Structural analysis of cattle farming and its development in the Entlebuch UNESCO Biosphere Reserve

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Abstract

As Switzerland is not a member of the European Community, it pursues its own agricultural policy, which imposes a higher competitiveness while maintaining multi-functionality and a stepwise approach to European conditions. State subsidies to support agriculture are above the European average. Contributions are primarily linked to grassland farming, animal welfare and nature protection. The Entlebuch UNESCO Biosphere Reserve (UBE) is a mountain grassland region with particularly unfavourable topographical and climatic conditions. 76.5% of the farms operate on a full-time basis. The average agricultural area per farm is only 14.0 ha. Dairy farms have a milk quota of 64,500 kg. Local identification and characteristics favour the production of specialities. The demand for site-dependent effects and achievements (environment, landscape) is high. Alternative cattle farm models (dairy, meat and cattle rearing farms) were defined and their stocking rate, agricultural work unit, gross margin and productivity were calculated.

Keywords: Swiss agriculture, mountain region, livestock systems, sustainable development.

Introduction

As Switzerland is not a member of the EU, it pursues its own agricultural policy (Agricultural report 2004). The agricultural act imposes a higher competitiveness and a stepwise approach to EU conditions. State subsidies supporting agriculture are above the average of the EU. Contributions are primarily linked to grassland farming (acreage) and are coupled with the ecological performance certificate (EPC). Ecological compensation areas must make up at least 7% of cultivated farm area and animal welfare has to be respected. In addition, a number of protective tariffs on feedstuffs and meat are still in force, resulting in a high degree of self-sufficiency. According to WTO negotiations, Switzerland is obliged to cut back tariffs, reduce product bound internal measures of support and on a medium and long-term basis, phase out any form of export aid. These measures will substantially decrease the farm income as Swiss agriculture is characterised by small-scale structures in a high-cost context. High priority is given to increasing productivity and efficiency as well as to improving production systems.

Material and methods

Data on agricultural structures and zones, livestock, farming and production methods and agricultural work units (AWU, man-year) were taken from BFS (2004) and AfS (2004). Five alternative farming models operating under the same environmental conditions (Eggimann, 2003; Hausheer and Meier, 2003) were defined. The typical full-time farm is a grassland dairy farm situated, in a mountain area zone 2, and cultivating an area of 15.25 ha, with a milk quota of 64,500 kg ha^{-1} (ZMP, 2004). The livestock consists of 13 cows and 10 heifers and pigs. As all farms are managed according to nutrient balance e.g. Swiss balance (Walther *et al.*, 2001), livestock systems and not farming methods (e.g. organic farming) were compared. The labour requirement, the amount of subsidies, the gross margin and from this the agricultural output were calculated (BETVOR and DBKAT, 2004). The dairy farms produce non-silage milk. The other model farms are supposed to make silage. The high structural and labour costs of these small structured farms were not considered.

Results and discussion

76.1% of the farms in the UBE are managed as a main-earning holding. The average agricultural area (14 ha) is 25% lower than in other Swiss mountain regions. AWU, milk quota (64,500 kg a^{-1}) and number of cows per farm are similar to the Swiss average. Extensively used meadows and pastures make up 7 % of the agricultural area. In addition, the farms manage 7.7 ha of forest. 60% of the agricultural areas are steep slopes reaching an inclination of 18- 35% which involves a high working intensity. Most farms (94%) have breeding cattle, 48% of them have pigs, 24% have sheep and 18% have goats. Most of the cows are dairy cows and only 10% are suckling cows.

Alternative 1: A dairy farm with pig production requires an AWU of 1.43. This farm type results in a high stocking rate of 1.7 LU ha^{-1}. In order to maintain the nutrient balance, 140 kg of phosphorous must be exported. The part of total income (gross margin + subsidies) stemming from animal production can be as much as 64 % which is higher than alpine pastures diary farms (A2, Table 1). Total income per livestock unit (LU) is the lowest of all the livestock farm types. Milk productivity (kg ha^{-1}) is low compared to average Swiss figures (Gazzarin *et al.*, 2004).

Table 1. Income and productivity for a model dairy-farm in comparison to alternatives (A 2-5) in a Swiss mountain region (Entlebuch UNESCO Biosphere Reserve).

Production system	A 1 Dairy farm	A 2 Dairy farm	A 3 Beef farm	A 4 Cattle rearing farm	A 5 Veal farm
Gross margin (€)	43,588	30,348	14,263	15,947	23,909
Percentage of total income (%)	64	50	30	33	41
Acreage subsidies (€)	15,635	15,635	15,635	15,635	15,635
Subsidies linked to animal production and welfare (€)	9,033	14,393	18,219	16,748	18,578
Income AWU^{-1} (€)	47,731	35,725	74,020	63,311	40,084
Income LU^{-1} (€)	2,610	2,614	2,872	3,059	3,142
Milk productivity (kg ha^{-1})	4,230	2,544			
Meat productivity (kg ha^{-1})			378	279	479

Alternative 2: Dairy farms with alpine pastures can graze their cattle on alpine pastures along with some boarder animals from lowland farms for almost 100 days which entitles them to additional subsidies. The stocking rate of 1.0 LU ha^{-1} drops to the lowest level of all alternatives. As labour input is higher, the AWU of 1.69 surpasses the other alternatives. 50% of total income comes from animal products. Income per work unit (AWU) and productivity are the lowest. This type of farm is linked with additional costs for infrastructure (e.g. alpine stables, roads).

Alternative 3: A beef farm with suckler cows coincides with a low stocking rate (1.1 LU ha^{-1}). This model requires the least labour input (AWU 0.65) and results in the lowest total income, but when relating it to AWU, the beef farm has the highest income with 30% of total income being derived from animal products. Thus, this production system strongly depends on subsidies.

Alternative 4: Cattle farms with rearing cattle need less AWU (0.74) than dairy farms and the stocking rate of 1.04 LU ha^{-1} is also lower. The contribution of animal production to total income is comparable to A3 and the income per work unit is quite high.

Alternative 5: A veal farm fattens the calves using cows milk (1,000 kg) and milk replacer (50 kg). The AWU is slightly higher than in a dairy farm. Animal production makes up 40% of total income. A high income per LU is attained. This farm type reaches the highest meat productivity (weight gain ha^{-1}).

Conclusions

Dairy farms generate a high total income, 50 % to 65% stemming from animal production. The required AWU is high compared to A3 and A4. Grassland farming with suckling cows and rearing cattle have a low stocking rate which is ecologically advantageous. These alternatives farming types generate a very

high income per hour. However, total income strongly depends on subsidies. As the AWU is low, a subsidiary income can be maintained.
Co-operation, particularly with respect to farm mechanisation, or a change from conventional grassland farming to organic farming becomes very important. The efficiency of all alternatives mentioned above must improve due to rising competition.
Sheep and goat farming is still of minor importance. Nevertheless, sheep and suckling cows are increasingly brought to alpine pastures as less rearing cattle is available from lowland farms.
It is important that possibilities for subsidiary income, for instance from winter and summer tourism supported by regional development policies, exist in regions like the UBE.
In 2009, the milk quota regulation will be abrogated and subsidies for cheese production will decrease. This will favour milk production in regions with more favourable climatic and topographic conditions. The production of local specialities and labels - dairy and meat products – and selling them on Swiss or neighbouring markets with the brand "Origin from Entlebuch Biosphere Reserve" is a promising prospect for mountain regions like UBE. Labelled products have a higher added value and obtain a higher price. Dairies and farmers will thus obtain additional income from their products.

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