

On farm fruit processing – an alternative for improving income situation on Slovene fruit farms

Obstverarbeitung am Bauernhof - eine Alternative zur Einkommensverbesserung bei Obstbauern

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Zusammenfassung

Die Verarbeitung der verschiedenen landwirtschaftlichen Erzeugnisse verbessert das Einkommen, die Lebens- und Arbeitsbedingungen. Die Erzeugung der verschiedenen Eigenprodukte (Schnaps, Apfelsaft und Apfelessig) öffnet eine neue Möglichkeit und trägt zur Existenzsicherung der Bauernhöfe bei. In dem Artikel werden zwei traditionelle Obstprodukte analysiert: Apfelsaft und Apfelessig. Mit der Anwendung eines Simulationsmodells wurden ökonomische Indikatoren der beiden Produktionen berechnet. Die Resultate zeigen, dass die Alternative der Verarbeitung des Obstes bessere finanzielle Resultate bringt als der Verkauf an die Verarbeitungsindustrie. Trotzdem gibt es in der Praxis viele Hindernisse und Probleme für die Obstbauer: hoher Administrationsaufwand, lange, legislative Prozeduren und eine sich ständig ändernde Rechtslage.

Schlagworte: Obstverarbeitung, Simulationmodels, SWOT Analyse

Summary

Supplementary activities contribute to the improvement of agricultural income and consequently of better working conditions and higher living standards. They ensure a continued agricultural land use and thereby contribute to the maintenance of a viable rural community. The home fruit processing as a supplementary on-farm activity is discussed here as a tool for improving income on Slovene fruit farms. Two

types of fruit products are introduced – apple vinegar and apple juice. Economic indicators, derived by simulation modelling, show that home fruit processing is more profitable than simply selling fruits to fruit processing industry. In practice, however, Slovene farmers meet many obstacles, such as long-lasting procedures, a bulk of administrative work and constant changes in legislation referring to this field.

Keywords: supplementary activities, on farm fruit processing, simulation models, SWOT analysis

1. Introduction

Fruit production in Slovenia contributes merely 3.5 % to Gross Agricultural Output (GAO), but nevertheless it is one of most prosperous production orientation in Slovenian agriculture. Furthermore, the fruit production is one of the few agricultural branches where no income decline after EU accession is expected. On the other hand, unfavourable size and production structure of private farms in Slovenia hinders fruit growers to achieve sufficient income levels. Likewise, each season due to inability to meet quality requirements a considerable share of fresh fruits cannot be sold in the market. These fruits can either be sold to fruit processing industry or can be processed directly on the farm (e.g., on-farm supplementary activity). Prices achieved for home made fruit products such as brandy, dry fruits, vinegar and cider are much higher than prices of fruits sold to the fruit processing industry. Several supplementary activities on fruit farms; most notably home fruit processing are being encouraged by Slovene agricultural policy makers. However, the vague and insufficient legislation hinders a further efficient development of home fruit processing. The main objective of this paper is to examine possibilities for home fruit processing and its economic impact on the performance of individual fruit farms. Two types of home fruit processing (apple juice and apple vinegar) are discussed here.

2. Overview of on-farm supplementary activities in Slovenia

In terms of Gross Domestic Product (2.9 percent in year 2000), employment (5.6 percent in year 2000) and export earnings, agriculture

has a relatively modest place in the Slovenian economy. However it has a fundamental role as an economic and social stabilizer, meaning that the sector as a whole is of a great strategic importance.

According to data of the Census of Agriculture, carried out in June 2000, there are 96669 individual agricultural holdings and 132 agricultural enterprises in Slovenia. The average size of utilised agricultural area (UAA) of private farms and agricultural enterprises is 4.8 and 220.7 hectares, respectively. The most common size of agricultural holdings is between 1 and 4 hectares UAA. The number of agricultural holdings with more than 10 hectares of UAA is increasing. Agricultural holdings use 517932 hectares of agricultural area, which is 3.5% more than at the 1999 Sample Survey of Areas Sown. According to data of the 2000 Census of Agriculture, there are more orchard plantations (by 16.3%), permanent grassland (by 5.4%), vineyards (by 4.2%) and arable land (by 0.9%) than in 1999 (SURS, 2002).

In Slovenia almost 5000 agricultural holdings are engaged in intensive fruit growing. They grow various varieties of fruit trees on slightly less than 5250 ha of land. 72.8% of the area of orchard plantations is cultivated and maintained by family farms, with the average size of the orchard plantation of 0.7 ha per farm. The structure of fruit varieties in orchard plantations in Slovenia is rather one-sided. As regards total and fertile area, and even more as regards total and fertile trees, apple trees absolutely predominate (1,8 million fertile apple trees), followed by peaches, olives and pears, while the shares of other varieties are almost negligible (SURS, 2002).

Just under 6% of the Slovene family farms are engaged in some sort of supplementary activities. Among them, three activities predominate: services with agricultural machinery, food processing and wood processing. Relatively widely developed are also farm tourism and cottage industry.

Predominant types of supplementary activities differ significantly between regions. The difference can probably be attributed to specific local conditions for development of individual activities (natural resources, spatial characteristics, proximity of markets). The share of family farms with supplementary activities rises with the size of the farm. Nevertheless, more than a half (54%) of family farms engaged in

supplementary activities are farms with 1 - 5 ha of UAA. Additional 25% of supplementary activities take place on family farms with 5 - 10 ha of UAA. The probability that a family farm will decide for engagement in a supplementary activity grows with additional labour force input on the family farm. However, also in this case most supplementary activities are registered on family farms with 1 to 2 annual work units (AWU), which represents 81% of all family farms engaged in supplementary activities (SURS, 2002).

One of the most typical problems of Slovene agricultural sector appears also here - insufficient farmers education, which is in most cases prerequisite for using the available sources of financing. As far the level of school education is concerned, holders of family farms differ considerably from the average of the labor force in Slovenia. According to SURS (2002), 38% of holders have vocational or upper secondary education and 59% have elementary education or are without formal education. Deriving from the criterion of formal agricultural education achieved, the situation as regards professional qualification of holders is even less favorable. Only 15% of them have finished at least one of the programs of agricultural education.

The development of supplementary activities is recognized as a necessity for the long-term viability and survival of farm business in Slovenia. The core of this kind of development are innovative ideas suggested by entrepreneurial farmers. Local specifics of rural regions are incorporated within existing on-farm activities in Slovenia - cottage industry like pottery-making, farm tourism and food processing. Supplementary activities can be described as a tool for improving income in one way and they emphasize on employment-opportunity creation on the other way. Unfortunately, there is no statistical data available about economic impacts of these activities in rural areas on farm business and consequently their prospects for sustainable growth. Likewise, evaluation of local/regional institutions and legislation impact have not been studied yet. Economical and social security for small farmers can be achieved by employment outside agricultural sector or by implementing supplementary activities. In last few years, some self-employment projects in rural areas have been going on in Slovenia. The field of home processing and marketing of food products was

recognized as an important job-creation opportunity. Activities were organized to support development of supplementary activities and support services on farms.

2.1 The impact of legislation necessary for fully implementing the home fruit processing

Slovenia started to implement its own agricultural policy in 1991. Most policy measures are compatible to the EU measures and harmonized with “the IV. Pillar of agricultural policy reform” - with emphasis on the multifunctional role of agriculture. In the program called “Rural development” - the main goals are measures for achieving the economical diversification in rural areas with supports for alternative sources of income, added value of products and innovative programs for economic development and landscape management.

To strengthen the role of the countryside, “Rural Development Program (CRPOV)” was introduced in nineties and has greatly contributed to the systematic approach to development issues in the countryside. By implementing the “Law of agriculture” in year 2000, bases for legislation of on-farm supplementary activities were created and defined. Activity holders are not necessarily just owners or leaseholders of the farms, but also the family members living and working on the farm. The extent of these activities is limited by the income, which can reach 1.5 and in less-favoured areas maximum 3 average salaries per employee in Slovenia. For fruit processing there are some specific demands defined by special regulations. For performing food processing the peasant must assure minimum 50% of his own yield and in case of especially high loss in the unfavorable season at least 20% of own yield. Regulations also define hygienic and sanitary conditions for performing activities and required education of individual activity holders. Until 1999, Slovenia has been one of few countries with no taxes imposed for home produced strong alcoholic beverages. In 1999, however, the excise duty amounts for brandy produced by small producers were determined. Since then every owner of distilling equipment of volume 40 litres and more has been compelled to report annual brandy production to the tax collector.

There exists a considerable interest on the part of peasant farmers to achieve parity income through home-fruit processing. Nonetheless, farmers emphasize long-lasting procedures, a lot of administrative work and constant changes in legislation which all inhibit their willingness to act in this field.

2.2 The financing of supplementary on-farm activities

The financing and investments when starting supplementary activities are high, and exposed to specific risks in agricultural sector (e.g. climatic variations and price risks) but they lead to improvement and rationalization of processing and marketing of agricultural products and thereby contribute to increasing competitiveness and added value of such products.

Complementary on-farm activities are financed from different sources:

- Partly by the Ministry of Agriculture, Forestry and Food. Its budget contains an expenditure item called "Supports for economic diversification of rural areas – alternative income sources", with the aim of creating new job opportunities for rural inhabitants and development of supplementary activities, especially farm tourism. Supports can reach up to 50 per cent of evaluated investment. Expected budget for this specific item may increase by 10 percent from year 2002 to 2003. The other expenditure item, referring directly to supplementary on-farm activities is called "Supports for restructuring and renovation of agricultural production" where the budget is also expected to rise by 7% in 2003 as compared to 2002 (SURS, 2002).
- partly by Ministry of Economic Affairs ,
- contributions from local institutions,
- funds from the program SAPARD (Special Accession Program for Agriculture and Rural Development), which contains presumption of co-financing of on-farm supplementary activities. AAMRD (Agency for Agricultural Markets and Rural Development) has been accredited as the SAPARD Agency, which will be responsible for implementing rural development measures for Slovene agricultural sector. Individual farmers, local communities and institutions are eligible to apply for SAPARD funds.

In our opinion, Slovene institutions give financial preferences to farm tourism and domestic craft, whereas neglect many other also important types of supplementary activities (food processing, wood processing, etc.).

3. Methods

3.1 Simulation modeling

In order to estimate costs and returns of different types of fruit processing on farms the data on technical parameters must be either compiled or calculated. Since technical parameters vary on different fruit farms, the simple production technologic economic models were used in order to derive enterprise budgets of different types of home fruit processing. The simulation modelling is often used in farm management analysis especially when there is no reliable data on analysed production. The model is, in brief, a simplified image of real system (in this case agricultural production – home fruit processing). Models can be divided into scale models and mathematical models. The farm management scientists tend to employ mathematical models rather than scale models. The origin of simulation modelling comes from the system analysis. The system here is a process of home fruit processing (i.e., apple vinegar production).

The method consists of extracting mathematical equation between elements of a system in order to calculate system outputs. The outputs would be quantities of home fruit products and production costs. However, the method of simulation modelling consists of following steps:

- Problem formulation and definition of the goals of empirical analysis
- The key model development objective in farm management is usually the estimation of costs and returns. In order to do that the farm management researcher needs technical data of a production (inputs used, working time used). This particular type of simulation is referred to as a technologic economic simulation. Alongside the cost analysis other analyses can also be conducted using simulation modelling (for instance biological simulation: calculation of expected yield according to

weather conditions, fertilisation, pest management, etc.). Both types of simulation can also be combined.

- System analysis of the problem under scrutiny

In order to express relationships in the system and express them with mathematical equations the complex analysis of a system is needed.

System analysis of apple vinegar production:

Fruit picking → melting → pressing → alcoholic fermentation → vinegar acid fermentation → filling the vinegar into bottles → marketing

System analysis of apple juice production:

Fruit picking → melting → pressing → pasteurisation → filling the juice into bottles → marketing

- Formulation of the mathematical model

In this stage the relationships between system elements are expressed with mathematical equations. For the farm management analysis the amount of input used (material and working time) must be calculated (technological model) in order to calculate costs in next stage (multiplying results of technological models with input prices). The basis for the calculation of time working are capacities, technological working normatives and special equations in order to estimate product quantity out of basic raw material (in this case fruits). The direct result of such a model is a calculation of operative production costs that represents the basic information for deriving the enterprise budget (calculation of operative production costs can easily be upgraded with corresponding fixed costs).

- Calculation of the model on a computer/computer simulation

A farm management simulation model usually consists of a series of equations. "Hand calculation" of those would be time consuming, therefore, an appropriate computer tool must be applied. In our case, the spreadsheet models were applied.

- Model experimentation

In this stage the actual simulation is going on. Sensitivity analysis is often employed in order to carry out model analysis.

- Result analysis and model verification

In the last stage the model results are compared with “the real world situation”.

3.2 The SWOT analysis

The SWOT analysis represents a tool for auditing internal (strengths and weaknesses) and external (opportunities and threats) factors. After the SWOT analysis is completed, strengths must be built (encouraged), weaknesses resolved, opportunities exploited and threats avoided.

4. Results

4.1 Simulation models

Our model results suggest that higher profits can be earned with home fruit processing than simply selling fruits to the fruit processing industry (see table 1 and 2). Supplementary activities contribute to the improvement of agricultural income and consequently of higher living standards and improved working conditions. They ensure continued agricultural land use and thereby contribute to the maintenance of a viable rural community. Slovene agricultural sector will have to adapt to new realities and further changes in market policy, trade developments and consumer demands. These changes will affect not only agricultural markets but also local economies in rural areas, and one way of successfully resolving this situation would be the implementation of supplementary activities. The issue of supplementary activities on farms and also their impact on farm income does not represent a new phenomena in Slovenia, but a new flourishing wave is to be seen in the last decade in the area of its diversification and extent. But in practice farmers face many obstacles which hinder their successful performance in agricultural market and do not allow them to achieve sufficient income levels.

By assuming that expected prices would be achieved in both cases (vinegar, juice), profits were higher than when simply selling product to fruit processing industry (the financial result for this alternative was

calculated as product of expected fruit price and yield intended for fruit processing). It must also be stressed out here that there is a small difference between processing farm using its own fruits or fruits purchased by other farmers - as a result of the fact that considerable amount of home labor is used when processing farm own fruits.

Table 1: Economic indicators of apple vinegar production

1. Farm fruits (own yield)		
	SIT	EURO
Expected price of the product /l	150	0,66
Total revenue	750000	3298,30
Break even price /l	144	0,63
Financial result	30940	136,06
Financial result when selling to fruit processing industry	-10833	-47,6
Sensitivity analysis		
Different prices	Financial result	
120	-119060	-524
150	30940	136
180	180940	796
200	280940	1235
2. Purchased fruits		
	SIT	EURO
Expected price of the product /l	150	0,66
Total revenue	750000	3298,30
Break even price /l	145	0,64
Financial result	26773	117,74
Sensitivity analysis		
Different prices	Financial result	
120	-123227	-542
150	26773	118
180	176773	777
200	276773	1217

Source: ROZMAN and MAJKOVIČ, own computations, 2002.

Table 2: Economic indicators of apple juice production

1. Farm fruits (own yield)		
	SIT	EURO
Expected price of the product/l	220	0,97
Total revenue	1100000	4837,5
Break even price/l	180	0,80
Financial result	197788	869,8
Gross margin	654974	2880,4
Financial result when selling to fruit processing industry	-10833	-47,6
Sensitivity analysis		
Different prices	Financial result	
150	-152212	-669
170	-52212	-230
190	47788	210
210	147788	650

2. Purchased fruits		
	SIT	EURO
Expected price of the product/l	220	0,97
Total revenue	1100000	4837,5
Break even price/l	181	0,8
Financial result	193622	851,5
Gross margin	504974	2220,7
Sensitivity analysis		
Different prices	Financial result	
150	-156378	-688
170	-56378	-248
190	43622	192
210	143622	632

Source: ROZMAN and MAJKOVIČ, own computations, 2002.

4.2 SWOT analysis

The SWOT analysis was applied to evaluate feasible benefits and drawbacks of farm fruit processing as a on-farm supplementary activity.

Strengths:

- The peasants awareness of the possibilities offered by implementing supplementary activities,
- positive experiences by on-farm supplementary activities holders,
- existing food-processing infrastructure,
- starting of common approach to marketing,
- existing knowledge of traditional skills (i.e., domestic craft),
- available labour force,
- existing machinery on farms,
- existing food trade marks ("Biodar", "Pohorje beef", "Dobrote izpod Pece"),
- existing farm tourism,
- increasing government investment in rural development.

Weaknesses:

- Long-lasting procedures of registration for supplementary activities,
- high initial investments,
- lack of producers' market knowledge,
- lack of cooperation at all levels in the product chain,
- limited local markets,
- high costs of distribution – long distances from centers,
- low educational level of peasants,
- there is no tradition of transferring farms to younger generation and early retirement schemes,
- unfavourable average size of farms, aggravated working conditions,
- there is no unified data base about agricultural and forestry activities,
- shortage of efficient marketing service from farm gate to market end-user.

Opportunities:

- Establishment of regional centres for education and qualifying of rural inhabitants,
- farmers introduction to computer skills,
- collaboration of various rural regions in establishing common processing units, marketing approach and services,
- establishment of institutions/organizations for developing and marketing of new agricultural products,
- linking, supplementing and upgrading the various financial instruments from different levels,

- integrating farmers into rural development programs,
- development and integration of existing data bases,
- growth in market demand for home-made produced food.

Threats:

- Constantly changing legislation and regulations considering on-farm supplementary activities,
- restrictive conditions for performing supplementary activities,
- ensuring peasants' own funds.

5. Conclusions

Both types of home food processing (apple vinegar, apple juice) appear to be economically viable, providing that these products are sold by (expected) market prices. Thus, favorable economic results coming out of home fruit processing are closely interrelated with the appropriate (effective) marketing approach. An interesting finding of this research is that current legislation inhibits the full implementation of home fruit processing in Slovene circumstances.

In future, an efficient data system must be established. The other important issue which is necessary for achieving positive results, is to set up an effective monitoring system. Also the improvement of peasants' educational level is necessary.

Supplementary on-farm activities are recognized as the self-employment opportunity for rural inhabitants. To achieve this goal effectively, production and marketing network among farmers should be established. Marketing of farm products can be seen as one of the major problems mainly due to the small-scale production on private farms. To overcome these obstacles, development of a brand mark for all food products in specific areas and marketing services, including the facility for packaging and quality control, should be made. Slovenia has a long tradition of extension services in agriculture and forestry. These two services should set up contacts with other public services, which is really "a must be condition" for an efficient regional development policy.

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