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Technology for milking and housing of dairy cows

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1 Visions for buildings and systems for dairy production in Finland in year 2010

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Finland as a member in EU

A new era in Finnish agriculture started in 1995 as Finland joined the European Union. The consumer prices reduced and lower producer prices were compensated with subsidies. Finland managed to negotiate reasonable terms of integration and the Agenda period (1992 - 1999) encouraged farmers to invest on new buildings. The Agenda 2000 brought a new perspective which gradually reduces both national and EU subsidies. The grain farming seems to be in critical situation because it is not profitable any more. Pork and beef seems to manage and milk farming is a survivor.

National development in numbers

The investments declined for several years before the EU membership. This was due to uncertainty of the membership terms and subsidy levels. As soon as they were clear the investments reached into higher levels than ever during the past 20 years. The public policy encouraged farmers to invest on larger units. The number of active, producing farms has fallen from 100.000 to 70.000 during the EU years. At the same time the number of milk farms has reduced from 33.000 to 20.300. The prognosis for the remaining milk farms by the year 2007 is 14.900. While the average herd size at the moment is 18 cows it is calculated to rise up to 23. The cow number in the whole country is 364.000 and it will decrease to 333.000 by the year 2007. However, the total milk production will grow during the same period from the present level of 2371 millions of litres. This is much due to increasing yields. The subsidy system will create aerial changes within the country. The production and new investments will increase in C2, C3 and C4 areas meanwhile A, B and C1 will loose production.

New unit sizes

Since 1995 practically all new cow houses have been loose house systems by the size of 40 - 50 cows + young cattle. The builders have typically been young families after the transfer of a farm to a descendant. Numerous enlargements of the conventional barns have also been made from 15 to 20 cows. Those builders are elderly farmers looking for reasonable profitability before retirement. A milk farmer developing a new cow house unit for himself is facing a bundle of questions to solve. It is a management issue nowadays. A farmer must consider not only the building and its details but the chain from technological choices to his labour capabilities and financing. The basic model is a family size farm with 1-2 full time workers. A rising phenomenon is a joint venture model between two neighbours or even 3 - 4 families.

Agricultural building research focused on uninsulated low price solutions in the early 90's. Now we know that this concept works in Finnish weather circumstances. An uninsulated barn was supposed to be a solution against reducing milk prices in the EU membership and

market. When the subsidy levels were cleared in 1995 farmers “voted with their purses” and continued making insulated barns. As a result of the 90’s a share of uninsulated barns seems to remain as low as 5 % of all new barns. Today a farmer has to consider weather to invest more in animal husbandry machines or in buildings and constructions. Especially AMS-systems plus feeding automation demands a major part of the investment and still the building has to be built.

The latest trend in new cow house projects is the size of 50 – 60 cows with a reservation to expand to 100 – 120 cows. This is a functioning family size and also suites for AMS-technology. The buildings are typically around 1500 m². The functional plan must contain convertibility not only for the number of dairy cows and young cattle but the milking technology as well. In most cases the AMS-technology is taken in consideration as a future reservation in new barn layouts even if a conventional milking parlour will be chosen for the first stage. The AMS-technology raises curiosity and enthusiasm among techno orientated young farmers. The price is considered high and there is a growing potential to invest on the second or third generation equipments with expectations of the technology to improve and the price to settle on a reasonable level. On the other hand farmers are cautious with dependence on technology and its hardware and software risks. This winter’s storms have taught us how vulnerable highly technical farms are for interruptions in the power supply.

Constructional solutions

New constructional concepts are under development to compete with concrete. They are wooden constructions based either on traditional truss technique or glue laminated wood or plywood solutions. The new barns are typically 20 – 25 meters in span. They are engineered constructions, which are more prefabricated and need skilled construction workers to put them together. The farmer has less time to build himself because his main business – animal husbandry and milk production – takes all working time. There is a growing need for small construction firms who would concentrate on farm buildings and their constructional details. Farmers need more education and consulting about construction site management. There is a growing market for consultants to operate between farmers and construction firms. The building designers could take that business but they still haven’t made an initiative. The building designers, also, need further education in functionality issues, constructions, ventilation and architecture.

Ventilation

Conventional low pressure ventilation with electric fans is still a typical solution in most of the new barns. Its functionality is not always proper and the reason for this is old technique in large units. There is a demand for ventilation research in large units at the moment. A gravity based ridge ventilation is a new concept and rather rare at the moment. The results of the indoor climate in these new barns seem to be encouraging in Finnish conditions.

Farm planning and architecture

The new barns are solid in form. The construction typically consists of concrete sandwich elements as load bearing walls plus wooden trusses on the roof. Slabs plus pillars are not usual because trusses are so cheap and technically competitive. Concrete sandwich wall element has architectural disadvantages because more than often its visual appearance is poor. Secondly concrete elements have bigger scale, which doesn’t match with the scale of

the traditional old red paint wooden buildings. Attention has to be paid to land use planning in the farm centres in order to make visually harmonious groups of new and old buildings. Architecturally elegant farm is a business card and a sign of good farm management.

Future aspects

The future of milk production seems to rely on large units up to 2010. The Eastern expansion of European Union and the next agenda period starting in 2007 will bring new threats, which obviously do not affect on milk production as much as to grain or meat. The general trend is expected to cut off national subsidies for buildings. Therefore the investment rate may keep high for the next five years. We must still remember that a great deal of milk will be produced in small conventional barns for years to come. We shall not forget their technical improvement needs or management problems in keeping milk quality high. And finally, when they give up production we have a growing number of vacant farm buildings in the countryside scenery to remind us of the heavy structural change in farming. The next big issue is what to do with those vacant buildings: demolish them, make museums, or perhaps farm tourism?