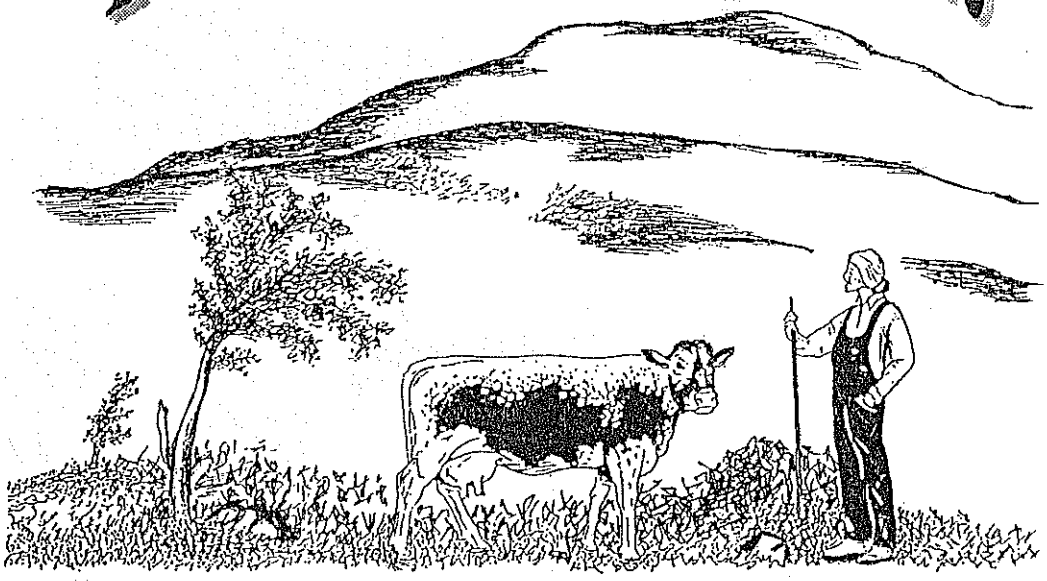
Sustainable Agriculture and Rural Development



Røros - Norway 10. - 16. March 1995

The 3.rd. International Symposium for Sustainable Agriculture and Rural Development

FINAL REPORT .

Submission to the United Nation's Commission on Sustainable Development (CSD), 11-28 april 1995, New York.

PREFACE SYMPOSIUM REPORT REV. 1.

The symposium report was submitted to the CSD before april 11, consisting of contributions delivered in different formats and languages.
After the deadline for the report some minor improvements and additions were received by the redaction. These are incorporated in this revised version.

Helge Christie
12.4.1995.

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SUSTAINABLE NORWAY - CAN NORWEGIANS BECOME SELF-SUFFICIENT WITH ECOLOGICALLY GROWN FOOD?

How can we achieve fair food prices?

Paper read at the 3.rd International Symposium for Sustainable Agriculture and Rural Development, Roros, Norway 14.3.95.

Summary

The Norwegian Centre for Ecological Agriculture has registered crop and milk yields on ecological farms for several years. These results are used to calculate if it is possible for Norway to become self-supplied with food if all farms are converted to ecological agriculture, no grains are imported and fossil fuels are used on the same level as today. To become self-supplied people have to eat half as much meat and eggs, and approximately twice as much grains, potatoes and vegetables. All organic materials have to be recycled. All cultivated land has to be in use, and about 800.000 hectars new permanent grassland land cultivated. Also, we have to harvest twice as much fodder by grazing in mountain and forest areas. An average farm is used as a basis for calculation. On this farm, 2 hectars of grains, 0,3 hectars potatoes and 0,15 hectars vegetables must be grown to cover the needs of human food for 4,35 million people. In addition, 30.000 fodder units* can be produced on the farm, and a composition of animals to optimally dispose of this fodder is suggested.

In a national perspective, fair food prices can be obtained if market prices equal production costs including labour on the most effective farms. Surplus costs on less effective farms and payment for benefits such as a more diversified landscape must be paid by all inhabitants in common - as subsidies.

*) Fodder unit = the energy content of 1 kg barley = 1650 kcal = 6904 kJ

Introduction

Norway has a lot of space per person - 4,33 mill. people share 323.000 square kilometers. People have moved, and still move, from the districts to district centres and larger cities, but still people are living all over the country exept in mountain areas. This means many Norwegians live closer to natural resources, but people and production spread in outlying regions need a lot of energy for transport.

Norwegian agriculture is dominated by milk production. Grain for human consumption has been imported for several hundred years. The average Norwegian farm in 1993 has 12 hectars of cultivated land. Of 91.000 farms, 550 are ecological or in conversion to ecological farming.

Self-sufficiency means the extent to which the society can provide the inhabitants with food and other essential goods. Each country should try hard to become self-sufficient. When food is imported to a country where cultivated land is put aside, this population is nourished by other people's resources.

Can Norway become self-sufficient with ecologically grown food?

If Norwegians are willing to reduce their consumption, change their diet and pay more for their food, ecological food production in Norway may provide for food needs. But then not only Norwegian farms, but the whole society must be converted in an ecological direction. I will present the assumptions and calculations that I have made to substantiate this assertion.

The assumptions and calculations describe today's situation on the one hand, and the situation after a radical conversion on the other hand.

Assumptions

Cultivated land, permanent grassland and mountain/forest grassland are the most important resources for agricultural food production. Today Norway has 0,9 million hectars cultivated land, 0,12 million hectars permanent grassland and harvest 280 million fodder units from mountain/forest grassland. I assume after the conversion we will still have 0,9 million hectars cultivated land. More permanent grassland must be taken into production, up to 0,2 million hectars. From mountain/forest grassland we must harvest up to 740 million fodder units - this amount of fodder was harvested from such areas in 1939.

These resources will be divided among 100.000 farms, about 10.000 more farms than today. This growth in the number of farms is probably necessary to make it possible to harvest the mountain/forest grassland. Each average farm then disposes 9 hectars cultivated land, 2 hectars permanent grassland and the possibility to harvest 7400 fodder units from mountain/forest grassland.

Since 1989, the Norwegian Centre for Ecological Agriculture has registered crop and milk yields on ecological farms in different parts of the country. These results indicate that if all Norwegian farms were converted to ecological farming, average crop yields would be:

CROP	YIELD, KG/ HECTAR
Grains	3000
Potatoes	25000
Carrots	35000

TYPE OF LAND	NET YIELDS, FODDER UNITS/ HECTAR
Cultivated meadows	3000
Permanent grassland	2000

Milk yields would probably be about 4200 kg per cow per year, when the fodder ration contains 10 % grains and 90 % roughage.

After conversion, we will probably be 4,35 million people in Norway. We will import no grains, whether for food or as fodder concentrates. We will still import some sugar, coffee and tropical fruits, but far less than today. We will probably eat more (wild) fish than today, especially in coastal regions.

After conversion, we have to eat less animal products and more plant products. I assume the yearly intakes will expand as follows:

Grains: 77 kg per capita today, 105 kg per capita after conversion
Potatoes: 85 kg per capita today, 130 kg per capita after conversion
Vegetables: 51 kg per capita today, 80 kg per capita after conversion

For practcal reasons, all vegetables are calculated as carrots.

All organic materials must be recycled, either as fodder for pigs or hens, or as fertilizers for cultivated land. Water closets must be replaced by mulching toilets. I assume that 50 % of the fodder for the pigs after the conversion will come from recycling.

I have not tried to figure out how Norway can become self-sufficient with food produced by renewable energy such as horses, hydrogen produced by solar energy, rape seed oils etc. If Norway decides to sell no more fossil fuels, and instead uses the Norwegian oil for agricultural production and necessary transport, we will probably have enough energy to maintain the same mechanical level in agriculture as today for a very long time.

Calculations

Based on the yields and needs for plant production for human consumption described in the assumptions, each average farm must grow 2 hectars of grains, 0,3 hectars of potatoes and 0,15 hectars of vegetables. Then, 6,55 hectars of cultivated land are left for fodder production. The total fodder production on the average farm will be 6,55 hectars x 3000 fodder units plus 2 hectars x 200 fodder units, that is 23.650 fodder units. In addition, 7400 fodder units can be harvested from mountain/forest grassland.

The fodder requirements for different alternatives of animal keeping has been calculated. Sheep make very efficient use of the mountain/forest grassland. Milk production is the most efficient way to change roughage into food for humans. Therefore, these productions are the most important after conversion. Each average farm has these animals:

14 ewes with 23,8 lambs (1,7 lamb per ewe)
Four milk cows, two calvings in spring, two calvings in autumn, all calves are slaughtered in autumn (being 6 or 12 months)
One milk goat
1/4 sow with 3 3/4 piglets each year
20 hens or 1/2 horse.

The amounts of animal products for human consumption will be as follows:

Milk delivery from each cow is 4000 kg per year (200 kg for the calf), altogether 1600 million kg per year. Today's production is about 1750 million kg per year, but today we export some cheese because of surplus milk production. This means, Norwegians can have approximately the same consumption of milk products as today after the conversion.

The meat production today and after conversion will be:

TYPE OF MEAT	TODAY'S PRODUCTION mill. kg	PRODUCTION AFTER CONVERSION mill. kg
Lamb	24,2	40,5
Beef (cattle)	83,3	57,6
Goat's meat	0,3	0,1
Pork	91,5	30,0
Poultry	23,5	1,0
(possibly horsemeat	0,9	0,6)
TOTAL	224,5	129,5

The meat production will be reduced to 58 % of today's production. This means, each Norwegian can eat approximately 30 kg of meat per year. Today we eat approximately 55 kg meat per year. Eventually we can reduce meat consumption to 22 kg per person per year, which would be a sustainable level according to the Friends of the Earth, Netherlands. Then 35 million kg meat can be exported each year.

If we choose to have hens, not horses, and each hen produces 250 eggs per year, we will have a total of 500 million eggs. Today we consume 800 million eggs per year, this means the egg consumption must be halved after conversion, to 115 eggs per person per year.

Conclusions and a short discussion

The calculations show that we will have enogh food after conversion. We might even export meat to justify the import of sugar, coffee etc. The food production will be ecological, and self-sufficient exept for the use of fossil fuels. Compared to the conventional agricultural production and society of today, which is based on imports of fertilizers, pesticides and grains especially for human consumption, it is striking how much food we will be able to produce on Norwegian land resources.

But the conversion depends on a serious change of mentality and behaviour not only among farmers, but among all Norwegians. We might have to bring about big changes not only with respect to what we eat, but also where we live, how we earn our living, how much we are engaged in producing our own food etc. All these changes may seem too difficult to realize. Even so, I hope this calculation can have a positive effect by showing that it is possible even in stony, cold Norway to become self-sufficient in food. Food is the most basic need for every living creature, and people will be willing to accept radical changes to get enough food for themselves and their children. It might very well happen that today's surplus of food for international sale will diminish. Then we have no choice but to produce our own food, or to starve.

For practical reasons, the national borders of Norway were used in this calculation. It may very well be that we could obtain regions transcending national borders which could more easily become self-sufficient than Norway on the whole and alone.

How can we achieve fair food prices?

Fair food prices can not be achieved until the gap of injustice between northern wealthy countries and southern poorer countries is closed. Then prices and production costs will become lower in, for instance, Norway. Market prices have to cover production costs and payment for work on the largest and most effective farms. Surplus production and labour costs on smaller and less efficient farms have to be covered by subsidies. Subsidies also have to pay for official benefits such as a more interesting, diverse and beautiful landscape, the farmers' traditional knowledge of survival by using local resources, possibilities of work and income and other benefits which agriculture produces. Custom barriers built up around Norway, Sweden and Finland for instance, can provide a local region of competition inside the barriers, protected from competition from outside the barriers.