working place is not visible in the statistics. There is no statistics available on how many persons work from home, and we also know very little about work conditions for those people. Economic, social and insurance packages are not developed for this type of work. These area needs to be studied.
- How to update competences is another area that needs to be developed both for call centre personnel working from home and for those having a call centre as a workplace.

- If we want to develop work from home in rural areas, this needs to be a positive option in which economic and social security considered. The risk is otherwise that delocalization could become a negative option.

Personnel at SAS sales centre in Tallinn

20. LOCALIZATION OF CAR TESTING

20.1 COLD CLIMATE AS A BUSINESS IDEA



In 1972 a German car manufacturer began testing vehicles in Arjeplog municipality in Norrbotten County, Sweden. The company needed to test components in an extremely cold winter climate. Since then, the car testing has increased and today is an important industry not only in Arjeplog municipality but also in the municipalities of Kiruna, Jokkmokk, and Arvidsjaur. Car industries and component factories from all over Europe, Japan and rea test their components in the north of Sweden. In 1999 the car testing in Arjeplog had a turnover of 22 million Euro and employed 360 persons. The test industry has been resulted in investments in hotels and other services and in a special technical gymnasium where personnel are trained.

The obvious reason for locating in the north of Sweden was the need to test components in cold weather and extreme conditions. The long winters, with temperatures down to -40C, which for most Swedes is a disadvantage, in this case was the reason for coming to the area. Car testing is seasonal; personnel come in autumn and return to their base in spring.

In 2002 the Swedish government appointed a special investigator to look into prerequisites for expanding the car test industry. Contacts with the industry brought following recommendations:

- High speed ICT connections to all plants, accommodations and service points. The connections have to be reliable with extremely high security level
- Access to well trained personnel

- Developed service sector with access to accommodations and other services of high quality

No other option was desired than dark fibre, which now is developed in the seven northern municipalities. The connections for developing car testing are estimated to cost €2,5 million.

20. 2 CONCLUSIONS

- To attract industry that demands high speed ICT, the infrastructure has to be of the same level as in cities. Without high speed connections localisations will not be possible.
- To attract industry to remote rural areas, investment in personnel and services are also necessary.

21. eLEARNING

21.1 BACKGROUND

Lifelong learning and eLearning have great potential that is barely developed in terms of what could be offered and what is technically available through broadband. Both concepts could be greatly advanced through broadband use, particularly in rural areas where access to such knowledge is limited. Broadband on one level could be used for learning and reading circles and to teach a variety of non-academic subjects, while at the college and university level, courses and information could be offered that might spark the interest of the individual.

eLearning can be described from an EU perspective[3] in three different ways:

- EU-programme
- Memorandum of Understanding and Action Plans
- European networks

eLearning can be used for different purposes such as life-long-learning, net universities, and for the school system.

21.2 EU PROGRAMMES

EU programmes in which eLearning is a part has been developed during the last 10-12 years. Two types of programmes are available, action programmes and R&D programmes. Among action programmes, the Comett-programme initially was central, with cooperation among universities, industries, and society. It can be argued that the participating universities gained most from Leonardo, Socrates, Adapt and Equal in terms of eLearning ambitions. To some extent these programmes were overlapping, and the effects were, according to Lindkvist[4], microscopic. The EU aims were to emphasise eLearning, lifelong learning and networks. Today the Socrates programme is the main action program for eLearning, with projects such as Minerva. Among the R&D programmes, the Delta programme is a training initiative focused on technology and emphasising system development more than methodology or service development. Other initiatives in eLearning are Humanities and Prometheus, and ”the eEurope Action Plan” and ”the eLearning Action Plan”. eEurope is the first project that aims at increasing citizen knowledge of ICT, and the other one aims at increasing access to computers, Internet and methods of learning. Tribune and Proacte in the 5th Framework Programme are ”horizontal actions” in R&D programmes which aim at cooperation and exchange of information.

[3] Europe – Education and training (http://www.europa.eu.int/comm/education/)

[4] Lindkvist, Kenneth: Report from partial project in portal pilot study, Nätuniversitetet, 2002.

21.3 SÁPMI PEOPLE OF EIGHT SEASONS AND THREE LANGUAGES

The Sápmi people live in the north of Europe in Norway, Sweden, Finland and northern Russia. The Sápmi speak three languages. South Sápmi is spoken in Sweden and Norway, Lule Sápmi in Sweden, Norway and Finland and north Sápmi in Sweden, Norway, Finland and Russia.

Ammarnäs is a village with 280 inhabitants in the Swedish municipality of Sorsele. Ammarnäs has a large Sápmi population and most inhabitants in the village work with tourism or reindeer herding. The village also has some SMEs in food industry. The school was founded in 1932. and 15 children go from pre-school to the 6th grade in Ammarnäs. In grades 7-9, the students travel by bus to Sorsele, a total of 180 km per day.

The school in Ammarnäs offers training in the south Sápmi language with the help of web-camera and voice telephone over the radio link broadband. The broadband network has made it possible for the pupils to be educated in their home language. Ammarnäs is a showcase for other rural schools.

21.4 TECHNICAL SOLUTIONS

1996 the school was connected to the Internet (ISDN). At the same time a project on distance learning was started for 7-9 grades. These pupils could stay in Ammarnäs one day a week and work at distance with help of a camera and orator.

The technology was difficult to manage and often the image transmissions were extremely slow. When the project ended it was difficult to carry on. When Ammarnäs got radio link broadband in 2000 the technology was used to give pupils B-language training from the 6th grade. When the technological problems were solved with high speed in transmission, the program of distant training was resumed and since 2001 the school offers training in south Sámi one hour a week with the help of a web camera and an orator.

21.5 PEDAGOGICAL SOLUTION

The Sápmi language is classified as a ”home language”. According to Swedish legislation, all municipalities are obliged to offer training in the home language. The extra training is financed by the school authority. In Ammarnäs all students (also non-Sápmi) are offered the same language training on the Internet to avoid splitting the groups.

Children are divided into two groups. The youngest pupils are 6 years old and oldest are 10. The school also give courses in Sápmi integration in which pupils learn Sámi culture and history. The language teacher comes to Ammarnäs round 10 times a year to meet students and extend training.

21.6 CONCLUSIONS

ICT technology has given Sápmi pupils the possibility to learn and develop their home language. Today it is difficult to find teachers in South Sámi language. The use of Internet makes it possible for more students have the right to learn. Language training is popular among the pupils, since they

also get computer training. The school authorities in the county are following the project to se if the service can be extended.

For the employees at the school, the main benefit is that they learn a new pedagogical method with computer training integrated. Their ICT skill has increased. The teachers hope that the ICT technology will be used in other subjects and teachers can meet on the net in video conferences.

Negative experiences are that the technology does not always function and that children are impatient when they are disconnected. With more connections on the radio link in the village, the problem with slow transmissions will increase. Another threat has been that some people in the village are afraid that the school will be closed down and replaced with on-line training.

The cost is teacher salaries for Sápmi courses, which are financed by the central government. The technology was already in place, but if that had not been the case, the cost for web camera and orator would have had to have been included.

eLearning needs to be developed in the following areas:

- Life-long learning models which include the possibility to gain the training on the net need to be designed
- Models for financing of training need to be developed
- SME courses especially for Micro SMEs, needs to be developed
- Special groups (Sápmi and other languages groups and own culture) need to have their needs answered
- Models for persons with problems (the elderly, persons with psychological or physical problems) living in rural areas need to be developed

22. ENTITIES THAT WILL ENSURE FOOD SAFETY

22.1 BROADBAND AND SAFE FOOD

The need for use of broadband, associated web sites and Internet to gain immediate vital farm-business and food-related information will increase as the European Union increases controls on hygiene within the food production chain, in order to make food safe.

As a result of the recent so-called crises in food hygiene (mad cow disease, foot-and-mouth disease, dioxins in feed), EU laws, regulations and directives related to food are increasing on every level, so that all those involved in the chain of food production, from farmers to animal-feed producers to those in food transport, storage, shops and restaurants will need to keep informed about new and existing regulations. Particularly in the countryside, where it may be difficult to gain up-to-date information, broadband can be of great use. But even consumers, whose confidence in food production hygiene has been shaken, could use broadband and associated web sites to check whether food production and handling have met regulations.

22.2 THE WHITE BOOK

EU has given high priority to safe food, resulting in a “white book” outlining strategies for increasing hygiene requirements, making it imperative that those working in any way in the food industries and businesses – from farm to fork – keep themselves informed in order to stay in business.

The white book gives priority to:

- Formation of a European food authority to be called European Food Safety Authority (EFSA), meant to guarantee citizen expectations of high quality in all parts of the food production, storage and delivery chain.
- Hygiene laws that will apply throughout the food production chain, from farms to slaughterhouses, transport, storage, shops and restaurants until, finally, food reaches the consumer. The basic principles underlying the new hygiene rules are introduction of farm-to-table to hygiene policy.
- Responsibility being placed on feed and food producers and others within the food production chain to ensure hygienic conditions. A programme for self-checking and modern hazard control techniques is introduced. Member states are responsible for surveillance and control of the food operators. The Commissions role is to inspect and audit member states actions.

22.3 BASIC PRINCIPLES

The basic principles underlying the new hygiene rules are:

1. Introduction of the farm-to-table hygiene policy. Currently there is no systematic and all-embracing hygiene regime covering all food in all sectors, rather a patchwork of rules for specific sectors and types of produce with gaps notably at primary production level (i.e., farms).

2. Introduction of the primary responsibility principle to food producers for the safety of food through the use of programmes for self-checking and modern hazard control techniques. The implementation of a harmonised Hazard Analysis Critical Control Point (HACCP) system will become obligatory for all non-primary food operators. These types of self-checking programmes are already in, place in parts of the food industry, notably in larger food factories, but were not yet required in for example slaughterhouses. HACCP prescribes a logical series of steps to identify throughout the production chain points where control is critical to food safety and focuses on the specific hazards particular to the business concerned. In most food business checking the quality of raw materials, avoiding bacterial contamination (for example salmonella), maintaining the cold chain during storage and transport and appropriate anti-bacterial heat treatment are critical to safety. Companies will be obliged to keep records of safety checks carried out under HACCP for surveillance purposes. On farms, Codes of Good Practice are to be used as the safety management instrument, given that for the moment full HACCP implementation is considered over-ambitious in the farming context.

3. A third key principle is the traceability of all food and food ingredients. To achieve this, compulsory registration of all food businesses is introduced. Such registration numbers must follow products. Record keeping identifying suppliers of ingredients and foods is made obligatory. Producers must also put in place procedures for the withdrawal from the market of products presenting a serious risk to consumer health. The basic hygiene rules, which are part of standard operating procedures of food businesses cleanliness of premises, washing hands before handling food, etc, remain as before.

22.4 HYGIENE PACKAGE

An example of the possibilities of farmers and those with food-related businesses being kept up-to-date by broadband database, web site and Internet is information that could be made available about the “hygiene package”, meant by the EU to pinpoint responsibility throughout the food production chain. Farmers and others increasingly will become legally responsible for knowledge of regulations such as the Hazard Analysis Critical Control Point (HACCP) system proposed to identify specific threats to hygiene at each step of food production.

Included in the hygiene package are requirements to document and archive all information in the food production chain, including additives used, so that each step in food production can be identified. Included in the proposed regulations are controls on animal feed.

The details of these types of regulations, essential in all aspects of food production, storage, transport and sales, could be easily available on a broadband database.

22.5 TRANSPARENCY AND TRACEABILITY WITH BROADBAND

One aim of the EU regulations is for the consumer to have access to information about food production, a task that would be made easier through broadband reaching into rural communities with Internet and web sites that could be used to document food production. But also farmers and related food-production businesses could gain input from consumers, although perhaps the primary broadband use in rural areas would be for farmers and others in relatively isolated areas to have immediate access to information that affect their businesses.

In Sweden, the Federation of Swedish Farmers (LRF) is studying the possibility of an independent organization setting up a database and associated web site on which all available information about food production could be assembled, including EU regulations.

Farmers would report to the database details of their farm production, animals, animal feed and related information. As all animals have identity tags, with information on date of birth, sex and home farm, their registration on the database would facilitate the increasing demands that all food operators and businesses comply with regulations within the food production chain.

To meet the request on traceability it is important that all products are registered. Today all animals have an ID. This ID can to be complemented with registration of all levels and actions on the way to the table.

Such a database also could be used to inform farmers and others on the latest scientific research related to food production. It could de used in schools as a teaching tool. Farmers could learn of competitive possibilities, not only about feed prices, fertilizer information, machinery prices, but also would have available the latest information on techniques and technology.

22.6 CONCLUSIONS

Broadband would facilitate such a wide-ranging database, related website and Internet access, open to a varied audience from farmer to consumer, animal-food producer to butcher, transport owners to those responsible for refrigeration to restaurant owners. But the primary use is envisioned in rural areas, to make immediately available the information, including EU regulations that agricultural workers need to carry out their businesses. With broadband, users can quickly download information that otherwise would take too long or not be possible to download. Broadband could also be used by farmers to carry out small-scale food sales direct from their farms. For the future

- Systems for traceability of food from rural areas need to be developed where production and distribution systems are small-scale
- Traceability from new distribution forms such as farm-shops need to be developed
- Traceability of food from private hunting and fishing products that are resold needs to be developed

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E. GLOSSARY OF TERMS

ADSL: Assymetric Digital Subscriber Line
Dark Fibre Is optical fibre without communication equipment
ETSI BRAN OFDM: European Telecommunication Standardization Institute Broadband Radio Area Network Orthogonal Frequency-Division Multiplexing
GSM Global System for Mobile Communication
GPRS General Packet Radio Service
LMDS: Local Multipoint Distribution System
SDH: Super High Definition Digital Cinema radio links
UMTS: Universal Mobile Telecommunications System
VoIP: Voice over Internet protocol

VSAT: Very Small Aperture Terminal
WLAN: Wireless Local Area Network
WLL: Wireless Local Loop
WMAN: Wireless Metropolitan Area Network