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Abstract. The Entlebuch UNESCO Biosphere Reserve (UBE) is situated in the northern foothills of the Swiss Alps. It consists mainly of grazed grassland and designated nature or landscape conservation areas. In 2004, the Cantonal Government and the Agricultural Credit Bank funded the "Entlebucher Milk" project, an advisory programme initiated with the objective of keeping jobs and agricultural added value within the UBE. In 2012 the project included 914 mountain farms with an average area of 18.2 ha; 504 dairy farms produced 47.8 million kg of milk. Of that, 31.5 million kg of milk was processed by eight cheese factories located in the Entlebuch region. The factories produced an Emmentaler "big-whole" cheese from ensiled feed milk, a traditional Emmentaler AOC-certified (Appellation d'Origine Contrôlée), and Sbrinz AOC. Only 7% of the produced milk was processed into milk specialities. In 2008, the participating farms produced 32.5 million kg of farm animal carcasses. Six local slaughterhouses butchered a share of the animals. In 2013, various processing enterprises established a common marketing company. The production of milk and meat specialities, as well as the merchandising of the brand "Origin Entlebuch," are promising prospects. Bottom-up approaches and participatory decision making are raising stakeholder awareness of how economic benefits can be optimised while considering ecological conditions for sustainable development. Targeted subsidies, such as those for the Entlebucher Milk project, can be an important tool to maintain added value in fringe regions such as the UBE.

Keywords. Swiss mountains – Agricultural added value – Dairy and meat industry jobs – Targeted subsidies.

Développement rural et création de valeur agricole dans la Biosphère UNESCO d'Entlebuch en Suisse

Résumé. *La Réserve de Biosphère UNESCO d'Entlebuch (BUE) est située sur le versant nord des Alpes suisses. Elle est principalement constituée de prairies pâturées et de zones de réserves naturelles. En 2004, l'Etat Cantonal et la Banque d`Agricole ont financé le projet public "Lait d'Entlebuch". Ce programme de vulgarisation a été initié dans le but de maintenir des emplois et de créer de la valeur agricole dans cette région. En 2012, le projet comprenait 914 fermes de montagnes avec une surface moyenne de 18.2 ha. Les 504 fermes laitières ont produit une quantité de 47.8 million de kilo de lait, dont 31.5 million de kilo ont été affinés en fromage par les huit fromageries artisanales de la BUE. Les fromageries ont produit de l'Emmenthal AOC, célèbre pour ses "gros trous", de l'Emmenthal à base de lait d'ensilage et du Sbrinz AOC. Seul 7% du lait produit fut transformé en spécialités laitières. En 2008, les fermes de la BUE ont produit 32.5 million kilo de carcasse et six boucheries artisanales découpaient la viande dans la BUE. En 2013, plusieurs entreprises de transformation artisanale ont fondé une coopérative de commercialisation. La production de spécialités de viande et de lait, ainsi que la vente ses produits sous l'appellation "Appellation d'Origine d'Entlebuch", semblent prometteuses. Les approches de bas-en-haut et participatives augmentent la conscience des participants sur la manière d'optimiser leurs bénéfices économiques, tout en considérant les conditions écologiques de leur développement durable. Les subventions ciblées, comme le projet "Lait d'Entlebuch", peuvent jouer un rôle important pour le maintien de l'emploi et pour la création de valeur agricole dans des régions éloignées, comme la BUE.*

Mots-clés. *Montagnes suisses – Création de valeur agricole – Filière laitière et viande – Emploi – Subventions ciblées.*

I – Introduction

Peripheral regions are particularly challenged (Hofstetter *et al*., 2007) by factors such as economic weakness, and the adoption of agricultural policies (Lanz, 2012; FOAG, 2014) such as the Swiss Agriculture Policy 2014-2017, the free trade agreement with the EU, and WTO negotiations. Subsidies play an important role in the agricultural income of farmers (Hofstetter, 2010).

The Entlebuch UNESCO Biosphere Reserve (UBE) is a fringe region situated in the northern foothills of the Swiss Alps. In 2008, 31.1% of the 9,245 employees in the UBE worked in the primary sector, 29.6% in the secondary sector, and 39.3% in the tertiary sector, compared with 4.2%, 25.3%, and 70.5%, respectively, among the working Swiss population (Lustat, 2012).

Over the past 10 years, farmers in the UBE have increasingly changed their livestock systems from dairy to beef production and shifted their conservation system from hay to silage. Therefore, small cheese factories that mainly produced silage-free cheese lacked a sufficient supply of milk. Consequently, their efficiency was lower and they were not able to generate a competitive milk price. Some businesses closed, jobs were lost in the region, and more milk was processed in larger, more remote creameries outside the UBE. In 2004, the Agricultural Credit Bank and the Cantonal Government of Lucerne funded the "Entlebucher Milk" project (2005) with the objective of retaining agricultural added value within the UBE. Based on market analysis, the study advised small cheese factory co-operatives to merge; optimise their milk logistics; produce softer, semi-hard goat and sheep cheeses or organic products; and to merchandise these as branded products. The inevitable questions arise of: (i) whether the recommendations of that study have been implemented; and (ii) whether this state-funded targeted project helped to retain added value in the UBE.

II – Material and methods

The UBE comprises an area of 394 km^2 situated in the foothills of the Northern Swiss Alps, a Pre-Alpine region. Its agricultural (30.2%) and alpine (18%) zones consist mainly of grazed grassland, or designated nature or landscape conservation areas with high biodiversity (Coch *et al*., 2009). The main production systems are dairy farms, summer fattening and cattle-rearing farms are increasing in number.

During the vegetation period from April to November, grazing systems, in combination with housing, are predominant on lowland farms. In the main valley, most cheese factories produce traditional hard cheeses from raw bovine milk. Some of the farms are moving their young cattle to Alpine farms for summer grazing. Data and trends were taken from Lustat (2012), Central Milk Producer` association (FOA, 2013), Gottlieb Duttweiler Institute (GDI, 2013), and Federal Statistical Office (FSO, 2013).

III – Results and discussion

1. Development of the agriculture farm structure

The numbers of agricultural employees, operational farms, and the gross value added (*i.e.* production value minus preparatory efforts) decreased from 2000 to 2012 (Table 1). In 2012, 93% of farms in the UBE kept cattle, and 36% produced pigs; mostly in addition to dairy farming. In 2000 and well in 2012 within the UBE, there were fewer organic farms compared to the Swiss average, partly due to the high levels of stock in the main valley of Entlebuch and the existence of only two organic cheese factories.

Therefore, most organic milk is sold outside the region. In 2011 and 2012, the UBE included 504 dairy farms with milk production capacity of 42.4 million kg. The average annual milk production per regional dairy farm was low compared to the Swiss average of 135,308 kg.

Table 1. Agricultural facts for the UBE and Switzerland in 2000 and 2012

Year	UBE		Switzerland	
	2000	2012	2000	2012
Persons employed (>75%)†	1,301	900	95,595	72,633
Number of farms	1,096	914	70,537	56,575
Of which full-time farms, %	73	70	70	71
Of which organic farms, %	3	5	7	10
Dairy farms††	632	504	38,082	24,972
Dairy farm size, ha†††	14.8	16.9	19.1	23.8
Merchandised milk, kg/farm††,†††	79,030	84,851	81,691	135,308
Merchandised milk, kg/ha†††	5,340	5,111	4,278	5,696
Merchandised milk, kg/cow†††	4,939	5,110	4,994	6,161
Gross value added, EUR Mio.††††	86	58	452	312

† Full-time labour; part-time job is less than 25%. †† Dairy farms within the UBE in 2007/08; ††† Data in 2012 for the whole mountain region in the Canton of Lucerne; †††† UBE data were calculated from those for the Canton of Lucerne.

2. Development of the processing companies

In 2004, 23.1 million kg of milk was processed in the UBE and 15.1 million kg was sold outside the region. Although the number of cheese-producing co-operatives decreased from 14 in 2004 to 8 in 2012, the average amount of milk processed per factory and the total amount increased (Table 2), mostly because of the consolidation, whereby smaller co-operatives had combined to form fewer factories in larger scale ones. In order to retain added value within the region and reduce transport costs, a new dairy factory was built in a remote part of the region, which has processed about 16 million kg of ensiled feed milk for an Emmentaler “big-hole” cheese. Only about 7% of the produced milk was processed into milk specialities. In 2012, twelve companies marketed certified milk and cheese specialties under the label “Origin Entlebuch.”

Table 2. Facts of the dairy industry in the UBE from 2004 to 2012

	Cheese factories [nos.]	Former milk quota, new average supply with contract per annum [kg]	Total milk processed per enterprise [kg]
Cheese factory co-operatives, 04/05	14	23,100,000	1,650,000
– producing other cheese specialities	8	1,850,000	231,250
Cheese factories, 2007/08	11	28,052,143	2,550,195
– producing milk specialities	12	~ 3,000,000	Partially certified
Cheese factories, 2001/12	8	34,250,306	4,281,289
– producing milk specialities	6	~ 3,500,000	Partially certified

Farms within the UBE produced about 3.3 million kg of animal carcasses, consisting of 1.9 million t cattle, 1.3 million t pig, and 0.1 million t of small cattle, wild animals and chicken etc. (Vogel, 2010). The small slaughterhouses butchered animals and treated the meat to produce specialties for selling over the counter and offered party services. Three slaughterhouses were processing an increased quantity of meat. A high share of the carcasses was processed elsewhere. In 2013, a new trading company was established by 15 enterprises (Echt Entlebuch, 2014) in order to boost marketing by offering an attractive aggregate supply of food specialties from the UBE.

3. Impact of the study

Structural reforms in the cheese factories were carried out as proposed in the Entlebuch Milk study. Milk logistics have been optimised by building a new cheese factory in a remote part of the valley, and through an increase in branded specialities. These specialities generate higher added value even though they require more labour input than traditional food production. It is a great challenge to develop and merchandise food specialities through new marketing channels, and is essentially dependent on dynamic entrepreneurship. For small- and medium-sized companies, well-educated and constructive cheese and meat manufacturers play a key role.

Contrary to the study's proposition, there was no increase in organic farming and its products. In summary, this targeted, state-funded program helped to retain greater added value within the UBE.

IV – Conclusions

As a result of measures to promote entrepreneurship, the new cheese dairies seem able to generate competitive milk prices and to effectively market their specialities. Although jobs and added value declined in the primary sector, new jobs were created in manufacturing and added value was retained within the region. In an environment of rising public debt, government spending and its outcomes should be monitored. In this study, we have shown that targeted subsidies can be an important tool to maintain added value in fringe regions such as the UBE. However, the main entrepreneurial initiative has to arise from the stakeholders.

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